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REPORT

OF THE

COMMISSIONER OF PATENTS

FOR THE YEAR 1852.

PART I.

ARTS AND MANUFACTURES.

CONTENTS.

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LETTER

FROM

THE COMMISSIONER OF PATENTS,

TRANSMITTING

His Annual Report.

MARCH 1, 1853.—Ordered to be printed.
MARCH 3, 1853.—Ordered that 17,000 additional copies be printed for the use of the Senate

UNITED STATES PATENT OFFICE,
February 28, 1853.

SIR: I have the honor of transmitting to you, as required by law, that portion of the Report of this Office, for the year 1852, which relates to Arts and Manufactures. The delay which has occurred in presenting it, and some deficiencies which might otherwise have been supplied, must be attributed to the recent period at which I entered upon the duties of this post, and the very urgent nature of the business which has meanwhile devolved upon me.

I have the honor to be, very respectfully, your obedient servant,

SILAS H. HODGES.

Hon. DAVID R. ATCHISON,
President pro tem. of the Senate.

REPORT

OF THE

COMMISSIONER OF PATENTS.

I.

FINANCIAL TRANSACTIONS.

UNITED STATES PATENT OFFICE, *January*, 1853.

The financial transactions of the Patent Office during the preceding year will be sufficiently exhibited by the following statements:

1. *Statement of moneys received at the Patent Office during the year* 1852.

Received on applications for patents, reissues, additional improvements and extensions, and on caveats, disclaimers, and appeals	$104,485 00
Received for copies and recording assignments	7,571 34
Total receipts	112,056 34

2. *Statement of expenditures and payments from the Patent fund during the year* 1852.

For salaries	$36,674 23	
For compensation of librarian	397 82	
For temporary clerks	18,992 93	
		$56,064 98
For books for the library		597 63
For contingent expenses		13,037 98
For agricultural statistics and purchase of seeds		4,831 33
Total expenditures		74,531 92
Refunded on withdrawals	$21,159 99	
Refunded money paid by mistake	225 00	
		21,384 99
Total payments		95,916 91

Leaving a balance of receipts over payments of	$16,139 43
If this balance is added to the Patent fund on hand January 1, 1852	24,152 95
The sum, which is	40,292 38

is the amount of the Patent fund, January 1, 1853.

The payments to the temporary clerks have been unavoidably increased during the year in consequence of the increase of business, rendering the employment of additional force necessary in several departments. According to a practice which has been long sanctioned, this additional force has been compensated under the provision for temporary clerks. The contingent expenses have also been somewhat augmented from the same cause. The only other item which has been enlarged materially is that of salaries, and this is to be accounted for by the addition to the corps of examiners made during the preceding year. The additional examiners began to receive their pay, it is true, during that year, and this item appeared larger, for that reason, in the last Report than ever before; but it was not till the year 1852 that they drew their full annual salaries, and consequently the amount is larger still in the above statement.

It should be observed that, though the expenditures, $95,916 91, are greater than those of the preceding year, which were $86,916 93, the receipts have more than kept pace with them: those of 1851 being only $95,738 61; those of 1852, $112,056 34. The difference in the expenditures of the two years is $8,999 98; of the receipts, $16,317 73. Last year the surplus of expenditures over receipts, which was carried to the credit of the Patent fund, was $8,821 68; this year it is $16,139 43. These statements will, it is believed, evince to the satisfaction of every one that the increase of business fully justifies the increase which has taken place in the expenditures.

A more correct apprehension as to the amount of receipts and expenditures for each year may be obtained by deducting the sums refunded on withdrawals, and for moneys paid by mistake. With this correction, they would stand thus:

Receipts in 1851	$81,160 72
Expenditures	72,339 04
Surplus	8,821 68
Receipts in 1852	$90,671 35
Expenditures	74,531 92
Surplus	16,139 43

The moneys thus refunded were never really available to the Office; nor is the payment of them any part of its proper expenditures. As the largest portion of the withdrawals, however, is on account of fees paid during former years, the subject is not susceptible of being followed up so as to attain perfect accuracy.

Office labors.—The extent of the business transacted in examining applications, granting patents, and the like, may be gathered, in some measure, from the following:

3. ***Statement of applications received and under consideration during the year* 1852.**

Cases on the examiners' desks, January 1, 1852	155	
Applications received during the year	2,639	
		2,794
Patents issued during the year	1,020	
Applications on hand not acted upon	481	
Rejections and suspensions	1,293	
		2,794

Included among these were—	
Patents reissued	18
Additional improvements	4
Extensions	3
Designs	107
There have also been filed—	
Caveats	996
Disclaimers	2
The number of patents expired during the year is	525
None have been extended by Congress.	

These statements fall far short of exhibiting the amount of labor performed in this department. An application is rarely disposed of before it has received at least two thorough examinations. Most of them receive more, not a few as many as six. The 1,020 patents issued, and the rejections and suspensions, stated at 1,293, (both amounting to 2,313,) will probably cost not less than 7,000 examinations. These have not all taken place within the year, it is true; some of them were made previously, some are yet to be made. Against these may be reckoned the numerous examinations of cases entered during previous years, and not yet disposed of. The task is rendered more onerous in consequence of the investigations being extended over such a length of time; the cases of an early date being no longer familiar to the mind, but requiring something of the care and labor of so many new ones. Many of them are in fact new to the examiners, from the frequent changes which have lately occurred in their corps.

Deducting the number of cases on hand at the beginning of the year (155) from those on hand at its close, (481,) the Office will be seen to have fallen in arrear to the number of 326. This does not equal the increase in the number of applications received during the year (2,639) over those received the year previous, (2,258,) which is 381. The caveats have also risen from 760 to 996. They do not, it is true, require to be investigated like an application. But no patent is ever issued until the caveats are thoroughly searched, lest it should conflict with some of them. Any marked addition to their numbers involves, therefore, an addition to the labors of the examiner.

That which has mainly contributed to augment the number of cases on hand, is the resignation of three of the examiners within the year. One of them had become incapable, through sickness, of discharging the duties of his post for several weeks before he relinquished it, and several more elapsed before his place was supplied. Applications were multiplied at his desk during this period, so as to enhance the labors of his suc-

cessor beyond what would have been otherwise required to dispose of the same amount of business. More than half of the accumulation of the year has taken place at this desk, in spite of the strenuous efforts of its present occupant.

In connexion with this subject it is proper to remark that, immediately after the close of the year, the oldest remaining examiner sent in his resignation. It cannot be necessary to demonstrate the high value to be attached to experience in this service, or the disastrous consequences of these frequent changes. It seems plain that stronger inducements must be held out to these officers to retain their posts; and the facility with which they abandon them, after having become conversant with their duties, gives force to the inquiry whether these situations should not be rendered more desirable and more permanent. The liability to removal is one great inducement to engage in other pursuits. It is known to have been the chief cause of several resignations, and has probably had more or less effect in producing others. The most eminent skill and science are demanded for these positions, and can in no way be so readily secured as by relieving their occupants from the apprehension of being dismissed to find employment anew.

The next table is the same that was published in the last Report, adding the transactions of another year. It will serve, in some degree, to show with what a steady progress the business of the Office has advanced for the period embraced, and how strong is the presumption that it will be constantly enlarged hereafter.

It must not be inferred, from the comparatively brief space occupied by these statements and tables, that the information conveyed is less than usual. All the statistics of any consequence, which it is customary to furnish in this form, will be found in them. Some tables showing the transactions of the Office for each month, and one exhibiting the number of patents issued to the citizens of each State, are all that are omitted. The latter can be readily supplied from the Classified List of Patents issued.

Table exhibiting the business of the Office for twelve years, ending December 31, 1852.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1841........	847	312	495	$40,413 01	$23,065 87
1842........	761	291	517	36,505 68	31,241 48
1843........	819	315	531	35,315 81	30,776 96
1844........	1,045	380	502	42,509 26	36,344 73
1845........	1,246	452	502	51,076 14	39,395 65
1846........	1,272	448	619	50,264 16	46,158 71
1847........	1,531	533	572	63,111 19	41,878 35
1848........	1,628	607	660	67,576 69	58,905 84
1849........	1,955	595	1,076	80,752 78	77,716 44
1850........	2,193	602	995	86,927 05	80,100 95
1851........	2,258	760	869	95,738 61	86,916 93
1852........	2,639	996	1,020	112,056 34	95,916 91

It is gratifying to perceive from this table that there is no faltering among us in the march of improvement. Looking at what has already been accomplished, some find it difficult to conceive that this flood of discoveries and improvements is still to maintain its progress, and even exhibit a swelling tide. As each annual Report appears, they look for a falling off in the list of applications and patents, and doubt whether there is room for the continued exercise of inventive genius. These apprehensions, it is plain, are not to be fulfilled in our day. At no time have there been more decisive indications that every step that is taken in this field, instead of bringing us nearer to the close of our career, does but open new scenes to explore, and prepares the way for new triumphs. The number of patents issued during the past year has been exceeded only in 1849; while the applications exhibit a marked advance in numbers over those of any former period. From the reports of the examiners, the public will learn that, in utility and ingenuity, the achievements here recorded rival those that have preceded them. And scarcely had the year been closed, when a new motive force was brought to the test of experiment; and if we might trust to accounts entitled to some confidence, it bids fair, from its superior economy, safety, and usefulness, to banish the power that has hitherto been our boast and wonder, and has exercised our skill and ingenuity to improve.

The language in which the Secretary of the Interior speaks of this Office in his late annual report is so just, and the measures repeatedly urged by the late Commissioner, which are advocated by him, are so essential to the efficiency of its operations, that it cannot be deemed amiss to record the entire passage in these pages.

Extract from the Report of the Secretary of the Interior.

"The eastern wing of the noble structure, erected and ultimately to be used for purposes connected with the industrial pursuits of our country, will soon be completed and ready for occupation. Some progress has also been made upon the basement of the western wing, and a large quantity of material has been collected with a view to the vigorous prosecution of the work next spring. The basement of the principal building has been greatly improved by dressing the rough stone of which it was built, so as to make it conform, in its general appearance, to similar portions of the newly erected building.

"There is probably no bureau connected with the government in whose operations the public at large feel a deeper interest than those of the Patent Office. It is inseparably associated with every interest of our country. The mechanic, the merchant, the manufacturer, and the farmer, are all concerned in everything which diminishes the labor of production in any of the departments of industry. Our people are eminently practical and ingenious. They are constantly employed in the discovery of new means of accomplishing important results at a diminished cost of time, labor, and money. The steam-engine, the cotton-gin, and the magnetic telegraph, are striking and imperishable memorials of the success which has attended their efforts. In the early period of our history, when population was sparse, and the prices of agricultural productions high, the labor of the country was directed mainly to the cultivation of the soil. But, as population progressively increases, more

attention is devoted to mechanical pursuits and the invention of machinery by which the work of many may be accomplished by a few. Not a day passes without furnishing some evidence of this fact, in the form of applications for patents for important inventions and discoveries. The mechanical interest has therefore become one of great magnitude; and it is justly entitled to all the protection and assistance which can be bestowed by Congress consistently with the provisions of the Constitution.

"The general principles of our patent system seem to have met with universal approbation, and to have been attended with beneficent results in practice. Since the organization of the Office in 1836, it has advanced with rapid strides. At that date, one 'examining clerk' was enabled to make all the preliminary investigations which were required to ascertain whether the applicant was entitled to a patent; but such has been the increase of the business, that six principal examiners and as many assistants are not now able to keep pace with it. The number of models in the Office on the 1st day of January, 1836, was 1,069; in the beginning of the year 1851 they had increased to 17,257; and at the close of the present year they will fall but little short of 23,000. If they should continue to increase in this proportion, making no allowance for the augmentation consequent on the increase of population, by the close of the present century they will amount to 150,000, and the whole of the present Patent Office edifice will not be sufficient for their convenient display. To provide against this contingency, as well as to accomplish other important results, I respectfully propose that the Commissioner of Patents be required to have prepared for publication a careful analytical and descriptive Index of all discoveries and inventions which have been patented, accompanied by accurate descriptions and drawings which will fully explain the principles and practical operation of the subject of the patent. The advantages of such a publication would be almost incalculable. It would not only perpetuate the invention or discovery by avoiding the casualties by fire and other causes, but it would multiply and diffuse among the people at large the specifications and descriptions, and substantially bring home to every neighborhood to which a copy of the work might be sent the benefits of the Patent Office. In much the larger number of cases the necessity for preserving and displaying the models would be obviated.

"The pages of the published Report would be a safer and more convenient depository for them than the cabinets of the Patent Office, and they would be accessible to everybody. Inventors in remote parts of the country would be placed on an equal footing with those residing near the seat of government. When their thoughts were turned to a particular class of machinery, instead of being compelled to make a journey to Washington to see what had already been done in that department of the arts, they could at once turn to the analytical index, and ascertain what progress had been made by others.

"Under the present system it not unfrequently happens that ingenious persons, having conceived what they believe to be a new idea, which, when carried into practice, will be of great value, employ much of their time, labor, and money in perfecting their invention, and when it is finished they come to Washington filled with the hope of those rewards which crown the labors of the successful inventor. Their application for a patent is presented and submitted to an experienced and skilful

examiner, who promptly refers the anxious applicant to a drawing or a model, which shows him that his ideas have been anticipated by another, and reduced to practice many years before. None but those who have taken pains to inquire into the subject can form an adequate idea of the amount of time, money, and labor which is uselessly expended under circumstances like these, to say nothing of the anxiety of mind and heart-sickening disappointment, all of which might be saved if such a descriptive index as I propose were readily accessible to the public. The publication of it would also tend to stimulate the inventive genius of the country, and lead not only to the development of new agents and processes, but to valuable improvements upon those which have already been brought into practical operation. It is hardly necessary to add that such a work would be of great value in the investigation by courts of justice of legal controversies involving the rights of patentees.

"When the index is completed up to the close of the present year, it will be easy, by an annual publication of an appendix to the ordinary Report from the Patent Office, to furnish a complete record of the inventions and discoveries of each successive year.

"To be of value, such an index should be prepared by a person fully competent to the task, and illustrated and printed, and bound in a style worthy of the subject and of the nation. It would doubtless be attended with a large expense, but it could readily be paid out of the Patent fund, without encroaching on the national treasury, and I can conceive of no purpose to which that fund could be applied which would be more acceptable to inventors, and in all respects so appropriate, as in perpetuating and diffusing the knowledge of their labors, and presenting to the public a full description of the existing condition of the mechanic arts, and the kindred branches of science in our country."

Occupation of the east wing.—The information concerning the extension of the Patent Office building contained in the above extract, will be welcome to all who take an interest in the progress and encouragement of inventive skill. If the east wing, of which the Secretary of the Interior speaks, could be at once placed at the service of this Office, there would be no occasion, it is hoped, for many years to reiterate the complaint of want of space that it has so often and so justly made. Before that structure, and the one now occupied, can become insufficient, the other portions of the edifice will no doubt be ready for use. Unfortunately, it has been deemed necessary to reserve for the Department of the Interior the principal floor of the wing in question, containing apartments of which the Office stands in pressing need for the transaction of its current business, those now occupied for that purpose being wholly inadequate. Those who are conversant with the crowded state of the one in which the disbursing and the assignment clerks, with their assistant, are located, will not soon forget the perplexity and delay which arise from their being restricted to such narrow limits, and the confusion from which it is consequently impossible to entirely preserve the documents in their custody. The cases in the draughtsman's room are incapable of holding the portfolios of drawings continually resorted to for inspection, which are therefore piled upon them, and no little embarrassment in consulting them is thus created. Nor is it easy to maintain a proper secrecy respecting the caveat files which are

in his care. The library will not contain over two-thirds of the books now belonging to it, to say nothing of the additions it requires and is constantly receiving. The remainder are kept in the common hall, or scattered through the various offices. It has, besides, been found necessary to station in this apartment a desk for the clerk for recording letters, and another for a copying clerk, to the exclusion of tables and other furniture, such as are deemed indispensable in other libraries for the convenient use of the books. The messenger has no place for performing his duties but in the same open hall to which every stranger has unrestrained access. Even the letters, many of them containing money, are there enclosed, and the mail made up with a degree of exposure not to be tolerated. Matters which should have been kept strictly private, have, in fact, gained publicity through the want of suitable accommodations for this official, causing inconvenience and annoyance both to the Office and to the parties concerned. In the several examiners' rooms it has become impracticable to screen entirely from the visitor's gaze the models in pending applications. The secrets which inventors have guarded with jealous care, and have confided to our trust, are often exposed, in spite of every precaution that can now be taken, to agents, to rivals, or the more dangerous scrutiny of competitors. Complaint has been made, and it was feared on good grounds, that applications which were under examination had been discovered by strangers, who had taken advantage of it. Keenly as this must be felt, there is no help for it in the present situation of affairs. The Office has not been wanting in representing the evil to those who had it in their power to repair it and "did it not." So long as the public have a right to the necessary facilities for transacting business in this building, it is impossible to secure proper seclusion under such disadvantages. Should the design of excluding the Office from the apartments in question be persisted in, the evil must become more aggravated every day. A new examiner is urgently needed, and there is a fair prospect that Congress will grant one at its present session, as well as other important functionaries. There is not, however, a place at all suitable for them at our disposal.

In addition to what has been said above, and in former reports, on this subject, there is a grave objection to the plan of allowing any other department to occupy any portion of the Patent Office building. It is a matter of no small difficulty and nicety to give the public suitable facilities for transacting business, and for examining the building and the collections in it, on the one hand; and, on the other, to secure the privacy which applicants demand for their discoveries. It can only be effected while the Office has entire command of the building, and can exercise perfect control over its inmates. Admit within it a body of men, over whom the Office has no power, who may come and go as they please without being amenable to it, and the task will become impracticable.

With the utmost respect for those who advocate the project in question, the legality of it must also be denied. If we look only to the several statutes under which these buildings have been erected, there is no room for doubting that they were erected for the sole use of the Patent Office, and are dedicated to its service. The only provision which can be supposed to countenance a different view is the fifth section of the act approved August 31, 1852, making appropriations for the expenses of the government. By this section certain former appropriations for "compensation of superintendent and four watchmen of the building occupied by the Secretary of the Interior" are "made applicable to the compensation of superintendent and four watchmen for that portion of the Patent Office building which will be occupied by the Secretary of the Interior." This, it is claimed, recognises and renders legal the contemplated movement. It is true that incidental expressions like the one above have been held to recognise proceedings which have actually taken place—measures which are in existence. If unlawful, Congress could not with propriety take notice of them, except by way of censure; and in making provision for them, it would acknowledge them as valid. Their nature and extent would be also well defined, and readily ascertained, and there could be no doubt as to what would be thus sanctioned. These reasons do not exist when a statute takes notice of a mere proposition still under deliberation. Not having been reduced to practice, there is no impropriety in making provision for it, in case it should be otherwise authorized. It would be dangerous, moreover, to legislate as it were hap-hazard, and give the sanction of a statute to a scheme, the circumstances, and character, and bearings of which were yet uncertain. The section adverted to can only be regarded as a contingent provision for a contemplated measure, to take effect when that measure should be otherwise made lawful; not an authority for it by itself. That is not its import, nor its design; it was framed for no such purpose.

Admitting the construction thus contended for to be well grounded, it would at most only justify the Secretary of the Interior in occupying such rooms as he actually selects for his own use. The remainder of the building must remain at the control of the Patent Office: so, also, must the whole structure, in virtue of the several acts for its erection, until the option has been exercised and the rooms designated for the other department. There is no warrant for the attempt to sequester an entire floor for an indefinite period, until it becomes convenient to make the choice. The terms of the act would equally sustain the exclusion of this Office from every part of the Patent buildings. The attempt is especially to be deprecated in view of the embarrassment it occasions.

The work has been commenced of removing the models belonging to rejected applications, usually termed "rejected models," to the rooms in the basement of the new wing. Those rooms will be required, if the business continues to increase at its present rate, for such clerks and other attendants as the public have no occasion to consult, and who can be located without inconvenience at a distance from that part where intercourse with strangers is conducted. For the present, they might be accommodated on the principal floor. It has become necessary, meanwhile, that the rejected models should be removed from the place where they have been kept, for the purpose of making repairs upon it. The plight to which they have been reduced for want of space is such as to elicit loud complaints from those who deposited them and feel an interest in their being preserved and suitably exhibited, as well as from others. They have been heaped upon one another, and upon the floor, lost from search, and exposed to injury. Many of them have been broken, their component parts scattered, and not a few entirely destroyed. It has become necessary that they should be thoroughly examined, and, as far as practicable, restored to their proper condition, and put in order. As soon, therefore, as the Office was notified that the new basement was about

to be placed at its disposal, it was decided to remove to it the models in question until the apartments which are to be appropriated to them in the portions of the building yet to be erected shall be ready. Temporary cases were therefore ordered, and, as was remarked, the removal of the models has been commenced. As far as practicable, they are at the same time restored to order, and are labelled and arranged anew. An index is also prepared, showing the place where every one is to be found, and enabling the Office hereafter to ascertain satisfactorily whether any of them are missing. This work will be vigorously prosecuted until it is complete, unless an alteration in our plan becomes necessary in consequence of being excluded from some portion of the wing.

Steps have also been taken to provide cases of a more permanent construction and suitable character to be placed in the hall of the new wing, for the reception of the patented models. These cases cannot, however, be prepared at once; indeed, several months must elapse before they will be ready for use. A similar course will be pursued in removing and arranging the patented models in them, as in case of the rejected models, only the work will be more thoroughly done, as it is supposed they will not have to be displaced.

The attention of Congress has been asked in former reports to several measures of legislation for the relief and convenience of this Office, and the benefit of inventors. It is proposed not so much to reiterate the observations already published as to suggest considerations respecting some of these measures, and to mention others that have not yet received their due share of notice.

Relation of the Patent Office to the Department of the Interior.—The attitude of entire dependence upon the Department of the Interior to which this Office has been reduced is followed by serious evils, and constitutes a prominent topic for consideration. The most important correspondence in which the Patent Office is engaged arises out of the investigation of inventions and discoveries presented for patents, and is employed in communicating the views entertained respecting them. These are the result of scientific and laborious investigations in each case, prosecuted by a corps of twelve able examiners and assistants. It is beyond the power of any one man, much less of the Commissioner, with his numerous other responsibilities, to become conversant with them, so as to satisfy himself of their correctness. He must necessarily adopt the conclusions formed by the examiners in the great majority of the cases, and act in reliance on their fidelity and judgment. He cannot feel safe unless he can repose implicit confidence in them, and he clearly ought to have the exclusive privilege of selecting them. These remarks will apply also to other officials. Yet the approval now required from the Secretary of the Interior may be so exercised as to deprive him of an independent choice in this matter.

Another result of the intimate relation into which the two offices are brought, is to subject them to the same political fluctuations. Few will deny this to be contrary to sound policy. Many considerations require that the post of Commissioner of Patents should be a permanent one. It seems plain that the mischief resulting from the present position of the Office which have been brought to notice above, and on former occasions, demand a change, and the elevation of this into an independent bureau.

Reorganization of the Patent Office.—The necessity of thoroughly

reorganizing the office seems to have been hitherto overlooked. Its present arrangement is to a great extent the mere result of expedients, resorted to, from time to time, as the pressure of business required. No well digested system can reasonably be looked for under such circumstances. Several of the officials, to whom are confided important trusts—pecuniary, as well as others—are recognised only through an incidental mention of them in some statute; their duties are nowhere defined. There are a number, besides, who are charged with responsible services, and are designated by courtesy accordingly, but who are known in law only as temporary clerks, and whose compensation depends upon a discretion, which may become caprice. There is not even any written code in the Office regulating the employments of these gentlemen; and the mode in which they are parcelled out betrays want of method. As it is a subject more properly within the province of Congress to correct, it is hoped that it will meet with early and effectual attention from that body. The department of the machinist especially requires remodelling and enlargement. Besides the rapid increase of the models, the removal which has been commenced of the entire number, their rearrangement and repairs, the disposition of new ones, the exhibition of them to visitors and inquirers, and the care of the whole, will require an addition to the force under his charge, which should be duly organized by law.

Need of a registry law.—It is not easy to perceive why two classes so analogous to each other as those protected under the law of copy-right and those which are patented as designs, should not be embraced under one statute. An engraving upon paper, or in any publication, needs only to be registered with the clerk of a district court, at a fee of fifty cents, and, upon depositing a copy with the Secretary of State, it is secured against infringement for twenty-eight years. If the same design is printed on silk and sold as a handkerchief, or upon paper-hangings or a fire-screen, a formal application must be made to this Office, a patent prayed out, costing $15, besides the expenses attendant on procuring papers, drawings and model; and, after all, an exclusive privilege in them inures but seven years. These incongruities indicate such a want of systematic legislation as to warrant the hope that they may be wiped from the statute-book by the enactment of a registry law covering all these subjects. The registry should be in the district court as now; to make it in this Office gives it too much the prestige of a patent.

The law now requires that a patent should be extended, if it all, before it expires; and previous to that time whatever controversy arises in such a case must be considered and determined. On the other hand, in order to decide the question, it is necessary to ascertain whether the applicant has not already been remunerated sufficiently for his invention, and for this purpose he is bound to exhibit a sworn statement of his receipts and disbursements on account of it. It is obvious that this statement should be made not long before the patent expires, as it might be materially varied by intervening transactions. Accordingly, applications presented a year before the patent expired have been rejected for that reason, and they are usually presented not more than three or four months previous. The opportunity for considering and determining the question is thus restricted to very narrow limits. In one late instance, the Commissioner had but twenty-four days, in a hurried pe-

riod, to hear arguments, examine several thousand pages of testimony, and satisfy himself on a number of difficult questions of law, before making a decision which involved, it was claimed, a million of dollars. The ends of the statute will be attained by requiring the proceedings to be closed before the Commissioner by the day now fixed for the decision, and allowing him such further time as he needs for forming his opinion.

Patent law amendments.—Emendations of the law, intended to give better security to inventors in the enjoyment of their rights, have been brought forward, from various sources, by associations interested in the subject, or individuals. Others have been proposed by this Office; and some have been introduced into the halls of Congress, and have been received with favor. The remedies proposed have not always been in unison with each other, and show the need of caution in adopting them. The attention they have met with justifies the devoting a few pages to them, not for the purpose of fully discussing them all, but in order to secure consideration to some suggestions which might otherwise be overlooked.

One of these emendations provides that, when a patent has been denied by the Commissioner, the applicant, if he still insists upon it, may have one upon his own responsibility. Before this becomes a law, it should be radically amended upon two points. It should be enacted that a patent thus issued should not, like those granted from this Office, be entitled to any presumptions in its favor, nor be regarded as *prima facie* evidence of the patentee's exclusive title. It should also be required that a marked and obvious distinction should be observed between the instruments obtained in these two methods, and they should be so framed as to remove all apprehension of the one being mistaken for the other. The machinery and manufactures protected by such a proceeding should bear a stamp disclosing to every one the true extent of the patentee's rights. Effectual precaution should be taken, in short, against the instrument being made use of as an official recognition of the claim, and against any person being imposed upon by the articles, as though they were protected from infringement under the existing law. The best mode of effecting this would be to give the applicant a mere right to register his invention in some distinct office, or with copyrights.

It is by no means certain that, with these precautions, such an addition to the present system might not be found advantageous. To carry out the principle, the right of appealing from the decision of the Office should be taken away. The party aggrieved might have his remedy by taking out a patent or registering his invention as thus provided, upon his own responsibility, and look to the courts for sustaining it. Other regulations might appear desirable on discussion, for which this is no place. This arrangement would obviate the difficulty now so commonly felt in finding a suitable tribunal for revising the action of this Office. It would also help to silence the complaints made against the system now in force, and give those who desire it all the benefits of the one formerly in vogue.

To secure the aid of experts upon the trial of patent causes is also a favorite project. That some such measure is desirable is admitted on all hands; but it should not stop short, if undertaken, of a permanent appointment of a suitable board, instead of relying upon an occasional resort to the class. The man who is called to serve upon a single cause will find it more difficult to preserve strict impartiality between the parties, and to maintain the appearance of it, than one to whom the duty

has become familiar. The judge, too, finds the resentment he awakens on one occasion counteracted by the better impressions he makes upon another, and those who have both won and lost in repeated instances, lose the prejudice they would have entertained had they appeared but once before him and met defeat. An arbitrator, forced upon a party for a single occasion, can never give satisfaction to the loser. After a few repetitions of the clamor that would be raised on every trial, the community will, it is apprehended, cease to endure such a substitute for their favorite trial by jury.

There seems little ground for another innovation that has been proposed, that of restricting the right of defence in a suit for infringing a patent, on the ground that it was not novel, to those who knew before the patent was granted of the invention having been in use; while those who acquire the knowledge afterwards are required to institute distinct proceedings to vacate the patent. When any one has satisfied himself that a patent is void, why should he be held to respect it, or engage in expensive litigation to avoid it, while his neighbor may infringe it with impunity, because he gained the knowledge a little earlier? If any distinction is to be made like this, it should be between him who knew the patent was void before he committed the supposed infringements, and who must be supposed to have acted in view of his rights, and him who had no such knowledge, and trespassed with no such excuse. Even he is presumed to know the existence of the patent; and why should he not be presumed to know its invalidity, and permitted to show it in his defence?

The expedient of declaring forfeit the machinery employed and the articles manufactured in violation of a patent, should be carefully framed, so as to give the owner notice of the claim and enable him to meet it. The device does not, moreover, seem well calculated to punish the wary and designing speculator, who will be on his guard and leave nothing worth taking exposed. It will fall with severity upon those who are comparatively thoughtless and innocent, and who have never taken any precautions. A jury is liable to mistakes, and might find even such a man guilty of wilful wrongdoing.

In connexion with the last, it has been proposed to require of the defendant securities for the payment, in all cases where extra damages and costs might be recovered before he is permitted to make a defence. It may be true that irresponsible persons have been put forward to do the ostensible work of infringing, and that for them a judgment has no terrors. On the other hand, it is equally possible that innocent persons may be sued, and suffer by the obnoxious provision. Justice does not, however, permit any one, before he is found guilty, to be treated as such. His property may, in some States, be sequestered; or he may be held to bail; and this may embarrass him, but does not shut his mouth. Under the proposed plan the plaintiff might entirely debar him from showing his innocence, or even demanding the proof of his guilt.

Another measure was brought forward from the same quarter, by which it was provided that, after one trial establishing the validity of a patent, the patentee may recover treble damages and treble costs if it is ever contested again; quadruple on a third trial; quintuple on every subsequent trial, with "liberal counsel fees" in every instance. It is not necessary that the defendant should have been a party to the previous suits in order to make him liable to the severe operation of this statute.

He may have lived at the other end of the Union, and have never heard of them; he may have supposed himself to have a *bona fide* defence, founded upon his having anticipated the plaintiff in his discovery. It will avail him nothing. In addition to this, it is well known that speculators in patents have obtained judgments upon them by collusion for the sake of effect. How easy to use them to enhance the costs under this proceeding. The statute as proposed, it is true, provides that the previous judgments must be in good faith. But how is their character to be shown? To impeach a fraudulent judgment is, at all times, a costly and hazardous undertaking. And when it is attempted at the risk of such aggravated recoveries, the odds are too great to be risked by any man of prudence, who can avoid it. It is true, also, that the plaintiff is liable to treble costs upon a third verdict against his patent; quadruple upon a fourth; and quintuple on all subsequent ones; not treble upon a second trial, and so on as when he succeeds. But it is also provided that, where judgments have been recovered both ways, they shall be adjusted and balanced against each other. Not to ask who shall keep the account for the defendants and make the necessary proof, it is obvious that the facility with which the plaintiff can obtain amicable verdicts, and the difficulty of exposing them, make this precaution useless. It has been the subject of loud complaints throughout the country that patentees and their agents have gone about levying contributions upon those who used their supposed inventions, and have met with great facilities from the dread commonly entertained of engaging in litigation with them. If these complaints have any foundation, what might not be expected from one who wielded such a formidable weapon as this provision places in his grasp? Very few men could be found who would not make large sacrifices rather than expose themselves to a judgment for five-fold damages and five fold costs, with liberal counsel fees, besides being compelled to find security to the amount, before being allowed to so much as contest their guilt.

Severe and aggravated as are the wrongs and depredations endured by inventors, they do not warrant measures for protection so liable to be abused, and made to operate with indiscriminate hardship upon the innocent as well as the guilty. They savor of what Bacon has called the last infirmity of a good man—indiscreet indignation against vice. The remedy for the evils complained of is not to be found by listening to the dictates of resentment, however just. There are serious difficulties in the way of devising an effectual one—so serious as to render it less surprising that measures such as have been discussed should have met with favor. It is respectfully suggested, however, that, if those who infringe upon these rights with so much recklessness and impunity are ever to be checked, it is by a careful inquiry into the circumstances to which they owe their success. Two things contribute to it. One is that every valuable invention becomes an object of importance to a large circle, sometimes embracing the entire community, who are therefore strongly tempted to resist a patent for it, and are at once tacitly leagued, if not expressly combined, against it. Another is the facility of manufacturing proof of like discoveries previous to that of the inventor, and dating them so far back as to render it difficult, if not impossible, to detect the fraud. Until these are counteracted, there is little to hope from legislation, however stringent. The object may possibly be secured by providing for a final and conclusive determination upon the validity of the patent at a date so early that people would not have generally become aware of its value, or interested in opposing it and concocting schemes against it; and, also, while any alleged previous use may be readily inquired into, and its true claims thoroughly scrutinized. A law may be framed, for instance, under which public notice shall be extensively given of the nature and object (so far as necessary) of every invention upon which a patent shall be granted, and all competitors shall be required to show cause against its validity by a specified day. If any party comes forward within the time and files objections, an investigation shall be made into the claims of the invention, and the adverse parties shall be heard in opposition to it. And when a patent has survived this ordeal, the validity of it shall never afterwards be contested. If such a statute could be drawn up, giving ample notice to all concerned, and otherwise free from objection, it is obvious that it would forestall the combinations and practices which have rendered the value of patents precarious almost in proportion to their usefulness. Whether such an act can be made effectual and practicable, yet do no injustice, is a question that seems worthy of serious consideration. It will be time to discuss its form and mature its provisions when it promises to become the subject of legislative deliberation.

It may not seem consonant with the observations recorded a few pages back to venture an opinion in favor of making the wilful infringement of a patent a crime, and punishable as such. The measure is, notwithstanding, free from the objections urged against the stringent projects there commented upon. In criminal prosecutions there is a strong presumption raised in favor of the respondent's innocence, and the danger is slight of his being convicted unless he is truly guilty. He is secure where the defendant in one of those suits would be exposed to serious peril. Neither would it be safe to use a threat of such proceedings as a weapon of extortion. On the other hand, it would deter many a man from the offence. Hundreds who have made up their minds to risk a pecuniary loss, would hesitate to subject themselves to the imputation of crime. It would serve, also, to correct the public sentiment, which is far from being just on this subject. Who shrinks from the temptation to infringe a patent as he does from the thought of breaking the law? It is from a defect of this kind that tribunals of justice, and especially juries, are found reluctant to give due protection to the rights in question. Correct this state of feeling, attach to the secret trespasser upon his neighbor's patent the stigma of transgressing the laws, and the offence might possibly become as rare as others which are committed not from want, but the mere love of money.

Importance of the Arts.—It may be thought that these subjects have been urged upon the attention of Congress beyond what their merits warrant; that they have no title to the amount of consideration which would be necessary to secure a judicious, thorough, and advantageous action upon them. It is respectfully submitted, however, that they justly challenge comparison, in point of intrinsic importance and of their bearing upon the prosperity of our country, with any upon which the national legislature have been usually employed. Not that ingenious discoveries and improvements in the arts are before all other sources of benefit to our fellow-citizens. I cannot concur in the terms of disparagement which the enthusiastic admirers of inventive genius have sometimes used to-

wards the great masters of belles-lettres and the fine arts. He who said, "Let me furnish a nation its ballads, and I care not who makes its laws," had a far more just and comprehensive view of the influences that mould the structure of society, give a people their character, and secure their true advancement.

The progress of invention has not been without its influence, meanwhile, upon the destiny of man. In the great work of elevating the masses, of giving to the entire body of mankind something like an equal opportunity in the race for happiness, and even power, it has co-operated with mighty effect. It has so reduced the cost of the comforts of life, and of the means of knowledge, as to bring them within the reach of every one. An immense amount of work, which could be performed by the hand alone a few years since, is now accomplished by machinery. Intelligent labor has come into demand, and receives an increased emolument; so that men can at once earn more than formerly, and their wages command subsistence, luxuries, and means of cultivation to an extent that previously had never been realized. Where these advantages are shared, experience tells us the entire mass of society is elevated in the tone of its morality, as well as the character of its enjoyments. It is true, as it never was before, that men are the architects of their own fortunes; that it depends upon themselves what they shall be. To render this complete, demands other aids, it is true. Religion and education must co operate. Political institutions of the right stamp are also needed, as England may well teach us by the multitudes she possesses destitute of the thousand comforts produced in their midst, at the lowest cost, by her wonder-working machinery. But inventive skill must bear a part, and contribute to the final result. To the people as individuals, and to our State governments, it belongs to sustain the institutions of religion and of education, and to provide salutary municipal regulations. It is the province of Congress, meanwhile, to foster the genius of discovery, and, by its wise legislation in this behalf, lend its aid to advance the interests of humanity.

It was in another view, however, that a comparison in point of importance was challenged between the inventive interests of the country and those which usually engross attention in the halls of the Capitol. Our manufactures, to protect which has been the object of so much debate, owe their very existence to them. Without them our foreign commerce, another favorite, would lose freight as well as power. Where, for instance, would be her exports were it not for the cotton-gin? and where her speed and regularity were it not for the steam-engine? Even agriculture feels the influence, and under the touch of the genius of invention promises to fulfil the much-sought desideratum, and make two blades of grass grow where one grew before. The great element of expense in the production of her fruits—manual labor—will be so supplanted by machinery as practically to effect the same purpose of cheapening them. Compare our means of inland intercourse with what they were a few years since, and another indication is afforded of the consideration due to inventors. The difference in our domestic traffic, as it was and as it is, we owe, in a great measure, to their ingenuity. They have done an immense work in building up the wealth of the country; they have given the nation standing and weight in the eyes of foreign States; they have entered into competition with their artisans in their appropriate fields, and have borne away a palm that reflects honor upon our land. At the great Exhibition it was freely admitted, by such as were never accused of partiality towards us, that Great Britain had gained more useful ideas from the United States than from all other sources. Those who have achieved so much for the nation are not to be deemed importunate, therefore, when they request such legislation at the hands of Congress as shall afford them effectual protection in their acknowledged rights, and shall enable them to prosecute their meritorious labors in peace.

Lists of Patents and Examiners' Reports.—Upon the succeeding pages will be found the usual lists of patents expired and patents issued, with the inventions and claims.

These will be followed by reports from the several examiners, describing some of the most important of the inventions which have been passed at their respective desks. This information has always been looked for with great interest, and conveys to the mass of readers a better conception of what is transpiring in the fields of discovery than they obtain from any other source. Should the bill be passed which is now before the Senate, authorizing the insertion of an intelligible account of the inventions patented, in lieu of the incomprehensible list of "Inventions and Claims" now published, those reports will become unnecessary. Meanwhile, they cannot well be dispensed with. Allowing their full force to the objections urged against them last year, they are not felt to be so serious as to require the omission of what constitutes so essential a part of "the information of the state and condition of the Patent Office" contemplated by the statute.

Guide to the practice of the Patent Office.—Upon reprinting the pamphlet issued from time to time by the Office, giving information to those having business to transact with it, so many errors were found to have crept into the work, in the course of repeated editions, that it was concluded to rewrite it. The new work will be found on the subsequent pages. The forms were collected in an appendix; but, as they have not been materially changed from those which appeared in the last Report, they are here omitted, with the exception of one or two new ones.

At the close will be found an opinion prepared by the Commissioner upon deciding the application for the extension of a patent before alluded to. It was not heard until the year we are contemplating had expired; yet having been determined before this Report could be rendered, it was deemed advisable that it should be inserted. The decisions of this Office constitute precedents, and have an essential bearing upon questions that are becoming every day more frequent and of greater consequence. It is highly proper that the more important of them should be published in the annual reports, which form a legitimate channel for communicating them. As the decision spoken of involved several novel and grave questions of law, and the case was argued at great length and with more than ordinary ability, it will be often referred to hereafter, and constitutes, therefore, a suitable precedent for the practice. For the same reason such decisions of the judges of the circuit court of the District of Columbia, upon appeals from this Office, as involve questions of law or practice, should find a place in the annual reports.

The only communication received during the year respecting early American inventions will be found on the pages following the Examiners' Reports.

II.

CLASSIFIED LIST OF PATENTS THAT HAVE EXPIRED DURING THE YEAR 1852.

CLASS I.—*Agriculture, including instruments and operations.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Beehive and beehouses	John Searle	Hill, N. H	Jan. 20
Churn	Step'n P W. Douglass.	Lansingburg, N. Y	Jan 9
Churn	Joshua G. Pike	Lisbon, N. Y	April 28
Churn	Rufus Porter	Billerica, Mass	May 10
Churn	Enoch Thomas	Harrisonburg, Va	May 30
Churn	Daniel Osgood, jr	Blue Hill, Me	July 9
Corn shelling	Thomas Wright	New Village, N. J	June 12
Corn shelling	James W. Webb	Mount Morris, N. Y	July 16
Corn shelling	Rufus Porter	Billerica, Mass	Sept. 12
Corn shelling	Lester E Dennison	Saybrook, Conn	Oct. 8
Cultivator, corn-plough	John Hernly	East Hempfield, Pa	Dec. 10
Cultivator and weeder	Simeon W. Marshall and J. W. Coburn.	Dracut, Mass	Oct. 3
Cutting grass and grain	David Lewis, jr.	Bern, N. Y	April 14
Cutting grass and grain	Ira Wheeler	Salem, N. H	May 30
Cutting, scythe, hanging	Jos. Clapp and Erastus S. Clapp.	Montague, Mass	July 16
Cutting, scythe snath	Samuel Puffer	Sunderland, Mass	April 7
Flax or hemp, gathering	Wm Brittain and John Silvers.	New Hope, Pa	Nov. 25
Hay, preserving, &c	A. D. Ditmars	Chester county, Pa	Feb. 15
Hoe, fastening handles to	George Hight	Gorham, Maine	May 25
Hulling clover seed	Daniel Hunsicker	Hartley, Pa	May 8
Hulling clover seed	Jacob Flook, of John	Middlesex, Md	May 10
Hulling grain and cleaning	Jeduthan Cross	Centre Lisle, N. Y	Oct. 8
Hulling rice and barley	Eleazer Carver	Bridgewater, Mass	Sept. 22
Hulling rice, mortar, for dressing	James J. Cordes	London, England	Sept. 19
Hulling rice and rubbing wheat, (antedated August 11, 1837.)	Alfred Duvall and William J. Duvall.	Baltimore, Md	Jan. 9
Lime, &c., spreading	Daniel F. Hill	Plainfield, N. J.	Feb. 10
Plough	William T. Sprouse	Sangamon, Ill	Feb. 15
Plough	Henry Taylor	Montague, Mass	May 17
Plough	D. Prouty and J. Mears	Boston, Mass.	Sept. 15
Plough	John Deats	Roxbury, N. J.	Nov. 25
Plough, cast-iron, malleable	Cyrus Alger	Boston, Mass	Aug. 3
Plough, clevis	Aaron Carman	Columbus, N. J	June 20
Plough, hill side	Isaac Teeter	Johnstown, Pa	Oct. 3
Plough, hill side, double	Martin Rich	Ithica, N. Y	May 24
Plough, mould board, double	Stephen Gregory	Sawpits, N. Y	Nov. 14
Plough, self-sharpening	John Ormiston	Centre, Ohio	Mar. 17
Plough, self-sharpening	John W. Post	Baltimore, Md	Oct. 8
Rake, hay	Daniel Smith	Vincennes, Ind.	June 7
Rake, hay	William Buckminster	Framingham, Mass	July 12
Seed, drill for sowing	George A. Hoyt	Albany, N. Y	April 21
Seeding all kinds of seed	William Buckminster	Framingham, Mass	Oct. 8
Seeding, corn-planter	Elisha Bunce	Westford, Mass	July 16
Seeding, sowing and planting ruta-baga.	Hiram R. Merchant	Guilford, N. Y	Jan. 20
Smut machine	John Parker	Sunbury, Ohio	Aug. 23
Smut machine, rubbing garlic from wheat.	Z. Davall, A. Callegan, and Jos. Miller.	Ellicott's Mills, Md	Nov. 3
Smut machine and cleaning rice, (additional improvement August 12, 1841.)	Daniel H. Southworth.	Little Falls, N. Y	Aug. 23

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Straw cutter	Jonathan S. Eastman	Baltimore, Md	Feb. 15
Straw cutter	William J Duvall	do	Mar. 28
Straw cutting	Edwin Gillett	Ellington, Conn	Jan. 9
Straw cutting	Ebenezer Dewey	Butternuts, N. Y	June 4
Straw cutting	Samuel Gilson	Arcadia, N. Y	June 27
Straw cutting	John Boynton	South Coventry, Ct	Nov. 25
Straw cutter, horizontal	Robert A. B. Beach	Williamson co., Tenn.	April 24
Thrashing clover seed	William B. Davis	Reading, Ohio	June 20
Thrashing clover seed	William Rowe	Frederick, Md	Aug. 25
Thrashing grain	L. Yale, S. W. Stimson, and N. Stimson.	Little Falls, N. Y	May 17
Thrashing grain	Amoni West	Greene, Maine	July 26
Thrashing grain, hulling, &c.	Hor W Waterhouse	Butler county, Ky	Mar. 21
Thrashing grain and shelling corn	Myron J Gilbert	Troy, N. Y	Jan. 20
Thrashing machine	Frederick and H. Grieb.	Hagerstown, Md	Oct. 19
Thrashing machine, clover, &c	Samuel Kern	Strasburg, Va	May 8
Thrashing machine, conveying straw from	Uriah Beebe	Clarendon, N. Y	Mar. 28
Thrashing machine, preventing dust from rising.	Joseph Ross	Bound Brook, N. J	Oct. 8
Thrashing and winnowing machine.	Reuben W. Currier	East Kingston, N. H.	Sept. 17
Trees, fruit, preventing canker worm in.	Jonathan Dennis, jr.	Portsmouth, R. I	June 21
Winnowing grain	David H Cole	Portland, Me	July 17
Winnowing grain	George A. Johnson	Johnsonburg, N. Y	Dec. 15

CLASS II.—*Metallurgy and manufacture of metals and instruments therefor.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Awls, attaching to hafts	Dexter Pierce	Montague, Mass	Aug. 13
Axes	J. Wright, (assignee of D. C Stone.)	Naponock, N. Y	April 21
Axes, hatchets, punching eyes, &c.	Elisha K. Root	Collinsville, Vt.	Dec. 10
Boring the inside groove, fliers for double speeders.	James S. Brown	Pawtucket, Mass.	July 9
Castors, for bedsteads, (reissued July 30, 1845.)	Philos Blake, Eli W. Blake & J. A. Blake.	New Haven, Ct	June 30
Copper, alloying, &c	M. Sorel	Paris, France	Sept. 17
Currycombs, making	Nathaniel C. Sanford	Meriden, Conn.	Nov. 3
Door springs	William Wilson	Greenfield, Mass	July 17
Drill stock, geared	George Page	Keene, N. H	May 8
Filing hand-saws	James S. Harris	Poultney, Vt.	June 21
Forges, backs, (additional improvement August 23, 1838.)	Luke Wilder	Leominster, Mass	Mar. 17
Forge, smiths'	Amos Bissey	Point Pleasant, Pa	June 23
Furnace, blast, draught of	Asahel Collins	Ulster, N. Y.	Dec. 31
Furnace, blast, hearth of	George Poe	Elkridge Land'g, Md.	June 23
Furnace, blast, heating air for	Charles C. Alger	Stockbridge, Mass	June 30
Furnace, manufacture of iron	Isaac C. Bryant	Philadelphia, Pa.	Dec. 31
Furnace and pots for melting	Cyrus Gridley	Waterbury, Conn.	Mar. 17
Furnace, refining iron	James Sharp	Liverpool, Pa	June 23

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Furnace, smelting lead	A. R. Drummond and N. G. W. Fuller.	Galena, Ill	May 30
Furnace, smelting ore	J. Baughman, J. Guiteau, and H. High.	Herford township, Mauch Chunk, Pa	May 21
Hinges, butt	Charles R. Macey	Hyde Park, N. Y.	Oct. 5
Hinges, helical spring joint	D. A. Hoyt and P. W. Bulkeley.	Danbury, Conn.	April 28
Iron, manufacturing	George Craine	London, England	Nov. 29
Iron ore, smelting	Joseph Richards	Philadelphia, Pa	Dec. 10
Knives and forks, table	George Ropes	Portland, Maine	May 10
Lock, door	Turner Whitehouse	Boston, Mass	June 14
Lock, door	Daniel Ball	Kingsbury, N. Y.	July 12
Lock, door	Robert Wilson	Burdett, N. Y.	May 10
Lock, door, for banks	James McClory	New York city	June 19
Locks, manifold permutation	Robert Newell	do	Sept 25
Locks, mortise	Leonard Foster	Boston, Mass	June 27
Locks, trunk	Joseph Nock	Philadelphia, Pa	Oct. 10
Locks, trunk, &c	Henry C. Jones	Newark, N. J.	Dec. 15
Nails and spikes, heading	Rencore Dare	Ridgton, N. J.	Jan. 27
Nails and spikes, wrought	Richard Savary	Pittsburg, Pa	April 2
Pipes, leaden	R. M. Seydle and Louis Ward.	Milton, Pa	Aug. 1
Punch, revolving spring	Solyman Merrick	Springfield, Mass	Mar. 17
Punching and shearing iron	Lemuel T. Pope	Boston, Mass	Mar. 17
Rolling mill, for circular saws	Eleazer Carver	Bridgewater, Mass	Sept. 27
Saw, circular, cutting teeth in, (antedated March 19, 1838.)	Thaddeus Sellick	Philadelphia, Pa	Sept. 19
Saw, for sawing ice	John Barker	Cambridge, Mass	Feb. 3
Saw-set	E. Waste, N. Wellington, and D Hutchins.	Bennington and Shaftsbury, Vt.	Mar. 28
Screws, cutting wood	Jas. Keene and Thos. Keene.	Haverstraw, N. Y.	July 9
Shears, flying, manufacturing	Seth Parsons	Hoosick Falls, N. Y.	June 7
Sockets, iron, making	Leo. Morse, (assignee of Harvey Pettee.)	Foxborough, Mass	Dec. 28
Spoons, plating, mill for	Sanford Boon	Hamilton, N. Y.	July 19
Steel, converting iron partially into	Walter R. Johnson	Philadelphia, Pa	June 30
Steel, increasing the strength of	Walter R. Johnson	do	July 9
Vice, bench, metal	Jas. Keane and Thos. Keane.	Haverstraw, N. Y.	Aug. 20
Window, spring fastener	Jonathan Bacon	Bedford, Mass	June 20

Class III.—*Manufactures of fibrous and textile substances, including machines for preparing fibres of wool, cotton, silk, fur, paper, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Calico, &c., printing	Godfrey Woone	London, England	[illegible]il 2
Calico, &c., printing	Bennet Woodcroft	Hardwick, England	[illegible]il 5
Calico, &c., printing	Alden Sibley	Pawtucket, Mass	July 9
Cards, wool	George Faber	Canton, Ohio	Aug. 1
Carpeting and rugs	John Humphreys	New York city	Dec. 10
Cordage, rope, twisting strand	Moses Day	Roxbury, Mass	Feb. 7
Cotton, separating trash for	Jacob Idler	Philadelphia, Pa.	Dec. 31
Flax and hemp breaking	Andrew Forsyth	Columbia, Tenn	Jan. 9

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Flax and hemp breaking	Alvin Keyes	Crittenden, Ky	April 4
Flax and hemp, &c., hatchelling	Foster Demasters	Shelbyville Ky	Nov. 20
Gin, cotton	William P. Baker	Boston, Mass	Nov. 20
Gin, cotton, roller	Eleazer Carver	Bridgewater, Mass	Sept. 27
Gin, cotton, saw ribs for	Eleazer Carver	do	June 12
Hats and furs, coloring	Harmon Hibbard	Attica, N. Y	May 25
Loom, power	Elijah Fairman	Stafford, Conn	Feb. 6
Loom, power	Wm. B. Pender and N. C. Horn.	Wolfeborough, N.H.	Aug. 15
Loom, power and common	Benjamin Lapham	Saratoga, N. Y	Jan. 20
Loom, power, friction to yarn beam.	Stephen Kimball	Putney, Vt	May 30
Loom, power, treadle in	Eli Horton	Stafford, Conn	Feb. 22
Loom, sattinette	John D. Sedgrave	Uxbridge, Mass	May 17
Loom, temples	Emory A. Augell	Killingly, Conn	Oct. 19
Loom, weaving knotted counterpanes.	Erastus B. Bigelow	W. Boyleston, Mass.	Jan. 6
Loom, weavers' harness for	J. Thorp and W. G. Angell.	Providence, R. I.	Dec. 31
Napper, metallic	John M. Pratt	Dudley, Mass	Oct. 3
Oakum, picking	Hiram Burnham	Boston, Mass	Oct. 5
Paper, brown, from beach grass	Isaac Sanderson	Milton, Mass	Feb. 22
Paper, engine regulator	Jno. M. Hollingsworth.	Braintree, Mass	Dec. 31
Paper, preparing husks to make	Homer Holland	Westfield, Mass	Aug. 13
Rags, dusting	Enoch Burt	Manchester, Conn	Sept. 14
Rags, dusting and tearing	Henry Clark and Wm. Albertson.	New London, Conn.	Sept. 19
Rags, washing	Robert Carter	Elkton, Md	Feb. 22
Shearing woollen cloth, (antedated October 7, 1837.)	Reuben Daniels	Woodstock, Vt	April 7
Shearing woollen cloth, (antedated May 25, 1838.)	Seth Parsons	Hoosick Falls, N. Y.	Nov. 25
Silk, reeling	Jonathan Dennis, jr.	Portsmouth, R. I.	Dec. 28
Spinning, fliers, flax and hemp	H. Evans and B. Churchill.	Plymouth, Mass	Sept. 26
Spinning, fliers and spindles, cotton.	Richard E. Yerkes	Philadelphia, Pa	June 12
Spinning, fliers and spindles, cotton.	John Hoarth and Nathan Jones.	Andover, Mass	Dec. 28
Spinning machine, domestic	Hiram F. Wheeler	Springfield, Pa	April 25
Spinning mule, self-acting, (antedated February 20, 1834.)	James Smith	Perth, Scotland	June 27
Spinning silk, &c.	Harrison Holland	Northampton, Mass.	Oct. 10
Spinning, silk, doubling and twisting.	Jonathan Dennis, jr.	Portsmouth, R. I.	Dec. 28
Spinning, speeder, cotton roving	William Mason	Taunton, Mass	May 4
Wool, cleaning from burs	Theodore Ely	Poughkeepsie, N. Y.	Sept. 17

Class IV.—*Chemical processes, manufactures, and compounds, including medicine, dyeing, color-making, distilling, soap and candle-making, mortars, cements, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Bark, evaporating the extract of	George W. Klein	Boston, Mass	Dec. 15
Bleaching cotton and linen	Lemuel W. Wright	Now in England	Mar. 3
Brewing beer	Thomas Behan	Norwich, N. Y.	Aug. 1
Cement, bituminous	Cyprian Poullalier	New York	Mar. 3

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Dyeing, art of	Patrick Magennis	Patterson, N. J	April 21
Dyeing wool	Felix Fossard	Philadelphia, Pa	April 21
Dyeing yarn from the beam, (reissued May 28, 1840; additional improvement April 17, 1841.)	William Spencer	Lowell, Mass	Sept. 25
Evaporator	Samuel T. Harrison	Baltimore, Md	Dec. 31
Extracting color from dye-woods	Laurens Kent	Dorset, Vt	Sept. 27
Gas meters, self-acting, dry	Samuel Clegg	G. Britain, England	Sept. 22
Gum elastic, manufacturing	Charles Goodyear	Roxbury, Mass	July 24
Leaching ashes	Elijah Williams	Westfield, N. Y	Jan. 9
Lead, white	William Cumberland	New York city	June 7
Lead, white	Homer Holland	Westfield, Mass	Nov. 3
Mineral water, soda fountain	Lansing B. Swan	Rochester, N. Y	Nov. 3
Salt, manufacturing	Charles G. Reynolds	Kanawha, Va	Mar. 3
Salt rheum, remedy for	Wm. B. Trufant	Bath, Me	Feb. 10
Starch, machine for washing and pulverizing potatoes for.	Sylvanus Richardson	Jericho, N. Y	Jan. 9
Sugar boiler, circulating	Francis Hoard	Demerara, W. I	May 30
Sugar, manufacturing from beets	Joseph Hurd, jr	Boston, Mass	July 26
Tannin, extracting	Augustus A. Hayes	Roxbury, Mass	July 12
Vegetable wash for the lungs	George Rogers	Northampton, Mass.	Dec. 31

CLASS V.—*Calorifics, comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Air, heating, for the hot blast in furnaces.	Joseph Jones	York, Pa	Dec. 10
Fireplace, parlor and kitchen	John Hagerty	Monroe, Mich	Mar. 24
Flues, &c., of kitchen ranges	Samuel Pierce	New York	Feb. 21
Flues of open fireplaces	Thomas Whitson	New York city	June 14
Fuel, composition for	John Allen	....do	Mar. 17
Fuel, preparing, and stoves to use therewith.	Thomas Joyce	Camberwell, Engla'd.	Nov. 12
Furnaces, portable	Jordon L. Mott	New York city	Oct. 19
Furnaces of stoves	Eben. Eaton	Troy, N. Y	Jan.
Gas burner	Antoine Arnoux	New York city	June
Grates, open, for burning coals	James Atwater	New Haven	Nov.
Grates, in stoves, lowering and raising	Josiah Dutcher	New York city	June
Heating buildings, (antedated Jan. 30, 1832.)	Angier M. Perkins	Now in London	Aug. 20
Kettles, sugar, setting, (additional improvement Dec. 11, 1838)	James Malory	New Orleans, La	Sept. 20
Kiln, charring, coal	Michael Carrol	Tellico Plains, Tenn.	April 28
Lamps, &c	Samuel Rust	New York city	Jan. 9
Lamps, &c., (antedated April 2, 1838.)	Samuel Rust	....do	June 7
Lamps, &c	John C. Fletcher	Springfield, Ohio	July 12
Lamps, &c	Joshua T. Beale	London, England	Nov. 29
Lamps, coach	William Lawrence	Wallingford, Conn	April 7
Lamps, patent	Samuel Rust	New York city	Jan. 9
Lamps, shade to	Samuel Rust	....do	Jan. 9
Lamps, signal	Jos. Feinour and Jos. Feinour, jr.	Philadelphia, Pa	Aug. 1

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Lamps, spirits of turpentine, burning.	Luther Jones	New York city	Nov. 25
Lantern for steamboats, (additional improvement April 25, 1839)	John M. Read	Louisville, Ky	Dec. 28
Roasting meat	Samuel Pierce	New York city	July 12
Steaming, boiling, &c., apparatus	B. F. Gold	New York	Jan. 9
Stoves	Phineas Gillet	New Hartford, Conn.	June 30
Stoves	James Miller	Baltimore, Md	Oct. 16
Stoves, close	William Beach	Philadelphia, Pa	Oct. 19
Stove, cooking	E. L. Parshley and B. Furbish.	Brunswick, Me	Jan. 9
Stove, cooking	Horace V. Teall	Canajoharie, N. Y	Jan. 20
Stove, cooking, (additional improvement Feb. 18, 1841.)	Jefferson Cross	Eaton, N. Y	June 27
Stove, cooking	Garet G. Hermance	Poughkeepsie, N. Y.	July 24
Stove, cooking	Simeon Heywood and L. P. Fisher.	Claremont, N. H.	Aug. 29
Stove, cooking	Jordan L. Mott	New York city	Sept. 19
Stove, cooking, (disc. March 26, 1846.)	Daniel Tisdale	Canton, Mass	Nov. 12
Stove, cooking, construction, (antedated August 30, 1838.)	Stephen Wilcox	Springfield, Mass	Sept. 13
Stove, cooking, heat to	Stephen J. Gold and Job S. Gold.	New York city	June 20
Stove, cooking, and oven	John R. Smith	New Haven, Conn	Mar 10
Stove, cooking, railway, (reissued August 27, 1840.)	Isaac B. Bucklin	West Troy, N. Y	July 9
Stoves, cooking, for summer	Anson Atwood	Troy, N. Y	June 30
Stoves, cooking, for summer and winter.	Philo P. Stewart	New York city	Sept. 12
Stoves, cooking, and warming rooms.	Josiah Hill	Andover, Mass	Oct. 16
Stoves, dumb, for parlors	John G. Treadwell	Albany, N. Y	June 30
Stoves and fireplace	Joseph Hurd, jr	Stoneham, Mass	June 23
Stoves and grates, (antedated Feb. 26, 1838.)	Eli C. Robinson	Troy, N. Y	June 30

CLASS VI.—*Steam and gas engines, including boilers and furnaces therefor, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Boilers, steam	Abram Van Order	Ithaca, N. Y	July 17
Boilers, steam	Ellis L. Horton	Hartford, Conn	Sept. 5
Boilers, steam	Jacob Perkins, (assigned to A. M. Perkins.)	Now residing in England.	Dec. 15
Boilers, steam, regulating height of water in.	Seth Graham	Roxbury, Mass	Feb. 15
Boilers, steam, safety	Levin P. Clark	Baltimore, Md	May 30
Boilers, steam, spiral flue for	Benjamin J. Miller	New York city	April 5
Pistons, steam engines for	Ellis L. Horton	Hartford, Conn	Sept. 5
Spark-catcher	Timothy Newhall	Lynn, Mass	Jan. 27
Spark-catcher, (additional improvement June 14, 1838.)	Jonas P. Fairlamb	Philadelphia, Pa	Mar. 3
Spark-catcher	William T. James	New York city	April 13

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Spark-catcher	T. L. Smith and W. J. Van Loane.)	Newark, N. J.	June 20
Spark-catcher	Wm. S. Montgomery.	Baltimore, Md.	July 28
Spark-catcher	Benjamin Briscoe	Detroit, Mich.	Dec. 15
Spark-catcher	Samuel Leonard	Bridgewater, Mass.	Dec. 15
Spark-catcher	John Finley	Baltimore, Md.	Dec. 23
Spark-catcher flue	Johannes Oberhausser	Charleston, S. C.	Feb. 24
Steam, condensing apparatus for	Asahel Collins	Ulster, N. Y.	Dec. 31
Steam engine	Seth Graham	Roxbury, Mass.	April 21
Steam engine	Nathaniel Bosworth	Philadelphia, Pa.	July 9
Steam engine, (reissued July 18, 1840.)	William A. Lighthall	Albany, N. Y.	April 14
Steam engine, cutting off steam from	Isaac Adams	Boston, Mass.	May 17
Steam engine, draught, box for	Andrew M. Eastwick	Philadelphia, Pa.	April 5
Steam engine, locomotive	Z. H. Man and Levi B. Thying.	Lowell, Mass.	Mar. 10
Steam engine, rotary	O. Wright and A. A. Wilder.	Warsaw, N. Y.	April 2
Steam, generating	Phineas Bennett	New York	Aug. 3
Steam, generating	Horatio Hubbell	Philadelphia, Pa.	Aug. 6
Valve, safety	John Hadley	Bennington, N. Y.	Mar. 10

CLASS VII.—*Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion; diving dresses, life preservers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Boats, canal	Edward Randolph	Salt Creek, Ohio	Jan. 9
Boats, canal	John H. Long	Lewistown, Pa.	April 5
Boats for travelling on ice	Thaddeus Chapin	Canandaigua, N. Y.	Sept. 14
Cables, chain, stopper for	M. P. Mix	New York	Nov. 3
Diving dress	William S. Taylor	....do	Jan. 20
Gaft of sail vessels	John Brown	Stonington, Conn.	Dec. 31
Ice-breaker	Walter Hunt and J. Townsend.	New York	Oct. 3
Life-preserver, safety	John J. White	Philadelphia, Pa.	April 7
Propelling paddles for boats	Isaac McCord	Harrisburg, Pa.	Sept. 22
Propelling vessels	John Ericsson	Kingdom of Sweden.	Feb. 1
Raising vessels and carrying	Hiram L. Meeker and J. Bergen.	Jersey city, N. J., and New York city.	May 25
Raising vessels and floating	Samuel Carson	Woodside, England.	July 12
Raising vessels out of water, (additional improvement Sept. 13, 1839.)	Thomas Bell	Brookhaven, N. Y.	Nov. 14
Tree-nails, turning	J. E. Andrews	Boston, Mass.	Aug. 30

II.—*Classified list of expired patents*—Continued.

CLASS VIII.—*Mathematical, philosophical, and optical instruments, including clocks, chronometers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Electro-magnets, changing the poles.	Nelson Walkley	Tuscaloosa, Ala.	June 27
Electro-magnetism as a motor	Solomon Stimpson	New York	Sept. 12
Plumb, balance and pendulum	Lemuel Lewis	Newfield, N. Y.	Oct. 3
Protracting table	William T. Steiger	Washington, D. C.	Sept. 7
Quadrant, artificial horizon for	Charles Goulding	Noble, Ala.	Feb. 24
Sphereometer for ascertaining relative bearings.	Cephas Johnson	Southington, Conn.	Jan. 9
Spring for clocks	Joseph S. Ives	New York city	May 4

CLASS IX.—*Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs, &c.*

Improvements or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Blasting rocks, safety fuse for	William Lewis	New York city	Oct. 26
Boring rocks	George C. Doherty	Cumberland co., Ky.	Aug. 29
Bridges, swinging	Abner R. Ring	Parma, N. Y.	Nov. 9
Canal lock gate	Franklin Livingston	Waterford, N. Y.	April 13
Doors, drop	George Kilburn	Walpole, N. H.	Dec. 31
Doors, hanging	Edward C. Tilson	Thomaston, Me.	Jan. 9
Excavating earth, elevating box, wheels for.	James Rowe	Triana, Ala.	Feb. 15
Excavating and removing earth	James Sawyer	New York city	Mar. 23
Excavating and embanking ditches.	George Page	Keene, N. H.	Oct. 26
Excavating, embanking, and ditching.	Linton Thorn	Washington, D. C.	Oct. 10
Excavator, mud-machine	John Hart	Middletown, Conn.	Nov. 20
Gravel pump for excavating wells	Laura Rice, administratrix of James J. Rice, deceased, and Ebenezer Rice.	Salina, N. Y.	Aug. 15
Marine railway	Robert Findle, administrator of Israel Riggins.	Baltimore, Md.	Aug. 30
Pile-driving, progressive, for railroads.	Smith Cram	New York city	June 14
Railroad, preventing cattle on	David Green	Greenfield, N. Y.	Aug. 25
Railroad timber	James Stimpson	Baltimore, Md.	Aug. 13
Removing obstructions under water.	Smith Cram	New York city	Oct. 26
Roofs, covering with tin	John B. Duval	Charleston, S. C.	Sept. 19
Snags, removing	Henry M. Shreve	St. Louis, Mo.	Sept. 12
Stumps, extracting, and moving heavy bodies.	Roswell H. Hall	Branchport, N. Y.	Sept. 15
Window sash, preparing stuff for	Caleb B. Rogers	Norwich, Conn.	Sept. 20

II.—*Classified list of expired patents*—Continued.

CLASS X.—*Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Axletrees and boxes, (additional improvement Oct. 25, 1838.)	James A. Smith	New Haven, Conn.	Mar. 23
Axletrees, railroad cars, strengthening of.	Ziba Durkee	Philadelphia, Pa.	Jan. 9
Brakes, for cars, eccentric	Ephraim Morris	Bloomfield, N. Y.	Sept. 19
Bumpers applied to locomotives, &c.	J. P. Fairlamb and L. C. Judson.	Philadelphia, Pa.	Jan. 9
Bumpers and spring draught, for railroad cars.	Peter Alverson	New Haven, Conn.	Sept. 8
Car, railroad, (additional improvement Nov. 21, 1842.)	Samuel Harrison, jr.	Philadelphia, Pa.	April 24
Car, railroad	William A. Davis	Baltimore, Md.	Oct. 5
Lock, spring, for coach doors	Peter Alverson	New Haven, Conn.	April 2
Sleigh runners to wheel carriages, attaching.	Henry G. Guyon	New York city	Sept. 13
Springs, carriage	William Patton	Towanda, Pa.	Jan 9
Springs, carriage	William Sharp	Burdett, N. Y.	April 7
Springs, carriage	Elbridge G. Woodside.	Augusta, Me.	May 4
Springs, carriage	George B Robinson	Pawlet, Vt.	Oct. 3
Springs, carriage	Remember Baker, executor of Stan Baker.	Elba, N. Y.	June 19
Springs, carriage, and attaching carriage bodies to them.	David A. Morton	Croton, N. Y.	Jan. 9
Springs, carriage, and attaching carriage bodies to them.	J. Jones, Allen Eells, and Horace Griswold.	Delaware, co., N. Y.	July 16
Springs, carriage, elliptic	Melzar Tuells	Penn Yan, N. Y.	July 9
Springs for locomotive	Johannes Oberhausser.	Charleston, S. C.	Feb. 15
Springs for railroad cars, (reissued Sept. 25, 1840, and June 8, 1841.)	Fowler M. Ray	Cattskill, N. Y.	Nov. 3
Tire for wheels, facing iron with steel.	William Johnson	Newark, Del.	May 30
Velocity, obtaining, on railroads	Jacob Nollner	Washington, D. C.	April 13
Wheels, car, cast-iron	Henry Morey	Beaver Meadow, Pa.	Mar. 10
Wheels, car, cast-iron	Jona. Bonney, Charles Bush, and Geo. B. Lobdell.	Wilmington, Del.	Mar. 17
Wheels, car, cast-iron	Samuel Truscott, Geo. Wolfe, and James Dougherty.	Columbia, Pa.	Mar. 17
Wheels, carriage, and harness	George Barnant	Washington, D. C.	May 25
Wheels, carriage, for railroad	Robert Grant	Baltimore, Md.	Nov. 3
Wheel-hubs of car, chilling	Hopkin Thomas	Beaver Meadow, Pa.	Oct. 13
Wheels of locomotive engines	Henry R. Dunham	New York	Feb. 15

II.—*Classified list of expired patents*—Continued.

CLASS XI.—*Hydraulics and pneumatics, including water-wheels, windmills, and other implements operated on by air or water, or employed in the raising and delivery of fluids.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Air, action, for propelling boats	James Black	Orangeville, Ohio	July 24
Bellows, hand	John Grennell	Springfield, Mass	Aug. 3
Bellows, steam	Martin Bell	Antis township, Pa.	April 24
Gate, flume, for water-wheels	William Buckminster.	Framingham, Mass.	April 25
Hydrants and fire-plugs	John M. Jorden	Baltimore, Md	Sept. 8
Hydrostatic press	Edward Merrill	New Bedford, Mass.	Mar. 23
Pistons of pumps, working	David Whittier	Belfast, Me.	April 14
Pumps	Joseph Smart	Enton, Pa.	Feb. 3
Pumps	Jesse Reed	Marshfield, Mass.	July 24
Pumps	Joseph Evans	Lebanon, Ohio	Nov. 9
Pump, fire-engine	Joseph Newman	Baltimore, Md.	April 14
Pump, suction and force	James J. Rice	Salina, N. Y.	Mar. 10
Pump, suction and force	Andrew Bailey	Jefferson, Ohio	May 4
Raising water	David L. Myers and Samuel Myers	Christianburg, Va.	July 28
Raising water and forcing	Elisha Vance	Wilmington, Ohio	June 7
Syphon for drawing oil	James Gray	Fredericksburg, Va.	April 25
Water-wheel	John W. Moon	Roxbury, N. Y.	Feb. 15
Water-wheel	John R. Wheeler	Seneca Falls, N. Y.	April 14
Water-wheel	John Mumma	West Alexandria, O.	April 28
Water-wheel	Samuel B. Howd	Geneva, N. Y.	July 26
Water-wheel	William Hatfield	Zanesville, Ohio	Dec. 31
Water-wheel	Thomas N. Whitcomb and Jos. M. Whitcomb.	Grafton, Vt.	Dec. 31
Water-wheel, reacting	Nelson Johnson	Erwin Centre, N. Y.	May 30
Wind-wheel, horizontal	Wm. Lewis and Thos. J. Lewis.	Boston and Cambridge, Mass.	Jan. 27
Wind-wheel, regulating	Israel Keyes	Putney, Vt.	Sept. 14

CLASS XII.—*Lever, screw, and other mechanical power, as applied to pressing, weighing, raising, and moving weights.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Balance, platform	B. Morrison	Milton, Pa.	Mar. 17
Balance, platform	J. B. Dale	Lansingburg, N. Y.	Aug. 30
Balance, platform	R. L. McCollum	Rochester, N. Y.	Dec. 31
Balance, scale, beam, and weights	Alvah H. Tree	Troy, N. Y.	Jan. 9
Boom derrick, (additional patent September 13, 1839.)	James S. Savage	Boston, Mass	Feb. 15
Cargoes, ascertaining weight of	Amory Amsden	Rochester, N. Y.	June 27
Crane, labor-saving	Thomas Godwin	New York city	Oct. 2
Press, cheese	Luke Hale	Hollis, N. H	June 30
Press, cotton	Henry Waterman	Bath, Me.	May 10
Press, cotton	Alexander Jones	New Orleans, La.	Oct. 26
Press, improved	George C. Chesley	Rocky Mount, Vt.	June 27
Raising heavy bodies, and extracting stumps.	Roswell H. Hall	Branch Port, N. Y.	Sept. 15

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Raising heavy bodies, machinery for, (additional patent December 31, 1838.)	George Kilburn	Walpole, N. H.	Aug. 25
Windlass	Russel Evarts	Madison, Conn	May 30
Windlass	F. G. Cameron	New York city	June 12
Windlass for weighing anchors	John M. O'Brien	Brunswick, Me	Nov. 9

CLASS XIII.—*Grinding mills and mill-gearing, containing grain mills, mechanical movements, and horse-powers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Bevel gear, universal	John Lewis	Burlington, Vt	Nov. 29
Cider mill, portable	Frederick Fredley	Sugar Valley, Pa	Aug. 3
Flax seed, grinding	George L. Stearns	Boston, Mass	Aug. 17
Friction rollers, (antedated September 26, 1837.)	Rollin Dickinson and S. G. Moorman.	Souchington, Ct	Mar. 26
Gearing for driving machinery	Jesse Urmy	Wilmington, Del	Feb. 6
Grist-mill	Perry Davis	N. Providence, R. I.	May 17
Grist-mill	O. P. Stevens, assignee of Ezra Goodell.	Port Lawrence, Ohio.	Oct. 10
Horse-power	James Secor	New York, N. Y	Ap'l 28
Horse-power	Miles C. Mix	Darby, N. Y	June 23
Horse-power	Orrin Straight	Lycoming co., Pa	Aug. 3
Horse-power	Jerub A. Fay	Baltimore, Md	Oct. 10
Horse-power, endless chain	Webber Furbish	Hallowell, Me	Ap'l 14
Mill-stones, dressing and laying the runners of.	Charles Vest	Stokes county, N. C.	Oct. 2
Mill-stones, facing, furrowing, and dressing.	Zebulon Cheesebrough	Alden, N. Y	Dec. 10
Mill, sugar, breaking and crumbling lumps of.	William Bent	Philadelphia, Pa	Feb. 3
Motion, reciprocating	Charles A. Watson	Greene river, Ky	Aug. 1
Spindle and brush, self-tightening	Henry Kinchbaugh	Lampeter township, Pa.	Oct. 19

CLASS XIV.—*Lumber, including machines and tools for preparing and manufacturing, such as sawing, planing, mortising, shingle and stave, carpenters' and coopers' implements.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Auger, double-twisted, (reissued July 30, 1845.)	E. L'Hommedieu, assignee of R. Watrous.	Chester, Ct	July 24
Boring and framing timber	Jared Badger	Brooklyn, Ct	Jan. 20
Casks, cutting heading for, (antedated July 27, 1837.)	Lee Wells	Hartsville, N. Y	Jan. 27
Clapboards, sawing	Crawford Tyler	Milford, N. H	Aug. 30
Coopering, crows for	James F. Brodhead	Kingston, N. Y	Oct. 8
Dovetailing and mortising	John Brainerd	Aurora, Ohio	Jan. 9

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Gimlet	Ezra L'Hommedieu	Chester, Ct	Mar. 10
Mortising and tenoning	Henry Barnes	Munson, Ohio	April 28
Mortising timber	Francis and Thomas Burdick.	Brooklyn, N. Y	April 7
Mortising timber	Ira McLaughlin	Sunderland, Vt	April 7
Mortising timber	John Andrews	Sudbury, Mass	May 30
Mortising timber	John Gridley, assignee of Erastus M. Shaw.	Baltimore, Md	Sept. 22
Plane, screw-arms for	Emanuel W. Carpenter	Lancaster, Pa	Feb. 6
Planing boards	Robert Luscomb	Penn Yan, N. Y	June 12
Planing boards	Joseph Lombard	Boston, Mass	Oct. 13
Planing boards	Barnabas Langdon	Troy, N. Y	Jan. 9
Saw, annular	Robert Grant	Baltimore, Md	Oct. 8
Saw-mills	Cornelius Van Alstine	Manlius Centre, N. Y.	Aug. 18
Saw-mills	James Secor	New York	Ap'l 28
Saw-mill dogs	H. Thurber	Painted Post, N. Y	May 30
Saw-mill, portable	Pearson Crosby	Fredonia, N. Y	June 7
Saw-mill, without saw-gate	John C. Yates	Columbus, Tenn	Ap'l 21
Shingles and clapboard, sawing	Thomas J. Flanders	Bradford, N. Y	Sept. 25
Shingles, sawing	Elnathan Sampson	Plymouth, N. H	Sept. 5
Shingles, shaving	B. Langdon	Troy, N. Y	Jan. 9
Shingles, shaving	W. Thorn and J. Thorn, jr.	Plainfield, N. J	June 7
Staves for barrels, jointing	James Wyman	Boston, Mass	July 28
Staves, sawing	William Bell	Lexington, Ky	Sept. 22
Staves, sawing and jointing	Nathaniel Moore	Ellsworth, Me	June 19
Staves, sawing and jointing	William Laney and Solomon Merrick.	Springfield, Mass	Sept. 25
Tonguing, grooving, &c., boards, side-cutter head.	Walter M. Hutton	Troy, N. Y	Oct. 26
Tonguing, grooving, and heading boards, (antedated August 21, 1837.)	Samuel Shepherd and D. Baldwin.	Nashua, N. H	Feb. 21
Tonguing, grooving, and heading boards.	Frederick Fredley	Sugar Valley, Pa	Sept. 15

CLASS XV.—*Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cements, and other building materials.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Brick making	Jesse Reeder	Cincinnati, Ohio	Feb. 15
Brick making	Samuel C. Brusster	Kensington dis't, Pa.	April 14
Brick moulding	Loomis E. Ransom	Millport, N. Y	Jan. 9
Brick moulding	John Bolton	Saratoga Springs, N. Y.	Aug. 23
Brick moulding and pressing	S. Waterman and C. Learned.	Charleston, S. C	Ap'l 14
Brick press	Gaylord V. Harper	Batavia, N. Y	Ap'l 25
Brick press	Stephen Ustick, assigned to C. P. Bronson.	Philadelphia, Pa	Dec. 28
Brick press for dry clay	N. Sawyer and J. W. Smith.	Washington, D. C	Aug. 13
Brick press for dry clay	Benjamin H. Brown	Washington, D. C	Dec. 8

II.—*Classified list of expired patents*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Earthenware	Joseph Smolinski	Philadelphia, Pa	Mar. 28
Hammer, cutting and dressing stone.	Joseph Richards	Braintree, Mass	Feb. 20
Hammer, pecking stone	Bela Gardner	Ashfield, Mass	Aug. 3
Marble, &c., dressing	John D. Buzzell	Cape Elizabeth, Me	Aug. 13
Stone, cutting and dressing, (antedated September 3, 1837.)	G. M. Alger and J. A. Alger.	South Strafford, Vt	Mar. 3
Stone, facing	Daniel Bunnel	Xenia, Ohio	July 16

Class XVI.—*Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Bating hides and skins	William Zollickoffer	Middleburgh, Md	Feb. 3
Crimping leather	Lucius Upham	Putney, Vt	Jan. 9
Crimping leather	Collins H. Jaquith	Keene, N. H	Mar. 21
Crimping leather, (antedated September 26, 1837.)	Joseph Adams	Fairhaven, Vt	Mar. 26
Crimping leather	Nathaniel Woodbury	Calais, Me	Aug. 16
Crimping leather	George and Major Algar	Greenport, N. Y	Nov. 25
Harness, horse-collars, stretching	Henry Barton	West Carlisle, Ohio	July 9
Leather, manufacturing	A. Hickman and E. L. Davenport.	Abington, Va	Aug. 1
Pricking leather for harness	Joseph Briggs, Luther C. Carner, and John C. Carner.	Paineville, Ohio	Mar. 26
Rolling and shaving leather	Thomas Chase	New York city	Sept. 12
Skiving and whitening leather	Gilbreth & Eaton, assignees of Seth Graham.	Roxbury, Mass	May 10
Splitting leather, sole and other	Elias Putman	Danvers, Mass	Nov. 20
Tanning leather, vats for	W. L. J. C. Rouse and Silas Taylor.	Bedford, Va	June 29
Tanning, process of	Thomas Chase, assigned to G. H. Richards.	New York city	Nov. 25
Trunks, travelling, fire and water-proof.	Charles F. Miller	Lancaster, Pa	June 20
Whips, platting machine for covering.	Seymour Holladay	Westfield, Mass	April 4

II.—*Classified list of expired patents*—Continued.

Class XVII.—*Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Bedstead	Samuel P. Smith	Salina, N. Y	Oct. 26
Bedstead fastening	William Bell	Lexington, Ky	Feb. 15
Bedstead fastening	Pardon Post	New Haven, Ct	June 12
Bedstead fastening	Laurens Kent	Dorset, Vt	Sept. 12
Bedstead rails, cutting screws on the ends of	Jacob Lindly	Cynthiana, Ky	June 20
Bedstead sacking, stretching	William S. Anderson	Shelbyville, Tenn	June 4
Bedstead, sofa	Nicholas McGraw	New York city	Dec. 10
Bedstead, sofa-sliding	George W. Wode	New York city	June 12
Bedstead, wardrobe	Zebulon C. Favor	Boston, Mass	April 2
Broom-making	John M. Spooner	Belchertown, Mass	April 28
Chairs, combined rocking and castor	John David Brown	New York city	Oct. 5
Coffee and tea, making	Antoni Bencini	Milton, N. C	Sept. 27
Couch, variety	Eleazer Carver	Bridgewater, Mass	June 12
Cutting apples, coring, quartering	Robert W. Mitchell	Martin's Hill, Ohio	April 13
Cutting vegetables	John G. Conger	Rebersburg, Pa	Jan. 27
Cutting vegetables, beet-roots, &c	Joseph Herd, jr	Boston, Mass	July 26
Dough, plating and cutting crackers	John M. Heagle	New Haven, Ct	April 13
Feathers, cleaning and purifying	Samuel G. Ladd	Hallowell, Maine	Sept. 22
Feathers, dressing and washing	John W Howlett	Greensborough, N. C.	Oct 5
Refrigerator	Henry V. Hill	Washington, D. C	May 25
Washing clothes, rotary pounder for.	Christopher Aurnock	Elbridge, N. Y	Mar. 10
Washing machine	Robert W. Oliphant	North Granville, N.Y.	June 7
Writing desk	Seth Luther	Boston, Mass	June 19

Class XVIII.—*Arts, polite, fine, and ornamental, including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Book-binding	David Felt	New York, N. Y	Aug. 1
Counterfeit notes, preventing	Eleazer Watson	Albany, N. Y	Aug. 3
Gilding copper, brass	George Richards	Birmingham, Engl'd.	May 17
Organs	John Meads	Albany, N. Y	Nov. 25
Pens, metallic, (antedated September 21, 1837.)	Henry C. Windle, Joseph Gillott, and Stephen Morris.	England	Mar. 21
Pencil case and pen	Thomas Addison	New York city	May 10
Piano-forte, (reissued December 31, 1839.)	Edwin Brown	Boston, Mass	Nov. 20
Piano-forte, key for tuning	John Cutts Smith	Boston, Mass	Nov. 14
Piano-forte, wrest pin of	Daniel Walker	New York, N. Y	June 19
Types, casting printers'	David Bruce, jr	Bordentown, N. J	Mar 17
Types, smoothing the sides of	David Bruce, jr	Bordentown, N. J	Mar. 10

II.—*Classified list of expired patents*—Continued.

Class XIX.—*Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Carriage, gun	William Smith	Washington, Ky	July 19
Fire-arms	H. & C. Daniels	Chester, Ct.	Feb. 15
Fire-arms, (additional improvement July 9, 1839.)	William Jenks	Columbia, S. C.	May 25
Fire-arms	H. L. Thistle	New Orleans, La	Aug. 1
Fire-arms	Samuel Adams	Springfield, Mass	Oct. 3
Fire-arms, many-chambered	P. F. Haviland and E. A. Bennet.	Waterville, Me	Feb. 15
Fire-arms, many-chambered	H. & C. Daniels	Chester, Ct	April 5
Fire-arms, many-chambered	Theodore F. Strong	Northampton, Mass.	April 21
Fire-arms, many-chambered	Rufus Nichells and Edward Childs.	Conway, Mass	April 24
Fire-arms, many-chambered	Mighill Nutting	Portland, Me	April 25
Fire-arms, many-chambered	Elijah Jaquith	Brattleboro', Vt	July 12
Lock, gun	Philo W. Hoyt	Danbury, Ct	Mar. 10
Powder	R. J. L. Witty	Lowell, Mass	April 2
Shot charger	George W. Dobbins	Baltimore, Md	Mar. 23
Shot, manufacturing	Alfred Duval	Baltimore, Md	May 8
Throwing balls, shot, &c	Robert McCarty	City of New York	Dec. 31

Class XX.—*Surgical and medical instruments, including trusses, dental instruments, bathing apparatus, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Corn eradicator	Peregrine Williamson	New York	May 17
Tooth extractor	David H. Dickey	Boston, Mass	Aug. 30
Truss, corset	Johannes Oberhausser	Charleston, S. C.	Jan. 20
Truss for hernia	Samuel A. Brown	Petersburg, Va	May 25

II.—*Classified list of expired patents*—Continued.

Class XXI.—*Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Combs, metallic	Richard A. Ives	Bristol, Ct	Mar. 28
Combs, metallic	Richard A. Ives	Bristol, Ct	Sept. 25
Garments, measuring and cutting	William Kahler and Charles Kahler.	Bloomsburg, Pa	Jan. 20
Shears, flying	Seth Parsons	Hoosick Falls, N. Y.	June 7
Springs for belts, pantaloon straps, and vests, (reissued to O. M. McDaniel, assignee of Hunt, November 16, 1839.)	Walter Hunt	New York, N. Y.	Mar. 21
Stock for the neck, metallic frame for.	John Johnson	New York	Dec. 31

Class XXII.—*Miscellaneous.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1838.
Fish, catching	Arunah Tiffany	Gibson, Pa	July 26
Hurdle for rearing silk-worms	Gamaliel Gay	Poughkeepsie, Ct	Oct. 6
Ice, packing and stowing	Fred. Sudor	Boston, Mass	May 4
Net for catching mackerel	Benjamin W. Hale	Newbury, Mass	June 4
Seine, fishing	Russel Evarts	Madison, Ct	Mar. 21
Seine, fishing	Cyrus Tracy	Savannah, Ga	Sept. 19
Traps for rats	Thomas Kell	Alexandria, D. C	Mar. 3

Classified list of patents for Designs that have expired during the year 1852.

Designs.	Patentees.	Residence.	Date of patent.
Stoves	Addison Low, assignor to John S. Leake and Francis S. Low.	Albany, N. Y.	Feb. 12, 1845
Lamps	P. F. Slane	East Cambridge, Mass.	Mar. 26, 1845
Stoves	Charles S. Hine	New York	May 1, 1845
Tripod stand for globes, &c.	Gilman Joslin	Boston, Mass.	May 7, 1845
Stoves	Sansom H. Ransom	Albany, N. Y.	July 10, 1845
Stoves	Ezra Ripley, assignor to Ira Jagger, William B. Treadwell, and John S. Perry.	Troy, N. Y.	April 1, 1845
Stoves	Anson Atwood, assignor to Benjamin Starbuck	Troy, N. Y.	July 14, 1845
Stoves	David Root	Cincinnati, Ohio.	Sept. 9, 1845
Stoves	Elijah P. Penniman	Rochester, N. Y.	Sept. 9, 1845
Umbrella stands	William L. Miller	New York	Sept. 13, 1845
Stoves	Addison Low, assignor to Rathbone & Co.	Albany, N. Y.	Oct. 7, 1845
Bust of J. C. Calhoun	Clark Mills	Charleston, S. C.	Oct. 7, 1845
Stove	John S. Peckham and M. Peckham	Utica, N. Y.	Sept. 6, 1845
Stove	Henry Stanley	Poultney, Vermont	Oct. 16, 1845
Stoves	Ezra Ripley, assignor to E. Johnson, G. Geer, and D. B. Cox.	Troy, N. Y.	Aug. 14, 1845
Stove-plate	Calvin Fulton, assignor to John M. French	Rochester, N. Y.	Nov. 7, 1845
Stoves	Ezra Ripley, assignor to Peter Low, John P. Choller, and Eber Jones.	Troy, N. Y.	Nov. 12, 1845
Parlor grate	William and Nathan H. Jackson	New York	Jan. 7, 1845
Stoves	Albert G. Bristol	Rochester, N. Y	Sept. 22, 1845

III.

ALPHABETICAL LIST OF PERSONS WHOSE PATENTS HAVE EXPIRED DURING THE YEAR 1852, WITH THEIR INVENTIONS OR DISCOVERIES, AND CLASS.

Patentees.	Inventions or discoveries.	Class.
Adams, Isaac	Steam engine, cutting off steam	VI.
Adams, Joseph	Crimping leather	XVI.
Adams, Samuel	Fire-arms	XIX.
Addison, Thomas	Pencil-case and pen	XVIII.
Algar, George & Major	Crimping leather	XVI.
Alger, Charles C.	Furnace, blast, smelting	II.
Alger, Cyrus	Plough, cast-iron, malleable	I.
Alger, G. M. & J. A.	Stone, cutting and dressing	XV.
Allen, John	Fuel, composition for	V.
Alverson, Peter	Bumpers, railroad cars	X.
Alverson, Peter	Lock, spring, coach doors	X.
Amsden, Amory	Cargoes, ascertaining weight	XII.
Anderson, William S.	Bedstead sacking, stretching	XVII.
Andrews, John	Mortising timber	XIV.
Andrews, Joseph E.	Tree-nails, turning	VII.
Angell, Emory A.	Loom-temples	III.
Arnoux, Antoine	Gas burner	V.
Atwater, James	Grates, open	V.
Atwood, Anson	Stove, cooking, summer	V.
Aumock, Christopher	Washing clothes, rotary pounder	XVII.
Bacon, Jonathan	Window, spring fastener	II.
Badger, Jared	Boring and framing timber	XIV.
Bailey, Andrew	Pump	XI.
Baker, Remem , exec'r of Stan. Baker	Springs, carriage	X.
Baker, William P.	Gin, cotton	III.
Ball, Daniel	Lock, door	II.
Barker, John	Saw for ice	II.
Barnant, George	Wheels, carriage, and harness	X.
Barnes, Henry	Mortising and tenoning	XIV.
Barton, Henry	Horse collar, stretching	XVI.
Baughman, J., Guiteau & High	Furnace, smelting ore	II.
Beach, Robert A. B.	Straw cutter	I.
Beach, William	Stoves, close	V.
Beale, Joshua T.	Lamps	V.
Beebe, Uriah	Thrashing machine, conveying straw	I.
Beehan, Thomas	Brewing beer	IV.
Bell, Martin	Bellows, steam	XI.
Bell, Thomas	Raising vessels	VII.
Bell, William	Staves, sawing	XIV.
Bell, William	Bedstead fastening	XVII.
Bencini, Antoni	Coffee and tea making	XVII.
Bennett, Phineas	Steam generating	VI.
Bent, William	Mill, sugar	XIII.
Bigelow, B. Erastus	Loom, knotted counterpanes	III.
Bissey, Amos	Forge, smiths'	II.
Black, James	Air propelling boats	XI.
Blake, Philos, Eli. W., & John A.	Castors for bedsteads	II.
Bolton, John	Brick moulding	XV.
Bonney, J , C. Bush, & G. B. Lobdell.	Wheels, car, cast-iron	X.
Boon, Sanford	Spoons, plating mill	II.
Bosworth, Nathaniel	Steam engine	VI.
Boynton, John	Straw cutting	I.
Brainard, John	Dovetailing and mortising	XIV.
Briggs, J. B., L. C. Carner, & J. C. Carner.	Pricking leather for harness	XVI.
Briscoe, Benjamin	Spark-catcher	VI
Brittain & Silvers	Flax or hemp gathering	I.
Brodhead, James F.	Coopering, crows for	XIV.
Brown, Benjamin H.	Brick press, dry clay	XV.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Brown, Edwin	Piano-forte	XVIII.
Brown, James S.	Boring groove for flier of speeders	II.
Brown, John	Gaft of sail vessels, (extended for seven years from December 31, 1852.)	VII.
Brown, John David	Chairs, rocking and castor	XVII
Brown, Samuel A.	Truss, hernia	XX.
Bruce, David, jr.	Types, casting, printers'	XVIII.
Bruce, David, jr.	Types, smoothing sides	XVIII.
Bruster, Samuel C.	Brick making	XV.
Bryant, Isaac C.	Furnace, iron	II.
Buckminster, William	Gate for water-wheels	XI.
Buckminster, William	Seeding, all kinds	I.
Bucklin, Isaac B.	Stove, cooking, railway	V.
Buckminster, William	Rake, hay	I.
Bunce, Elisha	Seeding, corn planter	I.
Bunnell, Daniel	Stone, facing	XV.
Burdick, Francis & Thomas	Mortising timber	XIV.
Burnham, Hiram	Oakum picking	III.
Burt, Enoch	Rags, dusting	III.
Buzell, John D.	Marble dressing	XV.
Cameron, F. G.	Windlass	XII.
Carman, Aaron	Plough, clevis	I.
Carpenter, Emanuel W.	Plane, screw, arms	XIV.
Carroll, Michael	Kiln, charring coal	V.
Carson, Samuel	Raising vessels	VII.
Carter, Robert	Rags, washing	III.
Carver, Eleazer	Hulling rice and barley	I.
Carver, Eleazer	Rolling mill for circular saws	II.
Carver, Eleazer	Gin, cotton, saw ribs	III.
Carver, Eleazer	Couch, variety	XVII.
Carver, Eleazer	Gin, cotton, roller	III.
Chapin, Thaddeus	Boats on ice	VII.
Chase, Thomas	Rolling and shaving leather	XVI.
Chase, T., (assigned to G. H. Richards.)	Tanning process	XVI.
Cheesebrough, Zebulon	Mill-stones, dressing	XIII.
Chesley, Geo. C.	Press, improved	XII.
Clapp, J. & E. S.	Cutting scythe, hanging	I.
Clark, Levin P.	Boilers, safety	VI.
Clark & Albertson	Rags, dusting and tearing	III.
Clegg, Samuel	Gas meters, self-acting	IV.
Cole, David H.	Winnowing grain	I.
Collins, Asahel	Furnace, blast, draught	II.
Collins, Asahel	Steam, condensing	VI.
Conger, John G.	Cutting vegetables	XVII.
Cords, James J.	Hulling rice, mortar	I.
Cram, Smith	Pile, for railroads, driving	IX.
Cram, Smith	Removing obstructions under water	IX.
Crane, George	Iron, manufacturing	II.
Crosby, Pearson	Saw mill, portable	XIV.
Cross, Jeduthan	Hulling grain and cleaning	I.
Cross, Jefferson	Stove, cooking	V.
Cumberland, William	Lead, white	IV.
Currier, Reuben W.	Thrashing and winnowing	I.
Dale, J. B.	Balance, platform	XII.
Daniels, H. & C.	Fire-arms	XIX.
Daniels, H. & C.	Fire-arms, many-chambered	XIX.
Daniels, Reuben	Shearing woollen cloth	III.
Dare, Rencore	Nails and spike, heading	II.
Davis, Perry	Grist mill	XIII.
Davis, William A.	Car, railroad	X.
Davis, William B.	Thrashing clover seed	I.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Day, Moses	Cordage, rope, twisting strand	III.
Deats, John	Plough	I.
Demasters, Foster	Flax and hemp, &c., hatchelling	III.
Dennis, Jonathan, jr.	Trees from canker worm	I.
Dennis, Jonathan, jr.	Silk, reeling	III.
Dennis, Jonathan, jr.	Spinning and twisting silk	III.
Denison, Lester E.	Corn shelling	I.
Dewey, Ebenezer	Straw cutting	I.
Dickey, David H.	Tooth extractor	XX.
Dickinson & Merriman	Friction rollers	XIII.
Ditmars, A. D.	Hay, preserving	I.
Dobbin, George W.	Shot charger	XIX.
Doherty, George C.	Boring rocks	IX.
Douglass, Stephen P. W.	Churn	I.
Drummond & Fuller	Furnace, smelting lead	II.
Dunham, Henry R.	Wheels of locomotives	X.
Durkee, Ziba	Axles, rail cars, strengthening	X.
Dutcher, Josiah	Grates in stoves, raising and lowering	V.
Duval, Alfred	Shot, manufacturing	XIX.
Duval, John B.	Roofs, covering with tin	IX.
Duvall, A. & W. J.	Hulling rice and rubbing wheat	I.
Duvall, William J.	Straw cutter	I.
Duvall, Z., A. Calligan, & J. Miller	Smut and garlic machine	I.
Eastman, Jonathan S.	Straw cutter	I.
Eastwick, Andrew M.	Steam engine, draught box for	VI.
Eaton, Ebenezer	Furnaces of stoves	V.
Ely, Theodore	Wool, cleaning from burs	III.
Ericsson, John	Propelling vessels	VII.
Evans, Joseph	Pumps	XI.
Evans & Churchill	Spinning fliers, flax and hemp	III.
Evarts, Russel	Seine fishing	XXII.
Evarts, Russel	Windlass	XII.
Faber, George	Cards, wool	III.
Fairlamb, Jonas P.	Spark-catcher	VI.
Fairlamb & Judson	Bumpers, applied to locomotives	X.
Fairman, Elijah	Loom, power	III.
Favor, Zebulon C.	Bedstead, &c.	XVII.
Fay, Jerub A.	Horse-power	XIII.
Feinour, Joseph, & Joseph Feinour, jr.	Lamps, signal	V.
Felt, David	Book-binding	XVIII.
Finlay, John	Spark-catcher	VI.
Flanders, Thomas J.	Shingles and clapboards, sawing	XIV.
Fletcher, John C.	Lamps, &c.	V.
Flinchbaugh, Henry	Spindle and bush, self-tightening	XIII.
Flook, Jacob, of John	Hulling cloverseed	I.
Forsyth, Andrew	Flax and hemp, breaking	III.
Fossard, Felix	Dyeing wool	IV.
Foster, Leonard	Locks, mortise	II.
Fredley, Frederick	Cider mill, portable	XIII.
Fredley, Frederick	Tonguing, grooving, &c., boards	XIV.
Gardiner, Bela	Hammer, pecking stone, &c.	XV.
Gay, Gamaliel	Hurdle for rearing silk-worms	XXII.
Gilbert, Myron J.	Thrashing grain and shelling corn	I.
Gilbreth & Eaton, assignees of S. Graham.	Skiving, &c., leather	XVI.
Gillett, Edwin	Straw-cutting	I.
Gillet, Phineas	Stoves	V.
Gilson, Samuel	Straw-cutting	I.
Godwin, Thomas	Crane, labor-saving	XII.
Gold, B. F.	Steaming, boiling, &c., apparatus	V.
Gold, S. J. & J. S.	Cooking stove, heat to	V.
Goodyear, Charles	Gum-elastic, manufacturing	IV.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Goulding, Charles	Quadrant, artificial horizon for	VIII.
Graham, Seth	Steam engine	VI.
Graham, Seth	Boilers, steam, regulating height of water in	VI.
Grant, Robert	Wheels, carriage, for railroads	X.
Grant, Robert	Saw, annular	XIV.
Gray, James	Syphon, for drawing oil	XI.
Green, David	Railroad, preventing cattle on	IX.
Gregory, Stephen	Plough, mould board, double	I.
Grennell, John	Bellows, hand	XI.
Gridley, Cyrus	Furnace, and pots for melting	II.
Gridley, J., assignee of E. M. Shaw	Mortising timber	XIV.
Grieb, F. & H.	Thrashing machine	I.
Guyon, Henry G.	Sleigh runners to wheel carriages, attaching	X.
Hadley, John	Valve, safety	VI.
Hagerty, John	Fireplace, parlor and kitchen	V.
Hale, Benjamin W.	Net for catching mackerel	XXII.
Hale, Luke	Press, cheese	XII.
Hall, Roswell H.	Stumps, extracting, and moving heavy bodies	IX.
Hall, Roswell H.	Stumps, extracting, and raising heavy bodies	XII.
Harper, Gaylord V.	Brick press	XV.
Harris, James S.	Filing handsaws	II.
Harrison, Samuel, jr.	Car, railroad, &c.	X.
Harrison, Samuel T.	Evaporator	IV.
Hart, John	Excavator	IX.
Hatfield, William	Water-wheel	XI.
Haviland & Bennet	Fire-arms, many-chambered	XIX.
Hayes, Augustus A.	Tannin, extracting	IV.
Heagle, John M.	Dough, plating and cutting crackers	XVII.
Herd, Joseph, jr.	Cutting vegetables	XVII.
Hermance, Garet G.	Cooking stove	V.
Hernly, John	Cultivator, corn plough	I.
Heywood & Fisher	Cooking stove	V.
Hibbard, Harmon	Hats and furs, coloring	III.
Hickman & Davenport	Leather, manufacturing	XVI.
Hight, George	Hoe, fastening handles to	I.
Hill, Daniel F.	Lime, &c., spreading	I.
Hill, H. V.	Refrigerator	XVII.
Hill, Josiah	Cooking stove, and warming rooms	V.
Hoard, Francis	Sugar boiler, circulating	IV.
Hoarth & Jones	Spinning fliers and spindles, cotton	III.
Holladay, Seymour	Whips, platting machine for covering	XVI.
Holland, Harrison	Spinning silk, &c.	III.
Holland, Homer	Paper, preparing husks to make	III.
Holland, Homer	Lead, white	IV.
Hollingsworth, John M.	Paper engine, regulator	III.
Horton, Eli	Loom, power, treadle in	III.
Horton, Ellis L.	Pistons, steam engines for	VI.
Horton, Ellis L.	Boilers, steam	VI.
Howd, Samuel B.	Water-wheel	IX.
Howlett, John W.	Feathers, dressing, &c.	XVII.
Hoyt, George A.	Seeding, sowing, drill for	I.
Hoyt, Philo W.	Lock, gun	XIX.
Hoyt & Bulkley	Hinges, &c.	II.
Hubbell, Horatio	Steam, generating	VI.
Humphreys, John	Carpeting and rugs	III.
Hunsicker, Daniel	Hulling clover seed	I.
Hunt, Walter	Springs for belts	XXI.
Hunt & Townsend	Ice-breaker	VII.
Hurd, Joseph, jr.	Sugar, manufacturing, from beets	IV.
Hurd, Joseph, jr.	Stoves and fireplace	V.
Hutton, Walter M.	Tonguing, grooving, &c.	XIV.
Idler, Jacob	Cotton, separating trash from	III.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Ives, Joseph S.	Springs for clocks	VIII.
Ives, Richard A.	Combs, metallic	XXI.
Ives, Richard A.	Combs, metallic	XXI.
James, William T.	Spark-catcher	VI.
Jaquith, Elijah	Fire-arms, many-chambered	XIX.
Jaquith, Collins H.	Crimping leather	XVI.
Jenks, William	Fire-arms	XIX.
Johnson, Cephas	Sphereometer	VIII.
Johnson, George A.	Winnowing grain	I.
Johnson, John	Stock for neck, metallic frame for	XX.
Johnson, Walter R.	Steel, converting iron partially into	II.
Johnson, Walter R.	Steel, increasing strength of	II.
Johnson, William	Tire for wheels	X.
Johnson, Nelson	Water-wheel, reacting	XI.
Jones, Alexander	Press, cotton	XII.
Jones, Luther	Lamps, spirits turpentine, burning	V.
Jones, J., Allan Eells, & Horace Griswold.	Springs, carriage, and attaching carriage bodies to them.	X.
Jones, Joseph	Air, heating, for hot blast in furnaces	V.
Jones, Henry C.	Locks, trunk, &c.	II.
Jorden, John M.	Hydrants and fire-plugs	XI.
Joyce, Thomas	Fuel, preparing, and stoves for same	V.
Kahler & Kahler	Garments, measuring and cutting	XXI.
Keene & Keene	Screws, cutting wood	II.
Kell, Thomas	Traps for rats	XXII.
Kent, Lawrence	Extracting color from dye-woods	IV.
Kent, Laurens	Bedstead fastenings	XVII.
Kern, Samuel	Thrashing machine, clover, &c.	I.
Keyes, Alvin	Flax and hemp machine	III.
Keyes, Israel	Wind-wheel, regulating	XI.
Kilburn, George	Machinery for raising heavy bodies	XII.
Kilburn, George	Doors, drop	IX.
Kimball, Stephen	Loom, power, friction to yarn beam	III.
Klein, George W.	Bark, evaporating extract of	IV.
Ladd, Samuel G.	Feathers, cleaning and purifying	XVII.
Lancy, Wm. & Solyman Merrick	Staves, sawing	XIV.
Langdon, Barnabas	Planing boards, (extended for seven years from January 9, 1852.)	XIV.
Langdon, Barnabas	Shingles, shaving, (extended for seven years from January 9, 1852.)	XIV.
Lapham, Benjamin	Loom, power and common	III.
Laurence, William	Lamps, coach	V.
Leonard, Samuel	Spark-catcher	VI.
Lewis, David, jr.	Cutting grass and grain	I.
Lewis, John	Bevel gear	XIII.
Lewis, Lemuel	Plumb, balance and pendulum	VIII.
Lewis & Lewis	Wind-wheel, horizontal	XI.
Lewis, William	Blasting rocks, fuse for	IX.
L'Hommedieu, Ezra	Gimlet	XIV.
L'Hommedieu & Watrous	Auger, double twisted	XIV.
Lighthall, William	Steam engine	VI.
Lindley, Jacob	Bedstead rails, cutting screws on ends	XVII.
Livingston, Franklin	Canals, locks, gate	IX.
Lombard, Joseph	Planing boards	XIV.
Long, John H.	Boats, canal	VII.
Luscomb, Robert	Planing boards, &c.	XIV.
Luther, Seth	Writing-desk	XVII.
Macey, Charles & R.	Hinges, butt, &c.	II.
Magennis, Patrick	Dyeing, art of	IV.
Mallory, James	Kettles, sugar, setting	V.
Mann & Thying	Steam engine, locomotive	VI.
Marshall & Coburn	Cultivator, &c.	I.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Mason, William	Spinning, speeder, &c.	III
Meade, John	Organs	XVIII.
Meeker & Bergen	Raising vessels, &c.	VII.
Merchant, Hiram R.	Seeding, sowing, &c.	I.
Merrick, Solyman	Punch, revolving spring	II.
Merrill, Edward	Hydrostatic press	XI.
Miller, Benjamin J.	Boilers, steam, spiral flues for	VI.
Miller, Charles F.	Trunks, fire and water-proof	XVI.
Miller, James	Stoves	V.
Mitchell, Robert W.	Cutting apples, &c.	XVII.
Mix, M. P.	Cables, chain, stopper for	VII.
Mix, Miles C.	Horse-power	XIII.
Montgomery, William S.	Spark-catcher	VI.
Moon, John W.	Water-wheel	XI.
Moor, Nathaniel	Staves, sawing and jointing	XIV.
Morey, Henry	Wheels, car, cast-iron	X.
Morris, Ephraim	Brakes for cars	X.
Morrison, Benjamin	Balance, platform	XII.
Morse, Leonard, assignee of Harvey Pettee.	Sockets, iron, making	II.
Morton, David A.	Springs, carriage, &c.	X.
Mott, Jordon L.	Furnaces, portable	V.
Mott, Jordon L.	Stove, cooking	V.
Mumma, John	Water-wheel	XI.
Myers, D. L. & S.	Raising water	X.
McCarty, Robert	Throwing balls, shot, &c.	XIX.
McClory, James	Lock, door	II.
McCollum, R. L.	Balance, platform	XII.
McCord, Isaac	Propelling paddles	VII.
McGraw, Nicholas	Bedstead, sofa	XVII.
McLaughlin, Ira	Mortising timber	XIV.
Newell, Robert	Locks, &c.	II.
Newhall, Timothy	Spark-catcher	VI.
Newman, Joseph	Pump, fire-engine	XI.
Nichols & Childs	Fire-arms, many-chambered	XIX.
Nock, Joseph	Locks, trunk	II.
Nollner, Jacob	Velocity on railroads, &c.	X.
Nutting, Mighill	Fire-arms, many-chambered	XIX.
Oberhausser, Johannes	Spark-catcher flue	VI.
Oberhausser, Johannes	Springs for locomotives	VI.
Oberhausser, Johannes	Truss, corset	XX.
O'Brien, John M.	Windlass for weighing anchors	XII.
Oliphant, Robert W.	Washing machine	XVII.
Ormiston, John	Plough, self-sharpening	I.
Osgood, Daniel, jr.	Churn	I.
Page, George	Drill stock, geared	II.
Page, George	Excavating, &c., ditches	IX.
Parker, Amos	Horse-power	XIII.
Parker, John	Smut machine	I.
Parshley & Furbish	Cooking stove	V.
Parsons, Seth	Shears, flying	II.
Parsons, Seth	Shearing cloth	III.
Patton, William	Springs, carriages	X.
Pender & Horn	Loom, power	III.
Perkins, Angier March	Heating buildings, &c.	V.
Perkins, Angier M., assignee of Jacob Perkins.	Boilers, steam	VI.
Pierce, Dexter	Awls, attaching to hafts	II.
Pierce, Samuel	Roasting meat	V.
Pierce, Samuel	Flues, &c., of kitchen ranges	V.
Pike, Joshua G.	Churn	I.
Poe, George	Furnace, blast	II.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Pope, Lemuel T.	Punching, &c., iron	II.
Porter, Rufus	Churn	I.
Porter, Rufus	Corn shelling	I.
Post, John W.	Plough	I.
Post, Pardon	Bedstead fastenings	XVII.
Poullalier, Cyprien	Cement, bituminous	IV.
Pratt, John M.	Napper, metallic	III.
Prouty & Mears	Plough	I.
Puffer, Samuel	Cutting, scythe snath	I.
Putnam, Elias	Splitting leather, &c.	XVI.
Randolph, Edward	Boats, canal	VII.
Ransom, Loomis E.	Brick moulding	XV.
Ray, Fowler M.	Springs, railroad cars	X.
Reed, John M.	Lantern for steamboats	V.
Reed, Jesse	Pumps	XI.
Reeder, Jesse	Brick making	XV.
Reynolds, Charles G.	Salt manufacturing	IV.
Rice, James J.	Pumps, suction and force	XI.
Rice, Laura, administratrix of J. J. Rice & E. Rice.	Gravel pump for excavating wells	IX.
Rich, Martin	Plough, hill side, double	I.
Richards, George	Gilding copper, brass, &c.	XVIII.
Richards, Joseph	Iron ore, smelting	II.
Richards, Joseph	Hammer for cutting, &c.	XV.
Richardson, Sylvanus	Starch machine	IV.
Ring, Abner R.	Bridges, swinging	IX.
Robinson, Eli C.	Stoves and grates	V.
Robinson, George B.	Springs, carriage	X.
Rogers, Caleb B.	Window sash, &c.	IX.
Rogers, George	Vegetable wash for the lungs	IV.
Root, Elisha K.	Axes, hatchets, &c.	II.
Ropes, George	Knives and forks, table	II.
Ross, Joseph	Thrashing machine, preventing dust	I.
Rouse & Taylor	Tanning leather, &c.	XVI.
Rowe, James	Excavating earth, elevating, &c.	IX.
Rowe, William	Thrashing cloverseed	I.
Rust, Samuel	Lamps, &c.	V.
Rust, Samuel	Lamps, &c.	V.
Rust, Samuel	Lamps, patent	V.
Rust, Samuel	Lamps, shade to	V.
Samson, Elnathan	Shingles, sawing	XIV.
Sanderson, Isaac	Paper, brown, from, &c.	III.
Sanford, Nathaniel C.	Currycomb-making	II.
Savage, James S.	Boom derrick	XII.
Savary, Richard	Nails and spikes, wrought	II.
Sawyer, James	Excavating earth, and removing	IX.
Sawyer & Smith	Brick press, for dry clay	XV.
Seagrave, John D.	Loom sattinette	III.
Searle, John	Bee-hive, and houses	I.
Secor, James	Saw-mill	XIV.
Secor, James	Horse-power	XIII.
Sellick, Thaddeus	Saw, circular, &c.	II.
Seydle & Ward	Pipes, leaden, &c.	II.
Sharp, James	Furnace, refining iron	II.
Sharp, William	Springs, carriage	X.
Shepherd. S., & D. Baldwin	Tonguing, &c., boards	XIV.
Shreve, Henry M.	Snags, removing, &c.	IX.
Sibley, Alden	Calico, &c., printing	III.
Smart, Joseph	Pumps	XI.
Smith, John Cutts	Piano-forte, key for tuning	XVIII.
Smith, Daniel	Rake, hay	I.
Smith, James	Spinning mule, self-acting	III.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Smith, James A.	Axletrees and boxes	X.
Smith, John R.	Cooking stove and oven	V.
Smith, Samuel P.	Bedsteads	XVII.
Smith & Van Loane	Spark-catcher	VI.
Smith, William	Carriage, gun	XIX.
Smolinski, Joseph	Earthenware	XV.
Sorrel, M.	Copper, alloying, &c.	II.
Southworth, Daniel H.	Smut machine, &c.	I.
Spencer, William	Dyeing yarn from the beam	IV.
Spooner, John M.	Broom making	XVII.
Sprouse, William T.	Plough	I.
Stearns, George L.	Flaxseed, grinding	XIII.
Steiger, William T.	Protracting table	VIII.
Stevens, Oliver P., assignee of Ezra Goodell.	Grist mill	XIII.
Stewart, Philo P.	Cooking stove, summer and winter	V.
Stimpson, James	Railroad, timber	IX.
Stimpson, Solomon	Electro-magnetism	VIII.
Straight, Orrin	Horse-power	XIII.
Strong, Theodore F.	Fire-arms, many-chambered	XIX.
Sudor, Fred.	Ice, packing and stowing	XXII.
Swan, Lansing B.	Mineral water, soda fountain	IV.
Taylor, Henry	Plough	I.
Taylor, William S.	Diving dress	VIII
Teall, Horace V.	Cooking stove	V.
Teeter, Isaac	Plough, hill-side	I.
Thistle, Hezekiah L.	Fire-arms	XIX.
Thomas, Enoch	Churn	I.
Thomas, Hopkin	Wheel hubs of car, chilling	X.
Thorn, Linton	Excavating, embanking, and ditching	IX.
Thorn, Wm., & James Thorn, jr.	Shingles, shaving	XIV.
Thorpe & Angell	Loom, weavers', harness for	III.
Thurber, H.	Saw mill, dogs	XIV.
Tiffany, Arunah	Fish, catching	XXII.
Tilson, Edward C.	Doors, hanging, &c.	IX.
Tindle, Robert, administrator of Israel Riggin.	Marine railway	IX.
Tisdale, Daniel	Cooking stove	V.
Tracy, Cyrus	Seine fishing	XXII.
Tree, Alvah H.	Balance, scale-beam, and weights	XII.
Treadwell, John G.	Stoves, dumb, for parlors	V.
Trufant, William B.	Salt rheum, remedy for	IV.
Truscott, S., G. Wolfe, & J. Dougherty	Wheels, car, cast-iron	X.
Tuells, Melzar	Springs, carriage, elliptic	X.
Tyler, Crawford	Clapboards, &c., sawing	XIV.
Upham, Lucius	Crimping leather	XVI.
Urmy, Jesse	Gearing for driving machinery	XIII.
Ustick, Stephen, assigned to Cotesworth P. Bronson.	Brick-press	XV.
Van Alstine, Cornelius	Saw-mills	XIV.
Vance, Elisha	Raising water, and forcing	XI.
Van Order, Abram	Boilers, steam	VI.
Vest, Charles	Mill-stones, dressing, &c.	XIII.
Walker, Daniel	Piano-forte, wrest pin of	XVIII.
Walkly, Nelson	Electro-magnets, changing the poles, &c.	VIII.
Waste, E., N. Wellington, & D. Hutchins.	Saw set	II.
Waterhouse, Horatio W.	Thrashing grain, hulling, &c.	I.
Waterman, Henry	Press, cotton	XII.
Waterman & Learned	Brick moulding, &c.	XV.
Watson, Charles A.	Motion, reciprocating, &c.	XIII.
Watson, Eleazer	Counterfeit notes, preventing	XVIII.
Webb, James W.	Corn shelling	I.

III.—*Alphabetical list of expired patents*—Continued.

Patentees.	Inventions or discoveries.	Class.
Wells, Lee	Casks, cutting head for	XIV.
West, Amoni	Thrashing grain	I.
Wheeler, Hiram F.	Spinning machine, domestic	III.
Wheeler, Ira	Cutting grass, &c.	I.
Wheeler, John R.	Water-wheel	XI.
Whitcomb, T. N. & J. M.	Water-wheel	XI.
White, John J.	Life preserver, safety	VII.
Whitehouse, Turner	Lock, door	II.
Whitson, Thomas	Flues of open fireplaces	V.
Whittier, David	Piston for pumps, working	XI.
Wilcox, Philip	Cooking stove, construction	V.
Wilder, Luke	Forges, backs	II.
Williams, Elijah	Leaching ashes	IV.
Williamson, Peregrine	Corn eradicator	XX.
Wilson, Robert	Lock, door, &c.	II.
Wilson, William	Door springs	II.
Windle, H. C., J. Gillot, & S. Morris	Pen, metallic	XVIII.
Witty, R. I. L.	Powder	XIX.
Wode, George W.	Bedstead, sofa, sliding	XVII.
Woodbury, Nathaniel	Crimping leather	XVI.
Woodcroft, Bennet	Calico, &c., printing	III.
Woodside, Ellbridge G.	Springs, carriage	X.
Woone, Godfrey	Calico, &c., printing	III.
Wright, Joseph, assignee of D. C. Stone.	Axes, manufacturing	II.
Wright, Lemuel W.	Bleaching cotton, &c.	III.
Wright, Thomas	Corn shelling	I.
Wright & Wilder	Steam engine, rotary	VI.
Wyman, James	Staves for barrels, jointing	XIV
Yale, L., S. W. Stimson, & N. Stimson.	Thrashing grain	I.
Yates, John C.	Saw mill, without saw gate	XIV.
Yerkes, Richard E.	Spinning fliers and spindles, &c.	III.
Zollickoffer, William	Bating hides	XVI.

Alphabetical list of patents for designs that have expired during the year 1852.

Patentees.	Designs.
Atwood, Anson, assignor to Benjamin Starbuck	Stoves.
Bristol, Albert G.	Stoves.
Fulton, Calvin, assignor to John M. French	Stove plate.
Hine, Charles S.	Stoves.
Jackson, William & Nathan H.	Parlor grate.
Joslin, Gilman	Stand for globes, &c., tripod.
Low, Addison, assignor to John S. Leake & Francis S. Low	Stoves.
Low, Addison, assignor to Rathbone & Co.	
Miller, William L.	Umbrella stands.
Mills, Clark	Bust of J. C. Calhoun.
Penniman, Elijah P.	Stoves.
Ransom, Sansom H.	Stoves.
Ripley, Ezra, assignor to Ira Jagger, William B. Treadwell, and John S. Perry.	Stoves.
Ripley, Ezra, assignor to E. Johnson, G. Geer, & W. B. Cox	Stoves.
Ripley, Ezra, assignor to Peter Low, John P. Chollar, & Eber Jones.	Stoves.
Root, David	Stoves.
Slane, P. F.	Lamps.
Stanley, Henry	Stove.

IV.

CLASSIFIED LIST OF PATENTS GRANTED DURING THE YEAR 1852, WITH THE NAMES OF PATENTEES, PLACES OF RESIDENCE, AND DATE OF PATENTS.

CLASS I.—*Agriculture, including instruments and operations.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bee hives	Lorenzo L. Langstroth	Philadelphia, Pa.	Oct. 5, 1852.
Bee hives, moth traps to	E. W. Phelps	Newark, Licking co., Ohio	April 6, 1852.
Cheeses, modes of covering	Upson Bushnell	Gustavus, Trumball co., Ohio	Jan. 6, 1852.
Chickens, apparatus for feeding	Simeon W. Albee	Walpole, Cheshire co., N. H.	Sept. 7, 1852.
Churn and butter worker	Orsamus R. Fyler	Brattleborough, Windham co., Vt.	July 27, 1852.
Churn	Lucien A. Brown and Hubbard Bigelow, assignors to Henry K. W. Welch.	Hartford, Conn.	Oct. 5, 1852.
Churning machines	Gelston Sanford, assignor to George A. Meacham.	Ellenville, N. Y., Enfield, Conn.	May 4, 1852.
Churns	Edwin B. Clement	Barnet, Caledonia co., Vt.	Jan. 20, 1852.
Churns	Clarkson Rhodes	Morrow, Ohio	May 18, 1852.
Churns	Norman B. Livingston	Portland, Indiana	July 6, 1852.
Churns	John McLaughlin	Goshen, Ohio	July 13, 1852.
Churns	Rufus Maxwell	Weston, Lewis co., Va.	Aug. 24, 1852.
Churns, swinging	Wm. F. & N. Davis	Castleton, Rutland, Vt.	Nov. 23, 1852.
Corn shellers	William Lindsley	Township of Waddam, Stephenson co., Ill.	Mar. 9, 1852.
Corn shellers	William Reading	Washington, D. C.	July 13, 1852.
Cultivators	Thaddeus J. Ball and John Post	Pittsfield, Mich.	April 6, 1852.
Cultivators, rotary	Pleasant E. Royse	New Albany, Floyd co., Ind.	Feb. 17, 1852.
Cultivators, wheel	Frederick P. Root	Sweden, New York	June 8, 1852.
Fans, buckwheat	Alfred Platt	Waterbury, Conn.	Jan. 13, 1852.
Flax pullers	Lewis S. Chichester	Brooklyn, N. Y.	Nov. 16, 1852.
Grain separators	John Thompson	Chili, Monroe co., N. Y.	April 6, 1852.
Grain separators	Cyrus Roberts	Belville, St. Clair co., Ill.	July 20, 1852.
Grain separators	Jacob Bergey	Wadsworth, Medina co., Ohio	Oct. 5, 1852.
Grain separators	Peter Geiser	Smithburg, Washington, co., Md.	Oct. 19, 1852.
Grass burner	John A. Craig	Columbia, Chicot co., Ark.	Feb. 3, 1852.
Harvesters	George H. Rugg	South Ottawa, Ill.	June 8, 1852.
Harvesters	William McLagan	Cuylerville, N. Y.	June 15, 1852.
Harvesters	William & Thomas Schnebly	New York, N. Y.	June 15, 1852.
Harvesters	John H. Manny	Waddam's Grove, Stephenson, co., Ill.	Nov. 23, 1852; antedated Sept. 17, 1852.
Harvesters, clover	Mahlon Garretson	Bermudian, Adams co., Pa.	Jan. 6, 1852.
Harvesters, clover	John Krauser	Reading, Pa.	June 22, 1852.
Harvesters, grain	Thomas Van Fossen	Lancaster, Fairfield co., Ohio	Jan. 26, 1852.
Harvesters, grain	Byron Densmore	Brockport, N. Y.	Feb. 10, 1852.
Harvesters, grain	Daniel Fitzgerald	New York, N. Y.	Sept. 7, 1852.
Harvesters, grain and grass	R. T. Osgood	Orland, Hancock, co., Maine	Feb. 17, 1852.
Harvesters, grain and grass	Daniel Fitzgerald and John H. Smith	New York, N. Y.	Aug. 10, 1852.
Harvesters, grain and grass	C. B. Brown	Griggsville, Pike co., Ill.	Dec. 7, 1852.
Harvesters, grain and grass	William H. Seymour, assignor to Seymour & Morgan.	Brockport, N. Y.	Dec. 14, 1852; antedated Oct. 25, 1852.
Harvesters, grain, rakes to	Jearum Atkins	Chelsea, Will co., Ill.	Dec. 21, 1852.
Harvesters, grass	W. F. Ketchum	Buffalo, N. Y.	Feb. 10, 1852.
Harvesters, grass	Jesse S. & David Lake	Smith's Landing, Atlantic co., N. J.	July 20, 1852.
Harvesters, grass	Eliakim B. Forbush	Buffalo, N. Y.	July 20, 1852.
Harvesters, grass	William Manning	South Trenton, Mercer co., N. J.	July 20, 1852.
Harvesters, maize	Jacob L. Ream	Mount Pulaski, Ill.	Dec. 21, 1852.
Harvesters, reels for	W. W. & C. C. Wright	Canton, Bradford co., Pa.	Dec. 7, 1852.
Hoes	William C. Finney	Fayette co., Tenn.	Nov. 30, 1852.
Hulling buckwheat	Wilson Ager	Rohersburg, Columbia co., Pa.	June 29, 1852.
Hullers, rice	Peter McKinlay	Charleston, S. C.	Mar. 30, 1852.
Hullers, rice	Clarke Jacobs	Brooklyn, N. Y.	July 20, 1852.
Lime and manure, spreading	Lewis Cooper	Coopersville, Lancaster co., Pa.	Oct. 19, 1852.
Ox yokes	Ezra Hough	St. Johnsville, Montgomery co., N. Y.	Aug. 3, 1852.
Planters, cotton seed	William A. Gates	Mount Comfort, Fayette co., Tenn.	Nov. 16, 1852.
Planters, seed	Edward Wicks	Bart township, Lancaster co., Pa.	Feb. 10, 1852.
Planters, seed	Ira Reynolds	Republic, Seneca co., Ohio	Mar. 9, 1852.
Planters, seed	Jesse Urmy	Wilmington, Del.	April 6, 1852.
Planters, seed	B. T. Stowell & A. Marcellus	Waddam grove, Stephenson co., Ill.	April 13, 1852.
Planters, seed	Francis Van Doren	Adrian, Geneva co., Mich.	April 13, 1852.
Planters, seed	James P. Ross	Lewisburg, Pa.	June 8, 1852.
Planters, seed	Benj. D. Sanders	Holliday's cove, Va.	June 8, 1852.
Planters, seed	Joshua Woodward	Haverhill, N. H.	July 13, 1852.
Planters, seed	Adam Kraber	York county, Pa.	July 27, 1852.
Planters, seed	D. Haldeman	Morgantown, Monongalia co., Va.	Oct. 5, 1852.
Planters, seed	Robert M. Jackson	Penningtonville, Chester co., Pa.	Oct. 5, 1852.
Planters, seed	James Robb	Lewistown, Pa.	Oct. 12, 1852.
Planters, seed	Edson Hart	New Albany, Floyd co., Ind.	Oct. 19, 1852.
Planters, seed	Henry Vermillion	Rising Sun, Cecil co., Md.	Nov. 2, 1852.
Planters, seed	Charles Randall	Palmyra, Lee co., Ga.	Nov. 2, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Planters, seed	Francis Townsend	Cambria, Niagara co., N. Y.	Nov. 2, 1852.
Planters, seed	Constant S. Trevitt	Ellicottsville, Cattaraugus co., N. Y.	Nov. 2, 1852.
Planters, seed	William Bullock	Philadelphia, Pa.	Nov. 2, 1852.
Planters, seed	Levis H. Davis and Samuel and Morton Pennock.	Kennett Square, Chester co., Pa.	Nov. 16, 1852.
Planters, seed	Lewis W. Colver	Louisville, Ky.	Dec. 7, 1852.
Planters, seed	Moses D. Wells	Morgantown, Monongalia co., Va.	Dec. 14, 1852.
Planters, seed	Henry Nycum	Uniontown, Fayette co., Pa.	Dec. 14, 1852.
Planters, seed, hand	Gellson Sanford	Ellenville, N. Y.	June 15, 1852.
Plough	Harvey Sprague	Riga, Monroe co., N. Y.	Dec. 14, 1852.
Plough, fastening devices	William A. Gates	Mount Comfort, Fayette co., Tenn.	Dec. 21, 1852.
Plough regulators	N. Blatchly	Windsor, N. Y.	July 20, 1852.
Ploughs	David Swartz	Thomasbrook, Va.	June 22, 1852.
Ploughs	J. N. McAbee, assignee of E. Ball	Greentown, Ohio, and Canton, Ohio	Mar. 23, 1852.
Ploughs	Joshua Woodward	Haverhill, Grafton co., N. H.	Mar. 9, 1852.
Ploughs	James Robb	Lewistown, Pa.	Oct. 12, 1852.
Ploughs, constructing	Albert Gardner, administrator of Wm. L Hunter, and Albert Gardner.	Cincinnati, Ohio	Oct. 26, 1852.
Ploughs, gang	Charles Bishop	Norwalk, Huron co., Ohio	Oct. 12, 1852.
Ploughs, gang	Harvey Kilham and George Valleau	Scottsville, Monroe co., N Y.	Mar. 30, 1852.
Ploughs, shovel	James Latimer	Chattoogaville, Chattooga co., Ga.	Mar. 16, 1852.
Ploughs, shovel	James H. Forman	Sharon, Chambers co., Ala.	Feb. 10, 1852.
Ploughs, shovel	W. F. Pagett	Whitepost, Clarke co., Va.	Mar. 30, 1852.
Ploughs, construction of	Fortunatus E. Richardson	Hicksford, Va.	Nov. 30, 1852.
Potato diggers	Jesse N. Seeley	Forsyth, Ga.	Dec. 21, 1852.
Potato diggers and stone gatherers	John T. Foster	New York, N. Y.	June 29, 1852.
Potato washers. (See Class XVII.)			
Rakes	Amza B. Lewis	Brooklyn, Green co., Wis.	Sept. 21, 1852.
Rakes, hay	J. S. Sturgis	Litchfield, Medina co., Ohio	Mar. 9, 1852.
Rakes, hay	Charles R. Soule	Fairfield, Franklin co., Vt.	May 18, 1852.
Rakes, hay	Zenas Sanders	West Windsor, Vt.	June 8, 1852.
Rollers, field, for cutting stalks and weeds	Joseph H. Gest	Batavia, Clermont co., Ohio	Dec. 14, 1852.
Scythe fastenings	Alpheus Kimball	Fitchburg, Worcester co, Mass.	Aug. 3, 1852.
Scythe snaths	Charles N., Charles, and Abram Clow	Port Byron, N. Y.	Dec. 14, 1852.

Shovels, construction of	Hiram Kimball	Worcester, Mass.	Jan. 6, 1852.
Straw-cutters, feeding rollers in	Nathaniel Nuckolls	Columbus, Muskogee co, Ga.	Jan. 6, 1852.
Straw-cutters	Absalom B. Earle	Oneonta, Otsego co., N. Y.	Feb. 24, 1852.
Straw-cutters	Joel Dawson	Barnesville, Belmont co., Ohio	Dec. 14, 1852.
Straw-cutters	Warren Gale	Louisville, Ky.	Dec. 21, 1852.
Thresher, grain, feeding apparatus for	William R. Palmer	Elizabeth city, N. C.	Feb. 17, 1852.
Threshers, grain, and cleaners	J. Jones and A. Lyle	Rochester, N. Y.	Dec. 21, 1852.
Threshing machines	Joseph G. Gilbert	New York, N. Y.	July 13, 1852.
Threshing machines, endless belts to	John R. Moffit	Piqua, Ohio	Nov. 30, 1852.
Winnowers	Thomas J. Doyle	Winchester, Va.	April 20, 1852.
Winnowers and weighers, grain	Thomas T. Strode	Coatesville, Chester co., Pa.	Feb. 24, 1852.
Winnowing machines	Samuel Canby	Ellicott's Mills, Md.	Dec. 28, 1852.
Winnowing machines, shakers of	Henry Fillbrun	Dayton, Montgomery co., Ohio	Jan. 13, 1852.
Yoke, neck, of horses	Calvin L. Rawdon	Bristol, Trumbull co., Ohio	Aug. 17, 1852.
Yokes, ox. (See Ox yokes.)			

Class II.—*Metallurgy and manufacture of metals, and instruments therefor.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Anvil	Charles Peters & William Fetter	Trenton, N. J.; Bucks co, Pa.	May 4, 1852.
Attaching pieces of metal to each other by casting, apparatus for.	Horatio B. Osgood	Thompsonville, Hartford co., Conn.	Jan. 13, 1852.
Axes, process for making	John Orelup, assignor to J. Blood, A. J. Goffe, & R. Thomas.	Ballston Spa, New York	June 8, 1852.
Bevelling the edges of skelps or metallic strips, &c., machinery for.	Robert Knight	Cleveland, Ohio	Sept. 21, 1852.
Bitts to braces, fastener of	Erasmus Smith, assignor to David Maydole.	Norwich, Chenango co., N. Y.	Aug. 17, 1852.
Blind, cast and wrought metal	Robert White	Washington, D. C.	Jan. 20, 1852.
Blind, operator and fastener	James R. Creighton	Cincinnati, Ohio	Aug. 31, 1852.
Blind rods, machine for wiring	Frederick H. Moore	Ithaca, N. Y.	June 15, 1852.
Blind and shutter fastener	Samuel Barker	New York, N. Y.	May 11, 1852.
Blind and shutter operator	Robert V. Jones	Buchanan P. O., Alleghany co., Pa.	Nov. 16, 1852.
Blind and shutter operator	James R. Creighton	Cincinnati, Ohio	Jan. 13, 1852.
Bolts, &c., machinery for heading	Edward Paye	Albany, N. Y.	Dec. 28, 1852.
Carpet-bag frames, &c., machinery for bending	Edward L. Gaylord	Newark, N. J.	Dec. 7, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Castors, ball, manufacture of	Robert Hinton	Roxbury, Mass	Dec. 14, 1852.
Chains, machinery for making	John M. Crawford	New Castle, Pa	Feb. 17, 1852.
Chain, jack, machinery, arrangement of	Hickford Marshall & Seth S. Cook, assignors to John Bostwick, jr., & Elbert White.	Stamford, Fairfield co., Conn	Mar. 16, 1852.
Circle plates, roses, &c., with dovetailed grooves, devices for casting.	Nathan Matthews, assignor to Richard Edwards, David A. Morris, & Nathan Matthews.	Pittsburg, Pa	April 20, 1852.
Coupling, hose. (See Class XI.)			
Doors, apparatus for closing	M. T. Cooper	Ballston Spa, Saratoga co., N. Y	April 6, 1852.
Door knobs, manufacture of	Benjamin Nott, assignor to J. P. Pepper.	Bethlehem, N. Y.; Albany, N. Y	Mar. 9, 1852.
Door spring	Henry Hochstrasser & A. Masson	Philadelphia, Pa	Feb. 3, 1852.
Drill or bitt stock	Dexter H. Chamberlain	Boston, Mass	Oct. 26, 1852.
Drilling, hand, machine	Reuben Daniels	Woodstock, Windsor co., Vt	Sept. 21, 1852.
Drilling machines	Charles W. Coe	Ashtabula, Ohio	Dec. 7, 1852.
Ferrules, wire, machinery employed in the manufacture of coiled.	William T. Richards	New Haven, Conn	Sept. 14, 1852.
Ferrules, wire, manufacture of	William T. Richards	New Haven, Conn	Nov. 2, 1852.
File-cutting machines	James H. Thompson	Patterson, N J	Jan. 27, 1852.
File-cutting machine	John Cust Blair	Pittsburg, Pa	April 27, 1852.
File-cutting machinery	John W. Conklin, H. L. Sidman, & E. Whritner.	Ramapo, Rockland co., N. Y	Aug. 17, 1852.
Forging machines	G. H. Richards, assignor to C. G. Plimpton.	Walpole, Norfolk co., Mass	Sept. 14, 1852.
Forging metals, &c., machinery for	William Field	Providence, R. I	Dec. 14; antedated June 14, 1852.
Gold-beater, mechanical	Robert B. Ruggles & Lemuel W. Serrell, assignors to Robert B. Ruggles.	New York, N. Y	Jan. 6, 1852.
Gold-beating machinery	William Vine	Hartford, Conn	May 11, 1852.
Gold, &c., by amalgamation, method of obtaining	Maybery A. Bertolet, L. Kirk, & Andrew M. De Hart.	Reading, Pa	Dec. 28, 1852.
Gold mineral, reducing	William Longmaid	Beaumont Square, Middlesex co., Eng.	Aug. 10, 1852.
Gold, washing and amalgamating, &c., machine for.	Alexander Barclay	Newark, N. J	June 22, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Gold, processes for dissolving	Charles F. Spieker	New York, N. Y	Feb. 10, 1852; antedated Aug. 10, 1851.
Grinding conical-edged knives, machinery for	James L. Plimpton	Westfield, Mass	May 4, 1852.
Grinding or polishing saw-blades, &c., machinery for.	William Southwell	Kensington, Philadelphia co., Pa	May 4, 1852.
Harpoon	J. D. B. Stillman	New York, N. Y	April 6, 1852.
Hinge for moulders' flasks	George Grant	Troy, N. Y	Dec. 7, 1852.
Hinges	William Baker	Utica, N. Y	April 13, 1852.
Horse shoe, elastic	John O. Jones	Newton, Middlesex co., Mass	Aug. 3, 1852.
Horse shoe machinery	Solomon Shetter	Alleghany city, Penn	Nov. 9, 1852.
Hubs, &c., patterns for metal	Jasper Johnson	Geneseo, N. Y	July 6, 1852.
Iron, coating, with copper	Theodore G. Bucklin	Troy, N. Y	Sept 21, 1852.
Iron fence, ornamental connexion of the parts of an	Henry Jenkins	Cincinnati, Ohio	Jan. 13, 1852.
Iron fences, mode of fastening the palings to the rails in.	George Hess	Easton, Northampton co., Pa	Nov. 23, 1852.
Iron fences	John B. Wickersham	New York, N. Y	Mar. 9, 1852.
Iron railings	Benjamin Kraft	Reading, Pa	Jan. 27, 1852.
Joint tube, application of a free, in circumstances where it is exposed to external pressure.	Richard Prosser, assignor to Thomas Prosser.	Birmingham, Eng.; New York, N. Y.	Sept. 21, 1852; antedated May 31, 1852.
Knobs to doors, &c., method of attaching roses for.	Nathan Matthews, assignor to Richard Edwards, David A. Morris, and Nathan Matthews.	Pittsburg, Pa	April 6, 1852.
Lead pipe machinery	Benjamin Tatham	New York, N. Y	May 11, 1852.
Lock	Albert Betteley	Boston, Mass	April 6, 1852.
Lock	Francis Garachon	New York, N. Y	June 29, 1852.
Lock	Richard Ketchum	Seneca Castle, Ontario co., N. Y	Dec. 7, 1852.
Locks	F. C. Goffin	New York, N. Y	Oct. 26, 1852.
Locks, alarm	Charles Fleischel	New York, N. Y	June 15, 1852.
Locks, door	Marcus R. Stephenson, assignor to Edwin Holman.	Boston, Mass	July 13, 1852.
Locks, door	Wm. Moore, assignor to Jas. Carman	Williamsburg, Kings co., N. Y.; New York, N. Y.	Sept. 14, 1852.
Lock, pad	Rudolphus Kinsley	Springfield, Mass	Dec. 7, 1852.
Lock, safety	Linus Yale, jr	Newport, Herkimer co., N. Y	Dec. 21, 1852.
Locks, trunk, plates of	Conrad Liebrick	Philadelphia, Pa	Mar. 2, 1852.
Locks, tumblers of	Henry Blakely	New York, N. Y	May 25, 1852.
Metal bars, machinery for crimping	G. Slocum & M. T. Sayles	Lansingburg, Rensselaer co., N. Y	Nov 9, 1852.
Metal disks, machine for turning up the edges of sheet.	J. F. Flanders, assignor to F. Roys & E. Wilcox.	Newburyport, Mass.; Berlin, Conn	Jan. 6, 1852.
Moulding in flasks, apparatus for	Edward Satterlee	Albany, N. Y	Jan. 13, 1852.
Moulding hollow ware	James J. Johnston	Cincinnati, Ohio	June 29, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Milling machines	William H. Robertson	Hartford, Conn.	Oct. 5, 1852.
Nail machines	Samuel G. Reynolds	Worcester, Mass.	Jan. 20, 1852.
Nail plate feeder	Caleb Isbister	Alleghany city, Pa.	Jan. 27, 1852.
Nail, wrought, machinery	Daniel Dodge	Keeseville, N. Y.	June 22, 1852.
Ore stampers	Thomas Reaney	Philadelphia, Pa.	June 15, 1852.
Ores, machine for stamping	Virgil Woodcock	Swanzey, N. H.	June 15, 1852.
Pail bales, &c., machinery for bending	Robert Bunker	Rochester, N. Y.	Dec. 7, 1852.
Planing metals, &c., mode of mounting the cutters of machines for.	Pierre Saulnier, assignor to J. T. Bruen.	New York, N. Y.	Dec. 28, 1852.
Plates, burglar-proof, for doors, safe walls, vaults, &c.	Linus Yale, jr.	Newport, Herkimer co., N. Y.	Oct. 19, 1852.
Process for restoring shape and tempering articles of hardened steel.	John Silvester	West Bromwick, Stafford co., England.	Aug. 31, 1852; in England July 17, 1850.
Puddling iron, &c., apparatus for	James McCarty	Reading, Berks co., Pa.	Oct. 5, 1852.
Punch, drop	Solomon Andrews	Perth Amboy, N. J.	April 13, 1852.
Punching sheets of metal, machinery for	S. T. Sanford	Fall River, Bristol co., Mass.	Jan. 13, 1852.
Quartz, mill for crushing. (See Class XIII.)			
Safes, iron	Wm. Alford & John D. Spear	Southwark, Philadelphia, Pa.	May 18, 1852.
Safes, &c., iron, lining for	Wm. P. Blake	New York, N. Y.	Dec. 14, 1852.
Saw gummers	R. S. Cramer & C. C. Blossom	Sommersville, Butler co., Ohio	Dec. 7, 1852.
Saw gummers	J. D. Otstol	Springfield, Clark co., Ohio	Nov. 2, 1852.
Saw gummer, jointed bed-plate	H. O Elmer	Mexico, Oswego co., N. Y.	Sept. 28, 1852.
Saw set. (See Class XIV.)			
Saw sets. (See Class XIV.)			
Sash stopper and fastener	Charles C. Felton	Dedham, Norfolk co., Mass.	April 20, 1852.
Sash stopper and fastener	James D. Smith	New Britain, Conn.	Oct. 19, 1852.
Sash stopper and fastener	J. B. S. Hadaway	East Weymouth, Norfolk co., Mass.	Nov. 16, 1852.
Screw blanks, mechanism for pointing and threading in the same machine.	Cullen Whipple, assignor to New England Screw Co.	Providence, R. I.	Dec. 14, 1852; antedated Oct. 16, 1852.
Screw-cutting stocks, and adjusting the chasers in.	Mitchell C. Gardner	Brockport, Monroe co., N. Y.	Aug. 3, 1852.
Screw blanks, &c., wood, mechanism for griping.	Thomas J. Sloan	New York, N. Y.	Aug 24, 1852.
Screw-threading machinery	Cullen Whipple, assignor to New England Screw Co.	Providence, R. I.	July 6, 1852; antedated May 15, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Screw driver	Jacob W. Switzer	Basil, Fairfield co., Ohio	Dec. 7, 1852.
Screw blanks, rivets, etc., machinery for shaving the heads of.	John Crum	Ramapo, Rockland, N. Y.	Mar. 30, 1852.
Screw blanks, rivets, etc., method of heading	William E. Ward	Port Chester, Westchester co., N. Y.	Dec. 28, 1852.
Screws, capping of	Charles T. Grilley	New Haven, Conn.	April 20, 1852.
Screws, &c., combination of cutters for threading wood.	Thomas J. Sloan	New York, N. Y.	July 6, 1852.
Screws, machinery for threading wood	Cullen Whipple	Providence, R. I.	Aug. 10, 1852.
Screws, threading pointed wood	Thomas J. Sloan	New York, N. Y.	Aug. 24, 1852.
Screwing bolts, &c., machinery for	John Caswell, assignor to Archibald C. Powell.	Syracuse, N. Y.	Nov. 30, 1852.
Screws, wood	Cullen Whipple, assignor to New England Screw Co.	Providence, R. I.	Dec. 7, 1852; antedated June 7, 1852.
Seaming, double, machines	Walter Hamilton	Elmira, Chemung co., N. Y.	Oct. 12, 1852.
Sheet-iron, while in process of manufacture, method of heating.	Henry McCarty	Pittsburg, Pa.	June 29, 1852.
Soldering n a vacuum, apparatus for	Joseph B. & John R. Horne	Xenia, Ohio	May 11, 1852.
Spike machinery, reciprocating die	Moody Belknap, assignor to Moody Belknap & Lyman Kinsley.	Canton, Norfolk co., Mass.	Nov. 9, 1852.
Spike machines	Philip P. Trayser	Baltimore, Md.	Dec. 14, 1852.
Spoons, forks, &c., machinery for making	Alfred Krupp, assignor to Thos. Prosser.	Essen, Prussia; New York, N. Y.	June 8, 1852; in England Aug. 26, 1846.
Stereotype plates, casting. (See Class XVIII.)			
Thimbles for rigging, &c., machines for making. (See Class VII.)			
Trip-hammers, vertical	Peter Stebbins & John Holmes	Schenectady, N. Y.	June 1, 1852.
Trip-hammers	James C. Forest & Geo. Baker	Schenectady, N. Y.	Dec. 14, 1852.
Tubes, machine for making sheet metal	Jehiel T. Farrand	Port Byron, N. Y.	June 15, 1852.
Tubes, sheet metal, machinery for forming	Orson W. Stow	Southington, Hartford co., Conn.	Sept. 28, 1852.
Tuyeres, water pipes of	Peter Sweeney	Buffalo, N. Y.	July 29, 1852.
Type casting. (See Class XVIII.)			
Vault and safe doors, &c., method of securing	F. C. Goffin	New York, N. Y.	Nov. 2, 1852.
Vice, taper, attachment for converting the ordinary into a.	Jeremy W. Bliss	Hartford, Conn.	Nov. 30, 1852.
Vice	William Butler	Little Falls, Herkimer co., N. Y.	Oct. 5, 1852.
Vices, jaw, turning	Abijah Hulbert	Augusta, Ga.	Nov 9, 1852.
Welding steel, &c., to cast iron, method of	Mark Fisher & John H. Norris	Trenton, N. J.	April 13, 1852.
Wrench, adjustable	Andrew Hotchkiss	Sharon, Conn.	May 4, 1852.

IV.—*Classified list of patents issued*—Continued.

CLASS III.—*Manufacture of fibrous and textile substances, including machines for preparing fibres of wood, cotton, silk, fur, paper, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Card-teeth, bracing and supporting	Cornelius Speer	New York, N. Y.	Nov. 16, 1852.
Carding by which variegated slivers are produced.	Jonas Holmes and Ephraim French	Lee, Mass	May 18, 1852.
Carpets	Thomas Crossley	Roxbury, Mass	Mar. 16, 1852.
Cloth on the cloth beam, method of measuring	Wm. H. Woodworth	Salmon Falls, Stafford co., N. H.	Dec. 21, 1852.
Cordage machinery	H. T. Jennings, C. S. Collier, and T. P. How, assignors to H. T. Jennings, C. S. Collier, Amenzo Beardsley, and Allen Hemmingway.	Bethany, N. Y.; Buffalo, N. Y.; Middlebury, N. Y.; Perry, N. Y.	Nov. 16, 1852.
Cordage machines	John W. Peer	Schenectady, N. Y.	July 6, 1852.
Cordage, machines for making	David Perry, assignor to F. and J. W. Slaughter.	Fredericksburg, Va	June 15, 1852.
Cordage, machines for making	Wm. Joslin	Waterford, Saratoga co., N. Y	Mar. 23, 1852.
Cotton battin	E. P. Rider	Brooklyn, N. Y	May 18, 1852.
Cotton yarn, preparing, for the manufacture of duck and other coarse fabrics.	Horatio N. Gambrill	Baltimore, Md	June 15, 1852.
Felting cloth	Joseph Weight, assignor to Samuel Lawrence.	Lawrence, Mass	Jan. 6, 1852; in England, Oct. 7, 1841.
Felting cloth, machinery for	George G. Bishop	Norwalk, Conn	Mar. 23, 1852; antedated Sept. 23, 1851.
Flocks, machines for preparing	John R. Peters, jr	New York, N. Y.	June 22, 1852.
Fulling mills	William E. Underwood	Middlefield, Hampshire co., Mass	Dec. 21, 1852.
Gins, cotton	Thomas J. Laws	Washington, Hempstead co., Ark	Mar. 16, 1852.
Gins for long staples of cotton	Calvin Willey, jr., assignor to A. J. Brown, of Chicago, and R. L. Dunlap, of Dunlap's Prairie, Illinois, executors of the estate of Calvin Willey, jr., deceased, and Urial Walker.	Chicago and Dunlap's Prairie, Ill	April 27, 1852.
Hat bodies, machines for forming	Thomas Walber	New York, N. Y.	Aug. 17, 1852.
Hat bodies, machinery for manufacturing	L. E. Hopkins	New York, N. Y.	Dec. 21, 1852.
Hat bodies, machines for manufacturing	Lansing E. Hopkins	New York, N. Y.	Dec. 7, 1852.

Hats	Francis Degen	New York, N. Y.	Dec. 7, 1852.
Heddles, metallic	Jacob Senneff	Philadelphia, Pa	Jan. 13, 1852.
Hemp brakes	L. C. Chichester	Williamsburg, N. Y	Feb. 3, 1852.
Knitting machines	Timothy Bailey	Ballston Spa, N. Y	Feb. 24, 1852.
Knitting machines, rotary	Daniel Tainter	Worcester, Mass	Nov. 30, 1852.
Knitting machines, rotary	Horatio G. Sanford	Worcester, Mass	Nov. 30, 1852.
Looms, carpet	John A. Van Riper	New York, N. Y.	Nov. 16, 1852.
Looms for weaving piled fabrics	Charles A. Maxwell	Troy, N. Y	Jan. 13, 1852.
Looms for weaving figured fabrics	B. H. Jenks and R. B. Goodyear, assignors to B. H. Jenks.	Bridesburg, Philadelphia co., Pa	April 13, 1852.
Looms for weaving figured fabrics	Cornelius W. Blanchard	Clinton, Worcester co., Mass	Aug. 3, 1852.
Looms for weaving figured fabrics	Samuel and James Eccles	Kensington, Philadelphia co., Pa	Aug. 3, 1852.
Looms for weaving piled fabrics without the figuring wires.	Robert W. Sievier	Middlesex co., England	June 1, 1852; in England, Sept. 5, 1844.
Looms, hand	S. C. Mendendall and Obed and Ezra King.	Richmond, Wayne co., Ind.; Salem, Henry co., Iowa.	Nov. 9, 1852.
Looms, mode of counterbalancing harnesses in	James Greenhalgh	Waterford, Mass	Nov. 2, 1852.
Looms, the motion of the lay in	John Goulding	Worcester, Mass	June 15, 1852.
Looms, jacquard	John Goulding	Worcester, Worcester co., Mass	Aug. 3, 1852.
Looms, jacquard, pattern cards for	Saml. T. Thomas and Edward Everett	Lowell and Lawrence, Mass	Mar. 16, 1852.
Looms, knitting	William Henson	Newark, N. J	Mar. 2, 1852.
Looms, power	Rensselaer Reynolds	Valatia village, N. Y	June 1, 1852.
Looms for weaving pile fabrics	Samuel Richardson	Claremont, Sullivan co., N. H.	Aug. 10, 1852.
Looms, shuttles for	Wm. Tucker	Blackstone, Mass	Dec. 28, 1852.
Looms, shuttle guides to	Horace T. Robbins	Lowell, Mass	Sept. 14, 1852.
Looms, stop motions of	L. B. Hoit	Millburn, Worcester co., Mass	Feb. 17, 1852.
Looms, mode of throwing shuttles in	Stephen C. Mendenhall	Richmond, Wayne co., Ind	Nov. 9, 1852.
Looms, temples for	E. and W. W. Dutcher	North Bennington, Vt	Dec. 28, 1852.
Mules, self-acting	Wanton Rouse	Taunton, Mass	Nov. 2, 1852.
Oakum, processes for preparing	John A. and George Cormack	New York, N. Y.	June 8, 1852.
Paper, making and sizing, machines for	George Wm. Turner	London, England	Jan. 27, 1852.
Paper, sized, mode of drying	Jos. Kingsland, jr., and Norman White.	Saugerties, N. Y.; New York, N. Y.	Aug. 10, 1852.
Pile fabrics, apparatus for cutting the pile of	Jno. Johnson, assignor to Elias Johnson.	Troy, N. Y	Jan. 13, 1852.
Pile fabrics, pile wires and pincers for weaving	E. B. Bigelow	Clinton, Worcester co., Mass	Nov. 2, 1852.
Pile wires, pincers for operating	Augustus Faulkner	Walpolle, Cheshire co., N. H.	Nov. 23, 1852.
Reeling machines	E. and S. Macy	Laurel, Franklin co., Ind	April 13, 1852.
Sewing machines	Isaac M. Singer	New York, N. Y.	April 13, 1852.
Sewing machines	W. O. Grover and W. E. Baker	Boston and Roxbury, Mass	June 22, 1852.
Sewing machines	A. B. Wilson, assignor to N. Wheeler, A. B. Wilson, A. Warren, and G. P. Woodruff.	Watertown, Conn	June 15, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Sewing machines	Charles Miller	St. Louis, Mo	July 20, 1852.
Sewing machines	Otis Avery	Honesdale, Wayne co., Pa	Oct. 19, 1852.
Sewing machines	Jno. G. Bradeen, assignor to J. G. Bradeen and G. Perkins.	Boston, Mass	Nov. 2, 1852.
Sewing machines	Christopher Hodgkins, assignor to N. Hunt.	Boston, Mass	Nov. 2, 1852.
Shuttle for weaving hair-cloth, &c	Daniel S. Dewey	Hartford, Hartford co., Conn	April 27, 1852.
Spinner, ring	George H Dodge	Attleborough, Bristol co., Mass	Jan. 27, 1852.
Spinning frames, cop	George H. Dodge	Attleborough, Mass	June 8, 1852.
Spinning machinery	Oliver Pearl and Henry P. Chandler	Lawrence, Essex co., Mass	Jan. 20, 1852.
Spinning machinery, connecting washers with spindles in.	Horace T. Robbins	Lowell, Mass	Mar. 16, 1852.
Spinning machines, throstle	Charles H. Hunt	Lawrence, Essex co., Mass	Sept. 28, 1852.
Twisting-tubes in the formation of roving	Harvey Silver	Lowell, Mass	Nov. 9, 1852.
Wool-picking machines	Edward Kellog	New Hartford, Litchfield co., Conn	Jan. 6, 1852.
Wool, machinery for combing	S. C. Lister and G. E. Donisthorp	York co., England	Oct. 26, 1852; in England, Mar. 20, 1850.
Wadding, machinery for making	Hiram T. Lawton	Troy, N. Y	Nov. 23, 1852.

CLASS IV.—*Chemical processes, manufactures, and compounds, including medicines, dyeing, color making, distilling, soap and candle making, mortars, cements, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Acid, sulphuric, manufacture of	Carl Hinrichs	New York, N. Y	Sept. 7, 1852.
Archil, preparation of	Leon Jaresson	New York, N. Y	June 15, 1852.
Beer material, concentrated	Franz G. Rietsch	Rudoletz, Moravia, empire of Austria	Feb. 3, 1852.
Bleaching ivory, processes of	Ulysses Pratt	Deep River, Conn	Jan. 6, 1852; antedated July 6, 1851.

Candle wicks	C. A. Wortendyke	Newtown, N. J	Mar. 30, 1852.
Candy, sugar, machines for making	Bartholomew O'Brien	Rochester, Monroe co., N. Y	Jan. 13, 1852.
Cements	B. S. Welch	Brooklyn, N. Y	May 18, 1852.
Compositions, explosive, for blasting rocks	Edward Callow	London, England	Feb. 17, 1852; in England, August 6, 1850.
Composition of enamels	Jno. G. Dunn and Alfred F. Howes	Laurenceburg, Dearborn co., Ind	Sept. 7, 1852.
Compositions for preserving butter	Louis De Corn	Cincinnati, Ohio	Aug. 3, 1852.
Compounds for uniting steel and iron	Boyd C. Leavitt, assignor to Jos. S. Bishop and Rd. H. Libbey.	Newport, Me	July 27, 1852.
Distilling apparatus	Charles Delescluze	New York, N. Y	Oct. 12, 1852.
Gas, apparatus for regulating and measuring the flow of.	William B. Leonard	New York, N. Y	Feb. 10, 1852.
Gas, illuminating, process of making	Geo. Darré, P. Nicholas, and F. Lopez.	Marseilles, France	Dec. 28, 1852; in France, Sept. 27, 1851.
Gas, illuminating, processes for making	Henry W. Adams	New York, N. Y	Aug. 10, 1852.
Gas, illuminating, apparatus	Robert Foulis	St. John, New Brunswick	Oct. 12, 1852.
Gas meters	John Laidlaw	New York, N. Y	Nov. 2, 1852.
Gas purifying apparatus	Abram Longbottom	New York, N. Y	Feb. 3, 1852.
Gas regulators	Walter Kidder	Lowell, Mass	Oct. 12, 1852.
Gas regulators	Walter Kidder	Lowell, Mass	Oct. 12, 1852.
Gas regulators	Walter Kidder	Lowell, Mass	Oct. 12, 1852.
Gutta percha, processes of manufacturing	John Rider	New York, N. Y	June 1, 1852.
Hydro-sulphurets, treatment of, and manufacturing carbonates and sulphur compounds.	Charles Lennig	Philadelphia, Pa	Mar. 16, 1852.
India-rubber bat cloth, modes of making	Charles Goodyear	New Haven, Conn	Oct. 12, 1852; in England, June 8, 1850.
Indian rubber, preserving	Frederick Bronner	Vera Cruz, Mexico	Sept. 7, 1852.
Ink, vessels for making	Alexander Harrison	Philadelphia, Pa	Feb. 24, 1852.
Imitation stone. (See Class XV.)			
Light, benzole. (See Class V.)			
Mashing maize, improved process for	Frederick Seitz	Easton, Pa	Jan. 20, 1852.
Mash tuns	Robert Wicks and James Faulkner, jr.	Williamsburgh, N. Y	May 11, 1852.
Oils, lubricating	Wm. H. Mason	Boston, Mass	May 25, 1852.
Oil, paraffine, making	James Young	Manchester, England	Mar. 23, 1852; in England, Oct. 7, 1850.
Paints, processes for making	Wash. F. Davis, assignor to B. Cornell.	New York, N. Y	Aug. 17, 1852.
Paints, processes for preparing	Heman S. Lucas	Chester, Hampden co., Mass	Nov. 23, 1852.
Pill-making machines	Erasmus A. Pond	Rutland, Vt	Dec. 7, 1852.
Retorts for chemical furnaces, construction of	John Akrill	Williamsburgh, N. Y	June 8, 1852.
Salt, common, manufacture of	James P. Haskin	Syracuse, Onondaga co., N. Y	Sept. 7, 1852.
Soaps	Wm. McCord	New York, N. Y	July 27, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Soap boilers	John R. St. John	New York, N Y	June 8, 1852; in England, June 6, 1851.
Soda ash and carbonates of soda, making	Henry Pemberton	Philadelphia, Pa	Oct. 19, 1852.
Soda, chromate of, manufacture of	John Swindells	Manchester, England	Dec. 21, 1852; in England, Nov. 14, 1850.
Stills, worm tubs for	George Johnston	Farmington, Iowa	May 25, 1852
Sugar, apparatus for boiling	Don Juan Ramos, assignor to J. C. Gallaher and Wm. F. Tirado.	Island of Porto Rico; Philadelphia, Pa.	June 29, 1852; in Spain, April 29, 1851.
Sugar-boiling apparatus	William H. Clement	Philadelphia, Pa	Oct. 12, 1852; in England, Nov. 21, 1848.
Sugar, processes, for defecating	Robert and John Oxland	Plymouth, England	July 6, 1852; in England, May 15, 1851.
Sugar, processes, for the manufacture of	Don Juan Ramos, assignor to J. C. Gallaher and Wm. F. Tirado.	Island of Porto Rico; Philadelphia, Pa.	June 29, 1852; in Spain, April 29, 1851.
Sugar pans, scumming apparatus for	William H. Clement	Philadelphia, Pa	Oct. 12, 1852; in England, July 23, 1846.
Wort, refrigerators of. (See Class XVII, R.)			
Zinc, preparing from the ores	Henry W. Adams	New York, N. Y	July 27, 1852.
Zinc, white, manufacture of	Samuel T. Jones	New York, N. Y	Feb. 24, 1852.

Class V.—*Calorifics, comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boilers, cooking	L. S. De Bibory	Baltimore, Md	May 11, 1852.
Burners, gas	A. H. Wood	Boston, Mass	Nov. 9, 1852.
Caloriferes	Samuel Whitemarsh	Northampton, Hampshire co., Mass	Aug. 17, 1852.
Cooking apparatus	Joseph Smolinski	New York, N. Y	May 25, 1852.
Dryers, grain	T. E. Weed	Williamsburgh, Kings co., Mass	Feb. 24, 1852.

Dryers, grain	Henry G. Bulkley	Kalamazoo, Kalamazoo co., Mich	Mar. 2, 1852.
Fuel, granular, the manufacture of, from brush wood and twigs.	Reuben Daniels	Woodstock, Vt	June 15, 1852.
Furnace cinders, machine for separating iron from.	Daniel Walroth and Lucius Evans	Chittenango and Manlius, N. Y	Dec. 21, 1852.
Furnace, reverberatory	Christopher G. Best	Albany, N. Y	Aug. 31, 1852.
Furnaces, construction of grate bars for	Francis Armstrong	New Orleans, La	Feb. 17, 1852; antedated Aug. 17, 1851.
Furnaces, air heating	Edmund D. Norcross	Augusta, Me	Feb. 24, 1852.
Furnaces, hot-air	Geo. S. G. Spence	Boston, Mass	Aug. 17, 1852.
Furnaces, hot-air	Augustus M. Rice, assignor to A. S. Rice and S. H. Lombard.	Boston, Mass	Oct. 26, 1852.
Furnaces, hot-air	Appollos Richmond, assignor to A. C. Barstow & Co.	Providence, R. I	Oct. 26, 1852.
Furnaces, hot-air	Stephen Gates	Albion, Orleans co., N. Y	Dec. 7, 1852.
Furnaces, slags of, utilizing	Rev. Wm. H. Smith	Barren Hill, Montgomery co., Pa	Dec. 7, 1852.
Furnaces, warm air	Alexander Kelsey, assignor to James Cowles.	Rochester, N. Y	April 27, 1852.
Grate bars, construction of	F. P. Dimpfel	Philadelphia, Pa	Mar. 16, 1852.
Grates, rotary stove	Alex. Harrison	Philadelphia, Pa	Oct. 5, 1852.
Heat, mode of generating	W. Hartell and J. Lancaster	Philadelphia, Pa	Nov. 30, 1852.
Lamps	Charles Siedhof	Lancaster, Worcester co., Mass	July 27, 1852.
Lamps, alarm time-piece for lighting	Wm. H. and R. T. Andrews	Plymouth, Litchfield, co., Conn	Sept. 21, 1852.
Lamps, camphine	Isaac Van Bunschoten	New York, N. Y	Mar. 2, 1852.
Lamps, camphine	R. V. De Guinon	Williamsburgh, N. Y	Jan. 6, 1852.
Lamps, Argand, burners for	Austin Olcott	Rochester, N. Y	Mar. 16, 1852.
Lamp tops, rivets, &c., method of making	Luther C. White	New Haven, Conn	Sept. 7, 1852.
Lamps for locomotive engines	Thos. Snook and S. Hill	Rochester, N. Y	Dec. 21, 1852.
Lamps, reflector	James H. Pease	Reading, Pa	June 8, 1852.
Lamps, spirit gas, burners for	Rufus W. Sargent	Philadelphia, Pa	Oct. 12, 1852.
Lanterns	Philos Blake	New Haven, Conn	Jan. 13, 1852.
Light, benzole	Henry M. Paine	Worcester, Mass	July 13, 1852.
Oil cans	S Field and C. W. Heald	Barre, Worcester co., Mass	Aug. 31, 1852.
Ovens	Thomas N. Reid	Baltimore, Md	May 18, 1852.
Radiators, heat	Merrill Colvin	Rochester, N. Y	June 22, 1852.
Range, cooking	Geo. S. G. Spence	Boston, Mass	Nov. 9, 1852.
Ranges, cooking	John P. Hayes	Boston, Mass	Jan. 27, 1852.
Registers, hot air	William Turton	Bushwick, Kings co., N. Y	Mar. 16, 1852.
Stoves	Geo. W. Kennison	Newburyport, Mass	May 18, 1852.
Stoves, cooking	R. J. Blanchard	Albany, N. Y	Aug. 24, 1852.
Stove, cooking	Hosea H. Huntly, assignor to David T. Woodrow.	Cincinnati, Ohio	Oct. 26, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Stove, cooking	Manly C. Sadler	Brockport, Monroe co., N. Y	Nov. 2, 1852.
Stove, cooking	H. J. Ruggles	West Poultney, Vt	Nov. 30, 1852.
Stove doors, &c., hinges for	Chas. J. Woolson	Cleveland, Ohio	Mar. 16, 1852.
Stoves, air heating	J. M. Thatcher	Lansingburg, Rensselaer co., N. Y	Mar. 23, 1852.
Thermostat, for regulating heat	Thomas J. Sloan	New York, N. Y	July 6, 1852.
Ventilating railroad cars	N. S. Barnum and L. Whitney	New Haven, Conn	Jan. 6, 1852.
Ventilators	Mortimer M. Camp	New Haven, Conn	Aug. 17, 1852.
Ventilators	David Wells	Lowell, Mass	Nov. 2, 1852.
Ventilators	A. S. Dozier	Norfolk, Va	Dec. 21, 1852.
Ventilating windows for railroad cars	H. M. Paine	Worcester, Mass	Jan. 6, 1852.

Class VI.—*Steam and gas engines, including boilers and furnaces therefor, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boilers, apparatus for feeding	Andrew Walker, jr	St. Johnsbury, Vt	Aug. 24, 1852.
Boilers, apparatus for heating feed-water of steam	M. W. Baldwin and David Clark	Philadelphia, Pa.; Schuylkill Haven, Pa.	Oct. 12, 1852.
Boilers, steam	James W. Farrell	Reading, Berks county, Pa	May 18, 1852.
Boilers, steam	James Millholland	Reading, Berks county, Pa	Feb. 17, 1852.
Boilers, steam, metre for	William H. Lindsay	New York, N. Y	Feb. 17, 1852.
Boiler, steam, arrangement of	William Barnhill	Pittsburg, Pa	March 2, 1852.
Boilers, steam, safety apparatus for	Henry Waterman	Williamsburg, N. Y	Dec. 28, 1852.
Boilers, sheet water space-stud brace for flues of	Andrew Lamb and William Alltoft Summers.	Southampton and Millbrooke, Hants county, England.	April 27, 1852; in England, December 9, 1848.
Cut-offs	Frederick E. Sickles	New York, N. Y	Feb. 24, 1852.
Cut-off valve motion	S. W. Rogers	Baltimore, Md	Dec. 21, 1852.
Engines, electro-magnetic. (See Class VIII.)			
Engines, electro-magnetic. (See Class VIII.)			
Engines which use steam expansively, equalizing apparatus for.	Wm. H. Morrison	Shelbyville, Indiana	Dec. 21, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Engines, locomotive	H. R. Remsen and P. M. Hutton	Troy, N. Y	June 29, 1852.
Engines, rotary, abutment motion for reversible	Cassius A. Mills	Cold Water, Branch county, Mich	Aug. 24, 1852.
Engines, steam, governor for	Geo. S. Stearns and William Hodgson.	Cincinnati, Ohio	Aug. 31, 1852.
Engines, steam, metallic stuffing-box packing in	Ebenezer Winship	New York, N. Y	Aug. 31, 1852.
Eccentric, adjustable, mechanism for actuating an.	Matthew Stubbs	Cincinnati, Ohio	April 6, 1852.
Gauge, float, feed regulator, &c., for steam-boilers, &c.	Thomas J. Sloan	New York, N. Y	April 27, 1852.
Gauge, pressure	Benjamin Crawford	Alleghany city, Pa	Mar. 16, 1852.
Gauge, steam and water	William C. Grimes	Philadelphia, Pa	Jan. 6, 1852; antedated July 6, 1851.
Gauge, water, of boilers, &c	Benjamin Crawford	Alleghany city, Pa	Mar. 9, 1852.
Governors	John Tremper	Buffalo, N. Y	Oct. 12, 1852.
Grease cocks	Robert M. Wade	Wadesville, Va	June 8, 1852.
Locomotives, &c., feed water of, apparatus for heating.	Israel P. Magoon	St. Johnsbury, Caledonia county, Vt	Sept. 7, 1852.
Metres, fluid	William H. Lindsay	New York, N. Y	June 22, 1852.
Safety-valves, defferential	John McClintic	Philadelphia, Pa	May 4, 1852.
Spark-arrester	V. P. & B. Kimball	Watertown, Jefferson county, N. Y	Oct. 5, 1852.
Spark-arresters	J. Leeds, H. H. Oat, jr., and A. A. Oat, assignors to J. Leeds.	Philadelphia, Pa	Aug. 17, 1852.
Valve motion, duplex eccentric	John J. G. Collins	Chester, Delaware county, Pa	Feb. 24, 1852.
Valves of oscillating engines upon their seats, method of keeping the.	Ephraim Morris	New York, N. Y	Feb. 3, 1852.
Valves, puppet, mode of grinding while the engine is in motion.	Enos Rogers	New York, N. Y	July 6, 1852.
Valves for steam-engines	Matthias W. Baldwin	Philadelphia, Pa	April 27, 1852.
Valves, safety, defferential. (See Safety-valves.)			
Valves, safety	Alfred Guthrie	Chicago, Ill	Oct. 12, 1852.
Valves, the relief, in partially condensing engines, mechanism for operating.	William Few and Francis Armstrong	St. Louis, Mo.; New Orleans, La	Jan. 27, 1852.

IV.—*Classified list of patents issued*—Continued.

CLASS VII.—*Navigation and maritime implements, comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving dresses, life-preservers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Anchor, compound	Samuel N. Miller	West Roxbury, Mass	June 29, 1852.
Bilge water, &c., apparatus for elevating and discharging.	Nehemiah Hodge	North Adams, Berkshire county, Mass.	Mar. 19, 1852.
Capstans	Peter Roberts	New York, N. Y	Feb. 17, 1852.
Life preservers	Stephen Albro	Buffalo, N. Y	Oct. 19, 1852.
Life-preserving seat	George P. Tewksbury	Boston, Mass	Oct. 19, 1852.
Paddle-wheel, oblique bucket	George S. Weeks	Oswego, Oswego county, N. Y	April 13, 1852.
Paddle-wheels, valves or gates for oblique float	Jacob C. Carncross	Philadelphia, Pa	June 15, 1852.
Propelling vessels	Mathew A. Crooker	New York, N. Y	June 29, 1852.
Propellers, vibrating	Franklin Kellsey	Middletown, Conn	Nov. 2, 1852.
Sail-hank	Samuel Barker	New York, N. Y	June 29, 1852.
Serving-mallets	D. H. Southworth	New York, N. Y	Nov. 16, 1852.
Ships' blocks	William and Stephen G. Coleman	Providence, R. I	Feb. 3, 1852.
Ships' blocks	Charles H. Platt	New York, N. Y	May 18, 1852.
Ships' davits	Charles Perley	New York, N. Y	Jan. 27, 1852.
Signals, marine	Thomas H. Dodge	Nashua, Hillsborough, N. H	Mar. 23, 1852.
Signals, marine	Thomas H. Dodge	Nashua, Hillsborough, N. H	Nov. 9, 1852.
Steering apparatus	Norman W. Wheeler	Buffalo, N. Y	Feb. 3, 1852.
Steering apparatus	Alfred Swingle and Nehemiah Hunt	Boston, Mass	April 27, 1852.
Steering apparatus, relief	Nathaniel T. Edson	New Orleans, La	April 27, 1852.
Steering submarine vessels	L. D. Phillips	Michigan City, Laporte county, Ia	Nov. 9, 1852.
Thimbles for rigging, &c., machine for making	William Field	Providence, R. I	Nov 16, 1852.
Vessels, apparatus for lightening	Orrillus T. Williams	Smithland, Livingston county, Ky	Feb. 24, 1852.
Vessels, yards of, parrel for	Daniel S. Bayles	Brooklyn, N. Y	Dec. 28, 1852.

IV.—*Classified list of patents issued*—Continued.

CLASS VIII.—*Mathematical, philosophical, and optical instruments, including clocks, chronometers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Battery, galvanic	Louis Drescher	New York, N. Y	Dec. 7, 1852.
Bill registers	J. N. Ayres	Stamford, Fairfield county, Ct	Aug. 24, 1852.
Clocks, alarm	Jonathan S. Turner	New Haven, Ct	July 13, 1852.
Clocks, galvanic	Moses G. Farmer	Salem, Mass	Sept. 21, 1852.
Compasses for determining variation from local causes.	John R. St. John, assignor to James Renwick, G. F. Barnard, and E. B. St. John.	New York, N. Y	Mar. 2, 1852; in England, Dec. 27, 1850.
Electro-magnetic alarm bells	Moses G. Farmer	Salem, Mass	May 4, 1852.
Electro-magnetic engines	John S. Gustin	Trenton, N. J	Sept. 26, 1852.
Electro-magnetic engines	John S Gustin	Trenton, N. J	Oct. 12, 1852.
Electro-magnetic fire alarms	Henry Van Ansdall	Eaton, Preble county, Ohio	Aug. 31, 1852.
Escapements, duplex	Charles E. Jacot	New York, N. Y	July 20, 1852.
Galvanic battery. (See Battery, galvanic.)			
Gauges, pressure	Eugene Bourdon	Paris, France	Aug. 3, 1852; French patent, June 18, 1849.
Joints around glass tubes for philosophical apparatus.	A. B. Latta	Cincinnati, Ohio	Mar. 16, 1852.
Lamps, alarm time-piece for lighting. (See Class V.)			
Lenses, glass, manufacture of	John L. Gilliland	New York, N. Y	Aug. 10, 1852.
Level, reflecting spirit and square	Francis Wilbar	Roxbury, Norfolk county, Mass	April 20, 1852.
Lightning rods	James Spratt	Cincinnati, Ohio	May 4, 1852.
Lightning rods	Herman H. Homan	Cincinnati, Ohio	Sept. 14, 1852.
Square, centre, for finding the centre of a circle	Nathan Ames, assignor to Walter Bryent.	Saugus, Mass.; Boston, Mass	July 6, 1852.
Tally-board. (See Class XXII.)			
Telegraph, magnetic printing	R. E. House	New York, N. Y	Dec. 28, 1852.
Telegraphs, signal	Charles Latimer	Washington, D. C	Aug. 24, 1852.
Time-pieces	Silas B. Terry	Plymouth, Litchfield county, Ct	Oct. 5, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Time-pieces	S. R. Wilmot	New Haven, Ct	June 22, 1852.
Watch-chain swivels	Samuel Y. D. Arrowsmith	New York, N. Y	Feb. 10, 1852.
Watch keys	Charles E. Jacot	New York, N. Y	Oct. 26, 1852.
Whaling apparatus, electric	Albert Sonnenburg and Philip Rechten, assignors to Christian A. Hainaken.	Bremen, Germany; United States	Mar. 30, 1852.

CLASS IX.—*Civil engineering and architecture, comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, weirs, dams, and other internal improvements, buildings, roofs, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Augers, submarine	Norman Blake	Ira, Cayuga county, N. Y	April 20, 1852.
Blasting rocks under water	Benjamin Maillefert	New York, N. Y	Mar. 2, 1852.
Bridges	Ammi White	Boston, Mass	Feb. 3, 1852.
Bridges, construction of	Wendall Bollman	Baltimore, Md	Jan. 6, 1852.
Bridges, construction of	Abel Bradway and Elijah Valentine	Munson, Mass	July 6, 1852.
Bridges, construction of	J B. Gridley	Brooklyn, N. Y	July 6, 1852.
Bridging navigable streams	Benjamin F. Lee	New York, N. Y	Mar. 2, 1852.
Caissons, cast-iron	James P. Duffey	Philadelphia, Pa	July 13, 1852.
Canal lock gates	Charles Neer	Troy, N. Y	Mar. 9, 1852.
Canal locks	W. W. Virdin	Havre de-Grace, Harford county, Md	Jan. 20, 1852.
Chairs, railroad, manufacture of	Peter P. R. Hayden	Columbus, Franklin county, Ohio	Jan. 6, 1852.
Chairs, wrought-iron railroad, machine for making	Robert Griffiths	Newport, Campbell county, Ky	Aug. 17, 1852.
Chairs, railroad, machinery for making	J. F. Winslow and J. Snyder	Troy, N. Y	Dec. 28, 1852.
Docks, floating	Orrillus T. Williams	Smithland, Livingston county, Ky	Feb. 24, 1852.
Doors, double-acting	William Rippon	Providence, Rhode Island	July 6, 1852.
Dredging machines	James Hamilton	New York, N. Y	Mar. 30, 1852; French patent, December 16, 1845.
Drills, rock	William F. Ash	Springfield, Ohio	May 4, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Excavating and dredging machines	Calvin Willey, jr., assignor to Calvin Willey, jr., and Usal Walker.	Chicago, Ill	Feb. 10, 1852.
Excavating machines	Charles Bishop	Norwalk, Huron county, Ohio	Mar. 30, 1852.
Fences	John Card	Gainesville, N. Y	Feb. 17, 1852.
Fuses, machinery for making	Albert F. Andrews	Avon, Connecticut	May 25, 1852
Gates, balance	William C. Van Hoesen	Leeds, Greene county, N. Y	April 20, 1852.
Gates, double	J. S Brown	Washington, D. C	Aug. 10, 1852.
Railings, iron	George Hess, assignor to Sylvanus Shimer.	Easton, Northampton, Pa	Jan. 6, 1852.
Rails, hand, machines for cutting	George B. Pullinger	Philadelphia, Pa	Aug. 24, 1852.
Sewers, street	Willard Day	Brooklyn, N. Y	Feb. 3, 1852.
Signals, railroad	Aurin Bugbee	Charlestown, Mass	Sept. 7, 1852.
Water-closets. (See Class XXII.)			
Wells, artesian, apparatus for boring	John Thompson	Kensington, Philadelphia county, Pa	Mar. 30, 1852.
Window frames	Henry C. Smith	Portland, Cumberland county, Me	Oct. 5, 1852.
Window sashes, expanding	Mighill Nutting	Portland, Cumberland county, Me	Oct. 5, 1852; antedated June 16, 1852.
Window sashes, expanding	Mighill Nutting	Portland, Cumberland county, Me	Oct. 12, 1852.

CLASS X.—*Land conveyance, comprising carriages, cars, and other vehicles used on roads, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Axletree arms	David Phillips	Sharon, Mercer co., Pa	Feb. 3, 1852.
Axles, carriage	Kingston Goddard	Philadelphia, Pa	June 15, 1852.
Axles, railroad car, divided	William S. Loughborough	Victor, N. Y	June 22, 1852.
Brakes, railroad car	Birdsill Holly, assignor to Silas Hewit, Edward S. Latham, Birdsill Holly, and Abel Downs.	Seneca Falls, N. Y	Feb. 10, 1852.
Brakes, railroad car	Thomas Walber	New York, N. Y	Mar. 16, 1852.
Brakes, railroad car	Benjamin Kraft	Reading, Berks co., Pa	April 20, 1852; antedated Dec. 31, 1851.
Boxes for journals	Henry Turner	Charlestown, N. H	April 27, 1852.
Brakes, railroad car	Thomas G. McLaughlin	Kensington, Philadelphia co., Pa	May 4, 1852.
Brakes, railroad car	William Montgomery	Roxbury, Massachusetts	July 6, 1852.
Brakes, railroad car	L. F. Thompson and A. G. Bachelder, assignors to H. Tanner.	Charlestown, Mass.; Lowell, Mass.; Buffalo, N. Y.	Jully 6, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Brakes, railroad car	Joseph P. Martin	Philadelphia, Pa	July 13, 1852.
Brakes, railroad car	J. Houston and E. Ross	Manchester, Hillsborough co., N. H	July 20, 1852.
Brakes, railroad car	William Hall	North Adams, Berkshire co., Mass	July 20, 1852.
Brakes, railroad car	John Schoenherr	Reading, Berks co., Pa	Aug. 10, 1852.
Car foot	Nehemiah Hodge	North Adams, Mass	June 22, 1852.
Car coupling, railroad	James Turner	East Nassau, Rensselaer co., N. Y	July 20, 1852.
Car seats	Wm. L. Bass	Cambridge, Middlesex, Mass	July 20, 1852.
Car seats	John Briggs	Boston, Mass	July 6, 1852.
Car seats, railroad	Abel B. Buel	Westmoreland, Oneida county, N. Y	May 11, 1852.
Car seats, railroad	Samuel M. Perry	New York, N. Y	July 27, 1852.
Car seats, railroad	Charles P. Bailey	Zanesville, Muskingum, Ohio	Aug. 3, 1852.
Car seats, railroad	Daniel H. Wiswell	Buffalo, N. Y	Nov. 16, 1852.
Carriage curtains, lock for	George Cook	New Haven, Conn	Jan. 6, 1852.
Carriages, running gear of	Gustavus Haussknecht	New Haven, Conn	Jan. 13, 1852.
Carriages, running gear of	C. F. Verleger	Baltimore, Md	Feb. 3, 1822.
Carriages	Jonathan Fox	Manchester, Passaic co., N. J	Aug. 10, 1852.
Cars, railroad, running gear of	Henry D. Taylor	Newark, N. J	Feb. 3, 1852.
Cars, railroad	Charles Waterbury	Bridgeport, Conn	June 29, 1852.
Cart, self-loading and dumping	B. T. Stowell	Waddam's Grove, Stephenson co., Ill	April 27, 1852.
Chairs	John T. Hammitt	Philadelphia, Pa	Dec. 7, 1852.
Cow-catcher	Cook Darling	Utica, N. Y	June 8, 1852.
Frogs, railroad, method of securing movable points of.	M. S. Curtis and Edgar St. John	Binghampton, Broome co., N. Y	Aug. 10, 1852.
Hubs, carriage	S. S. Barry	Brownhelm, Ohio	Jan. 6, 1852.
Hubs for boxes, apparatus for boring. (See Boring, &c., Class XIV.)			
Omnibus register	F. O. Dechamps	Philadelphia, Pa	Mar. 2, 1852.
Omnibus, registers for, and for other purposes	J. Z. A. Wagner	Philadelphia, Pa	Sept. 28, 1852.
Omnibus step	Josiah Ashenfelder	Philadelphia, Pa	Mar. 23, 1852.
Planes, inclined, method of ascending	James S. French	Old Point Comfort, Va	June 22, 1852.
Railroad gates	Egbert P. Carter	Yorkshire, Cattaraugus co., N. Y	Feb. 17, 1852.
Railroads, apparatus for transporting trains on inclined planes of.	Samuel McElfatrick	Dauphin, Pa	Oct. 12, 1852.
Railroads, mode of preventing collisions on	Thomas A. Davies	New York, N. Y	Feb. 10, 1852.

Sleds, hold-back for	Perry Dickson	Blooming Valley, Crawford co., Pa	April 27, 1852.
Spark deflector	Albert Eames	Springfield, Mass	June 8, 1852.
Spikes, machine for drawing	Daniel Hale	Hinsdale, Cattaraugus co., N. Y	April 20, 1852.
Spring, pneumatic	Elijah Ware	Roxbury, Mass	July 6, 1852.
Switches, railroad	A. S. Miller	Republic, Seneca co., Ohio	Jan. 27, 1852.
Switches, railroad	Ira Reynolds	Republic, Seneca co., Ohio	Jan. 27, 1852.
Switches, railroad	Amos Hodge	Adams, Berkshire co., Mass	Feb. 10, 1852.
Switches, railroad	John F. Klein	Trenton, Mercer co., N. J	April 27, 1852.
Swingletrees	Charles Howard	Alton, Madison co., Ill	Mar. 23, 1852.
Track clearer, railroad	Simeon Minkler	Chazy, Clinton co., N. Y	July 27, 1852.
Truck, railroad	Edwin Stanley	Bennington, Wyoming co., N. Y	Aug. 24, 1852.
Trucks and brakes, railroad car	E. G Otis	Bergen, N. J	May 25, 1852.
Trucks for locomotives	John L. White	Corning, Steuben co., N. Y	Jan. 6, 1852.
Trucks, railroad car	Caleb R. Disbrow	Bath, N. Y	June 29, 1852.
Wagons, dumping	Thomas Castor	Frankford, Philadelphia co., Pa	Aug. 3, 1852.
Wagons, dumping	Abraham V. Cross	Washington, D. C	June 22, 1852.
Wheels, carriage, machines for making	Chauncey H. Guard	Brownville, Jefferson co., N. Y	Sept. 7, 1852.
Wheels and axles of cars, protecting, by encasing them.	A. L. Finch	New Britain, Hartford co., Conn	April 20, 1852.
Wheels, car, and rails	John Valentine	New York, N. Y	April 6, 1852.
Wheels, cast-iron car	H. W. Woodruff	Watertown, N. Y	Jan. 6, 1852.
Wheels, cast-iron car	Albert G. Bristol and Joel C. Jackson	Rochester, N. Y	Feb. 24, 1852.
Wheels, cast-iron car	Orson Moulton	Blackstone, Worcester co., Mass	Mar. 2, 1852.
Wheels, cast-iron car	Hiram W. Moore	Bridgeport, Fairfield co., Conn	Mar. 2, 1852.
Wheels, cast-iron car	Stephen Thurston	Scranton, Pa	May 25, 1852.
Wheels, cast-iron car	Hiram H. Scoville	Chicago, Ill	July 13, 1852.
Wheels, cast-iron car	Daniel R. Rawl	Rochester, N. Y	June 1, 1852.
Wheels, cast-iron car	Peter Dorsch	Schenectady, N. Y	June 15, 1852.
Wheels, railroad car	Nehemiah Hodge	Adams, Mass	June 1, 1852.
Whiffletree	Dewit C. Williams	Madison, Lake co., Ohio	Nov. 23, 1852.
Whiffletree hook	E. A. Palmer and A. J. Simmons	Clayville, Oneida co., N. Y	Sept. 7, 1852.
Yoke, neck	John T. Plato	Jasper, Steuben co., N. Y	Jan. 27, 1852.

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IV.—*Classified list of patents issued*—Continued.

CLASS XI.—*Hydraulics and pneumatics, including water wheels, wind mills, and other implements operated on by air or water, or employed in raising or delivering fluids.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cocks with pipes, connecting	Daniel A. Webster	New York, N. Y	June 29, 1852; antedated Dec. 29, 1851.
Coupling, hose	A. W. Cary	Brockport, N. Y	Feb. 10, 1852.
Engines, fire	Orville G. Adkins	Oswego, Oswego co., N. Y	July 20, 1852.
Faucets, measuring	J. R. Byler and George W. Sensenich	Beartown, Pa	May 11, 1852.
Funnels	Christen Schneider	Washington, D. C	May 4, 1852.
Metres, water	Samuel Huse	Boston, Mass	Jan. 27, 1852.
Pipe, lead. (See Class No. II, Lead pipe, &c.)			
Pumps	Abel Barker	Honesdale, Wayne co., Pa	Feb. 17, 1852.
Pumps, endless chain, buckets for	Clark Polley	May's Landing, N. J	Dec. 14, 1852.
Pumps, rotary	H. C. Spaulding and G. Stickney	Hartford, Conn	April 20, 1852.
Pumps, valves for	Joel R. Bassetts	Cincinnati, Ohio	June 22, 1852.
Tubes, machine for making sheet metal. (See Class II.)			
Water, apparatus for raising	N. H. Lebby	Charleston, S. C	April 20, 1852.
Water-gun for extinguishing fires	Hiram Strait	Covington, Ky	Feb. 24, 1852.
Water-wheels	Joel B. Nott and W. S. Kelley	Guilderland, Albany co.; Princeton, Schenectady co., N. Y.	Feb. 24, 1852.
Water-wheels	Ira Jagger	Albany, N. Y	Oct. 19, 1852.
Water-wheels, packing	Erasmus Smith	Norwich, Chenango co., N. Y	Oct. 12, 1852.

CLASS XII.—*Lever, screw, and mechanical power, as applied to pressing, weighing, raising, and moving weights.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Derricks	Selah Hill and Charles M. Dupuy, jr.	Jersey City, N. J.; Rondout, N. Y	June 15, 1852.
Lever jacks	Levis H. Davis, assignor to J. A. Dugdale.	Chester county, Pa	May 4, 1852.
Presses for bundling flocculent and other substances.	Daniel Kellogg	Pittsfield, Washtenaw co., Mich	Oct. 12, 1852.
Presses, cotton	Lewis Lewis	Vicksburg, Miss	Mar. 2, 1852.
Presses, cotton	Jacob G. Winger	Vicksburg, Miss	July 13, 1852.
Presses, cotton	Lewis Lewis	Vicksburg, Miss	Aug. 17, 1852.
Presses, oil	William P. Chadwick	Edgartown, Dukes co., Mass	Nov. 9, 1852.
Pressing tobacco, machines for. (See Class XXII.)			
Scales, platform	Robert Newell	Lebanon, Boone co., Indiana	May 11, 1852.
Scales for weighing	William P. Goolman and William Holtselaw, jr.	Springtown, Hendricks co., Indiana	Aug. 3, 1852.
Weighing machines	William and Thomas Schnebly	New York, N. Y	Feb. 17, 1852.
Windlasses	Amzi C. Semple	Cincinnati, Ohio	Jan. 27, 1852.

CLASS XIII.—*Grinding mills and mill gearing, including grain mills, mechanical movements, and horse-powers.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bran dusters	Abel Hildreth	Newark, Licking co., N. Y	Feb. 17, 1852.
Bran dusters	Lewis Fagin	Cincinnati, Ohio	Feb. 17, 1852.
Clutches, friction	Gerard Sickles	Brooklyn, N. Y	Mar. 2, 1852.
Clutch, friction	Wendell Wright	New York, N. Y	June 15, 1852.
Corn shellers	David Eldridge	Philadelphia, Pa	June 1, 1852.
Crusher, quartz	James H. Swett	Boston, Mass	Feb. 10, 1852.
Flour bolts	Samuel Cook	Adams's Basin, Monroe co., N. Y	Mar. 9, 1852.
Flour bolts	David Marsh	Fairfield, Conn	May 25, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Governors	Ephraim Morris	New York, N. Y	Feb. 10, 1852.
Grinding quartz, mill for	Horatio Blasdell	New York, N. Y	Jan. 20, 1852.
Grinding quartz, mills for	Smith Cram	New York, N. Y	Feb. 10, 1852.
Hominy machines	Samuel Null	Taneytown, Md	May 25, 1852.
Hominy mills	James Hughes	Cambridge, Wayne co., Indiana	Oct. 12, 1852.
Horse-power	David Russell	St. Louis, Mo	Aug. 24, 1852.
Horse-powers	M. H. Cornell	Feasterville, Bucks co., Pa	Feb. 10, 1852.
Horse-powers	Aaron D. Crane	Newark, N. J	June 22, 1852.
Horse-powers, endless chain	Horace L. Emery	Albany, N. Y	Feb. 24, 1852.
Horse-powers, endless chain	Theodore Sharp	Albany, N. Y	Mar. 2, 1852.
Mill for crushing quartz	John W. Cochran	New York, N. Y	June 15, 1852.
Mill dress	John W. Kane	New Carlisle, Clark co., Ohio	Aug. 10, 1852.
Mill spindles	Egbert T. Butler	Buffalo, N. Y	Jan. 27, 1852.
Mill spindles, hanging	William H. Naracon	Auburn, N. Y	June 15, 1852.
Mill spindles, steps, and bearings of	Theodore S. Minniss	Meadville, Crawford co., N. Y	June 22, 1852.
Mill-stone dress	Wilson Ager	Rohersburg, Columbia co., Pa	June 29, 1852.
Mill-stones	Thomas Barnett	Beverly, York co., England	Oct. 12, 1852; in England Jan. 8, 1852.
Mill spindles, hanging steps of	Gideon Hotchkiss	Windsor, New York	June 29, 1852.
Mills, portable grain	Charles Leavitt	Quincy, Ill	July 6, 1852.
Mills, cider	Jarvis Case	Selma, Clarke co., Ohio	Aug. 10, 1852.
Mills, grinding	Oldin Nichols	Lowell, Mass	Oct. 12, 1852.
Motion, method of converting reciprocating rotary into reciprocating rectilinear.	Alfred Carson	New York, N. Y	July 20, 1852.
Motion, method of converting reciprocating into rotary.	Charles Howard	Alton, Madison co., Ill	Aug. 10, 1852
Ores, machines for stamping	William Ball	Chicopee, Hampden co., Mass	Mar. 23, 1852.
Ores, mill for grinding	William Ball	Chicopee, Hampden co., Mass	Mar. 30, 1852.
Packers, flour	Nathan Kinman	Lewiston, Niagara co., N. Y	Mar. 23, 1852.
Picks, stone	Joseph U. Houston	Conway, Franklin co., Mass	Dec. 14, 1852.
Pulleys, banding	Robert W. Parker	Roxbury, Mass	Feb. 17, 1852.
Smut machines	Thomas H. McCray	Madisonville, Monroe co., Tenn	Mar. 23, 1852.
Smut machines	Daniel Shaw	Cheshire, Gallia co., Ohio	April 6, 1852.
Smut machines	Charles and James Keeler	Union, Broome co., N. Y	Sept. 14, 1852.

Smut machine	G. S. Peck	East Smithfield, Pa	June 1, 1852.
Smut machinery	John M. Earls	Troy, N. Y	April 27, 1852.

CLASS XIV.—*Lumber, including machines and tools, for preparing and manufacturing, such as sawing, planing, mortising, shingle and staves, carpenters' and coopers' implements.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bitts, expanding	Charles L. Barnes	New York, N. Y	Nov. 16, 1852.
Boring hubs for boxes, apparatus for	Henry Sidle	Dillsburg, York co., Pa	Feb. 24, 1852.
Carving machines	Charles E. Bacon	Buffalo, Erie co., N. Y	Sept. 21, 1852.
Casks, machinery for making	James Hamilton	New York, N. Y	April 13, 1852; in England Sept. 28, 1850.
Grindstone, self-sharpening	Jesse Pannabecker	Elizabeth township, Lancaster co., Pa	Jan. 20, 1852.
Lath machine	Henry C. Smith	Cleveland, Ohio	Sept. 28, 1852.
Mortising machines	John B. Chambers	Pittsburg, Pa	May 25, 1852.
Mortising machines	William C. Shaw	Madison, Jefferson co., Ia	July 27, 1852.
Mortising machines	Joseph Guild	Cincinnati, Ohio	Nov. 30, 1852.
Planes, bevelling	Harrison W. Lewis	Bath, Steuben co., Ohio	Jan. 13, 1852.
Planing, cutter heads for	Jas. M. Patton and Wm. F. Fergus	Philadelphia, Pa	July 6, 1852.
Plane irons, double	Fordyce Beals	Pittsfield, Berkshire co., Mass	Mar. 16, 1852.
Planes, hand	Birdsill Holley	Seneca Falls, N. Y	July 6, 1852.
Planing machines, feed apparatus for	Joel Whitney	Winchester, Middlesex co., Mass	April 13, 1852.
Planing machines, feeders for	John Cumberland	Mobile, Ala	Feb. 3, 1852.
Planing machines	G. W. Tolhurst	Cleveland, Ohio	Jan. 20, 1852.
Planing machines	Daniel Stearns	Rome, Oneida co., N. Y	Mar. 16, 1852.
Planing machines	John Howarth	Salem, Essex co., Mass	Mar. 23, 1852.
Planing machines	Nicholas G. Norcross	Lowell, Mass	June 22, 1852.
Planing machines	William Watson	Chicago, Ill	July 6, 1852.
Planing machines	Aretus A. Wilder	Detroit, Mich	Dec. 21, 1852; antedated July 17, 1852.
Saw-mills	Oliver B. Judd	Rockton, Herkimer co., N. Y	Feb. 24, 1852.
Saw-mills	William C. Bronson	Erwin, Steuben co., N. Y	April 6, 1852.
Saw-mills	Hazard Knowles	New York, N. Y	Sept. 28, 1852.
Sawing, mills for curvilinear	James Hamilton	New York, N. Y	April 13, 1852; in England June 1, 1848, to Thomas H. Barber.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Saws in saw-mills, straining	Edmund Booth	Philadelphia, Pa	May 18, 1852.
Saw-sets	Asahel G. Bachelder	Lowell, Mass	May 18, 1852.
Saw-set	A. Bradway and E. Valentine	Monson, Hampden co., Mass	Aug. 31, 1852.
Shingle machines	William Stoddard	Lowell, Mass	Dec. 7, 1852.
Shingle machines	Luther B. Parker	Pine township, Crawford co., Pa	Jan. 27, 1852.
Shingle machines	Robert L. Noblet	Haverford, Pa	July 13, 1852.
Shingle machines	Furman Hand, jr	Chicago, Ill	July 13, 1852.
Shingles, machines for jointing	William Stoddard	Lowell, Middlesex, Mass	Mar. 23, 1852.
Shingles, machines for shaving	Abel Bradway	Monson, Hampden co., Mass	July 20, 1852.
Screw blanks, rivets, &c., machinery for shaving the heads of.	John Crum	Ramapo, Rockland co., N. Y	Mar. 30, 1852.
Staves, machines for jointing	Dennison Woodcock	Independence Centre, N. Y	May 25, 1852.
Staves, machines for jointing	David Rood and E. Jenny, assignors to E. Jenny.	Boston, Mass.; Middleborough, Mass.	June 15, 1852.
Tonguing boards, machines for	R. H. Edgcomb, assignor of his interest to R. Crosby, and R. Crosby, assignor to Ransom Crosby, jr.	New York, N. Y	April 13, 1852.
Tonguing and grooving apparatus	Phineas Emmons	New York, N. Y	Dec. 7, 1852.
Tonguing boards, machines for	Samuel Albro	White Hall, N. Y	July 13, 1852.
Turning engines	James S. Brown	Pawtucket, Mass	July 6, 1852.
Turning prisms, &c	Allen Sherwood and Avery Babbett	Auburn, N. Y	Jan. 13, 1852.
Turning and polishing, machines for	Benjamin J. Taymon	Philadelphia, Pa	June 1, 1852.
Window-blind machinery	Daniel H. Thompson	Springfield, Mass	May 4, 1852.

Class XV.—*Stone and clay manufactures, including machines for pottery, glass-making, brick-making, dressing and preparing stone, cements, and other building materials.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Brick kilns	William Linton	Baltimore, Md	Jan. 20, 1852.
Brick kilns	Richard E. Schroeder	Rochester, N. Y	Sept. 28, 1852.
Brick machines	S. L. Speissegger	Savannah, Georgia	Mar. 2, 1852.
Brick machines	Jesse Samuels	Allentown, Lehigh co., Pa	April 20, 1852.
Brick machines	R. A. Ver Valen	Haverstraw, N. Y	June 29, 1852.
Brick machines	Arad Woodworth, 3d, and Samuel Mower.	Boston, Mass	Aug. 31, 1852; in England Jan. 24, 1852.
Brick machines	H. H. Strawbridge and Daniel Tyson	New Orleans, La.; Covington, La	Nov. 9, 1852.
Clay, mixing, and mashing vegetables, mill for	Clark Alvord	Geddis, Onondaga co., N. Y	Aug. 31, 1852.
Crucibles and other articles of earthenware, mode of forming.	John Akrill	Williamsburg, Kings co., N. Y	Oct. 26, 1852.
Drilling stone, machines for	Henry Goulding	Boston, Mass	Jan. 20, 1852.
Glass, mode of frosting	John Levy and Charles Jones	New York, N. Y	Dec. 7, 1852.
Glass, plate and window, manufacture of	Terence Clark	Pittsburg, Pa	June 8, 1852.
Kilns for burning pottery	George R. Booth	Hanley, England	Aug. 31, 1852; in England June 15, 1843.
Marble, imitation of, preparing stone in. (See Stone.)			
Mortar, mixing	Jesse Peck	Buffalo, N. Y	June 29, 1852.
Stone-cutting machines	John W. Cochran	Williamsburg, Kings co., N. Y	April 6, 1852.
Stone-dressing machines	S. W. & R. M. Draper	Roxborough, Mass	May 25, 1852.
Stone drilling, machines for	Lemuel P. Jenks, assignor to Joseph W. Page, assignor to George Arthur Gardner.	Boston, Mass	Nov. 2, 1852.
Stone drilling, machines for	Joseph J. Couch	Philadelphia, Pa	Nov. 23, 1852.
Stone and earthenware, manufacture of	Jacob and Freeman Wise	Fredericktown, Washington county, Pa.	Nov. 30, 1852.
Stone imitation	Charles Iles, assignor to E. H. Ashcroft, assignor to E. H. Ashcroft and George W. Savage.	Birmingham, England; Boston, Mass.; New York, N. Y.	June 15, 1852; in England April 26, 1849.
Stone, machines for dressing	Albert Eames, assignor to Charles T. Shelton.	Springfield, Mass	Jan. 13, 1852.
Stone, machines for dressing	Robert Eastman, assignor to Seth Eastman.	Concord, N. H.; Washington, D. C	July 20, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Stone, machines for drilling	Henry W. Catlin, administrator of Alexander Catlin.	Burlington, Chittenden co., Vt	Aug. 10, 1852.
Stone, machines for rubbing	Pleasant E. Royse	New Albany, Indiana	July 20, 1852.
Stone, machines for rubbing	P. E. Royse and Ira Reynolds	New Albany, Ia.; Republic, Ohio	July 6, 1852.
Stone in imitation of marble, preparing	Hiram Tucker	Cambridgeport, Middlesex co., Mass	Sept. 7, 1852.
Stone pick. (See Class XIII, Picks, stone.)			
Stone, sawing, saws for	Albert Eames	Springfield, Mass	July 27, 1852.

Class XVI.—*Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boot crimps	Laman Barrett	Gainesville, Wyoming co., N. Y	Oct. 26, 1852.
Boot heels, revolving	Thomas Walker, assignor to B. B. Thayer, assignor to W. W. Churchill and Jos. Baxter.	Birmingham, England; Boston, Mass.; Quincy, Mass.	June 29, 1852; in England July 18, 1849.
Boot jacks	Sardis Thompson	Hartsville, Berkshire co., Mass	April 6, 1852.
Boot soles, tools for cutting pegs out of	D. D. Allen	Adams, Berkshire co., Mass	Oct. 19, 1852.
Boot trees	David Sadleir	McWilliamstown, Chester co., Pa	Nov. 23, 1852.
Collars, horse	Henry B. Latham	Huntingdon, Suffolk co., N. Y	April 6, 1852.
Collars, horse	J. H. Hall and John Lourey	Wheeling, Va	Sept. 21, 1852.
Curriers' beam and knife	James D. Willoughby	Shippensburg, Cumberland co., Pa	Aug. 17, 1852.
Gauges, leather	Lewis W. Beecher	Avon, New York	May 4, 1852.
Hame-tugs	R. B. Whipple	Cleveland, Ohio	April 20, 1852.
Harness, cruppers for	John J. Flack	Joliet, Will co., Ill	July 20, 1852.
Harness, fastenings for	Thomas Henderson	Black Horse, Harford co., Md	July 27, 1852.
Harness from horses, detaching	George Yellott	Bel Air, Maryland	June 15, 1852.
Harness saddle trees	Thomas Mardock and Wm. C. Kellar	Cincinnati, Ohio	Oct. 12, 1852.
Last-holder, revolving	Henry G. De Witt	Napanock, N. Y	June 29, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Lasting boots, instruments for	Hezekiah Conant	Worcester, Mass	Aug. 24, 1852.
Lasting boots, instruments for	Benjamin Livermore	Hartland, Windsor co., Vt	Aug. 24, 1852.
Leather, machines for polishing	John M. Poole, assignor to J. Pasey and James Scott.	Wilmington, Del	Sept. 28, 1852.
Mail bags, air-tight	Charles A. Robbins and Harvey Allen.	Iowa City, Johnson co., Iowa; Allen's Grove, Walworth co., Wisconsin.	Sept. 7, 1852.
Nails, instrument for driving, in difficult places	Seth P. Carpenter	Milford, Worcester co., Mass	July 13, 1852.
Planes, edge, for shoemakers	Nicholas Bucher	Weedsport, Cayuga co., N. Y	Nov. 2, 1852.
Saddles	William S. Kennedy	Philadelphia, Pa	June 15, 1852.
Saddles	Thomas Mardock	Cincinnati, Ohio	Nov. 9, 1852.
Shoes and gaiter boots	Joseph Brackett	Swampscot, Essex co., Mass	Sept. 28, 1852.
Tanning	A. K. Eaton	Rochester, N. Y	Aug. 10, 1852.
Tanning	David Kennedy	Reading, Berks co., Pa	Nov. 16, 1852.

Class XVII.—*Household furniture, machines and implements for domestic purposes, including washing machines, bread and cracker machines, feather dressing, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bedstead fastenings	William Shaw	Clarion, Clarion co., Pa	Mar. 30, 1852.
Bedstead fastenings	A. S. Newhouse	McBeen, Ga	June 15, 1852.
Bedstead fastenings	Jasper Johnson	Geneseo, N. Y	June 27, 1852.
Bedstead fastenings	Isaac A. Sergeant	Hamilton, Ohio	July 13, 1852.
Bedstead fastenings	William Shaw	Clarion, Clarion co., Pa	Aug. 17, 1852.
Bedsteads	Daniel W. Smead	Peru, La Salle co., Ill	Oct. 19, 1852.
Bedsteads, machines for cutting screws on rails and posts of.	J. Parsons Owen	Norwalk, Huron co., Ohio	Mar. 16, 1852.
Bedsteads, portable cot	Wm. C. Betts	Brooklyn, N. Y	May 11, 1852.
Bedstead, sofa	John T. Hammitt	Philadelphia, Pa	Mar. 16, 1852.
Bedsteads, sofa	Alfred Walker	New Haven, Conn	June 29, 1852.
Bed for invalids	S. D. Hopkins	Staunton, Augusta co., Va	Aug. 24, 1852.
Brooms	Cyrus T. Moore, assignor to F. S. Noyes.	Concord, N. H	July 27, 1852.
Brushes, shoe	John Jay Adams	Boston, Mass	Feb. 10, 1852.
Brushes	Freeman Murrow	Williamsburg, Kings co., N. Y	April 27, 1852.
Brushes, manufacture of	Abbot R. Davis	East Cambridge, Mass	May 11, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Butter from firkins, implement for cutting	Nathaniel Woodbury	Salem, Mass.	May 11, 1852.
Chairs	George O. Donnell	New Lebanon, Columbia co., N. Y.	Mar. 2, 1852.
Cheese, machines for cutting	Walter K. Foster	Bangor, Me.	Aug. 24, 1852.
Clothes, machines for wringing	Joseph P. Martin	Philadelphia, Pa.	Oct. 5, 1852.
Clothes pins	Saml. Aldrick	Springfield, Windsor co., Vt.	Sept. 14, 1852.
Cracker machines	John McCollum	New York, N. Y.	Mar. 23, 1852.
Fans, automatic	Seth E. Winslow	Kensington, Philadelphia co., Pa.	Nov. 9, 1852.
Irons, flat, steam	Caleb C. Walworth	Boston, Mass.	Dec. 21, 1852.
Irons, smoothing	N. Taliaferro and Wm. D. Cummings.	Augusta, Bracken co., Ky.; Murphysville, Mason co., Ky.	Mar. 30, 1852.
Irons, smoothing	Federal C. Adams	Aberdeen, Brown co., Ohio	Sept. 7, 1852.
Knives and forks, machine for scouring	Christopher Aumock	Columbus, Franklin co., Ohio	Jan. 13, 1852.
Mattresses	Thos. G. Clinton	Cincinnati, Ohio	April 20, 1852.
Mattresses, spring	John Waters	Southwark, Philadelphia co., Pa.	Jan. 20, 1852.
Meat cutters	William Burns	Rome, Ohio	May 11, 1852.
Meat cutters	Joseph Potts	Yocumtown, Pa.	June 15, 1852.
Potato washers	Alonzo Bentley	Honesdale, Wayne co., Pa.	May 4, 1852.
Refrigerators	Andrew Maish	Cincinnati, Ohio	April 20, 1852.
Refrigerators of wort	Adolph Hammer	Philadelphia, Pa.	Sept. 7, 1852.
Sausage stuffers	Thos. W. Bailey	Lewistown, Mifflin co., Pa.	Mar. 30, 1852.
Speaking tubes	Thos. Woolcocks and Wm. Ostrander.	New York, N. Y.	May 4, 1852.
Spoons, forks, &c., machinery for making. (See Class II.)			
Tables	Timothy H. Taylor	Fayetteville, N. Y.	May 11, 1852.
Wardrobes, portable	Seth L. Hobart	Hingham, Plymouth co., Mass.	Sept. 21, 1852.
Washboards	Lester Butler	Kenosha, Kenosha co., Wis.	Aug. 31, 1852.
Washing machines	John McLaughlin	Goshen, Clermont co., Ohio	Jan. 20, 1852.
Washing machines	Christopher Hollingsworth	Liberty, Ind.	May 4, 1852.
Washing machines	Jarvis T. Mudge	Washington, D. C.	Aug. 31, 1852.
Washing machines, or other purposes, connecting joints for.	S. S. Egbert and S. W. Green	Willoughby, Lake co., Ohio	Sept. 14, 1852.

CLASS XVIII.—*Arts, polite, fine, and ornamental, including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Books, machines for paging	Stephen E. Parrish, assignor to Edwin B. Clayton & Sons.	New York, N. Y.	Mar. 23, 1852.
Carving machines. (See Class XIV.)			
Copying manuscript	John Jones	Clyde, N. Y.	June 1, 1852.
Crayon rubber	Danl. F. Pond	New Haven, Conn.	Sept. 21, 1852.
Cutting paper, machine for	James E. Mallory	New York, N. Y.	Sept. 21, 1852.
Cutting paper	Jno. P. Farnum, assignor to Jno. P. Farnum, J. Jenkins, and C. B. Clark.	Andover, Mass.	Dec. 28, 1852.
Daguerreotyping	William Yarnell	Newark, Licking co., Ohio	Dec. 28, 1852.
Daguerreotypes, gilding	Charles L'Homdieu	Charleston, S. C.	Oct. 26, 1852.
Daguerreotype pictures	Henry E. Insley	New York, N. Y.	Jan. 6, 1852.
Daguerreotype plates, polishing	Townsend Duryea	Williamsburg, N. Y.	June 15, 1852.
Drawing, perspective, apparatus for	Prof. Adolphus Richter	New York, N. Y.	Nov. 16, 1852.
Engraving surfaces	Isaac Taylor	Stanford Rivers, Essex co., England	June 1, 1852; in England Feb. 21, 1849.
Glass, &c., ornamental painting on	Jno. W. Bowers	Brookline, Norfolk co., Mass.	Jan. 13, 1852.
Guitars, &c., tuning pegs for	James Ashborn	Wolcottville, Litchfield, Conn.	Sept. 22, 1852.
Label cards	James Sharp	Roxbury, Mass.	June 15, 1852.
Melodeons	A. L. Swan	Cherry Valley, Otsego co., N. Y.	Mar. 9, 1852.
Organs	Albert and George Gemunder	Springfield, Mass.	June 15, 1852.
Pens, gold	Adam Wm. Rapp	Philadelphia, Pa.	Jan. 6, 1852.
Pen-holder, fountain	Charles Cleveland	Middlebury, Vt.	June 1, 1852.
Pen and pencil cases	John H. Rauch	New York, N. Y.	Jan. 6, 1852.
Piano forte action	Geo. Brown, assignor to G. Brown and J. Munro.	Boston, Mass.	Jan. 27, 1852.
Piano forte action	George Howe	Boston, Mass.	Sept. 28, 1852.
Piano fortes	Wm. Compton	New York, N. Y.	June 15, 1852.
Piano fortes	James and John McDonald	New York, N. Y.	Oct. 5, 1852.
Piano fortes, organs, &c., keys of	Wm. F. Furgang	Albany, N. Y.	April 20, 1852.
Piano fortes, &c., sounding board of	A. Speer and E. Marx	Aquachanock, Passaic co., N. J.	Sept. 28, 1852.
Piano fortes, upright	R. E. Letton	Quincy, Adams co., Ill.	Oct. 5, 1852.
Printing floor-cloths, machines for	Simeon Savage	Lowell, Mass.	Mar. 2, 1852.
Printing oil-cloths, blocks for	James Jenkins	Elizabethtown, N. J.	May 11, 1852.

IV.—*Classified list of patents issued*—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Printing press	Geo. P. Gordon	New York, N. Y.	Aug. 31, 1852.
Printing press	Joel G. Northrup	Syracuse, Onondaga co., N. Y.	Nov. 16, 1852.
Printing presses	Charles W. Hawkes	Boston, Mass.	Sept. 14, 1852.
Printing presses	John G. Nicolay	Pittsfield, Pike co., Ill.	Oct. 5, 1852.
Printing presses	Charles Foster	Cincinnati, Ohio	Oct. 5, 1852.
Printing presses	Lucius T. Guernsey	Montpelier, Vt.	Oct. 19, 1852.
Printing presses	Joel Densmore	Blooming Valley, Crawford co., Pa.	Nov. 9, 1852.
Printing presses	Stephen P. Ruggles	Boston, Mass.	Nov. 16, 1852.
Printing presses	Charles Montague	Pittsfield, Berkshire co., Mass.	Nov. 23, 1852.
Printing presses	Martin Buck, Jas. H. Buck, Aaron H. Cragin, and Franklin A. Tenney, assignors to Aaron H. Cragin.	Lebanon, Grafton co., N. H.	Nov. 23, 1852.
Printing presses, hand	Henry Moeser	Pittsburg, Pa.	Jan. 20, 1852.
Reed instruments, bellows for	Isaac T. Packard	Campello, Plymouth co., Mass.	Sept. 28, 1852.
Stereotype plates, casting	H. P. Cook	Albany, N. Y.	Aug. 3, 1852.
Swivel hooks	A. & Morris Falknau & Moses Pollak	New York, N. Y.	May 25, 1852.
Swivel, watch chain	W. B. Carpenter, assignor to W. D. Salisbury and S. Y. D. Arrowsmith.	New York, N. Y.	May 25, 1852.
Type-casting	Wm. P. Barr, assignor to Geo. Bruce	New York, N. Y.	Aug. 10, 1852.
Type, setting, spaces for	E. C. Harmon	Troy, N. Y.	Nov. 23, 1852.
Type, wooden, manufacturing	John McCreary	Chesterville, Ohio	Dec. 7, 1852.
Violins	Wm. S. Mount	Stony Brook, N. Y.	June 1, 1852.

Class XIX.—*Fire-arms and implements of war, and parts thereof, including the manufacture of shot and gunpowder.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cannon, friction primers for	William Ball	Chicopee, Hampden co., Mass.	Mar. 23, 1852.
Cartridges for breech-loading guns	Wm. H. Marston and Fred. Goodell	New York, N. Y.	May 18, 1852.
Fire-arms	Chas. V. Nickerson	Baltimore, Md.	Jan. 27, 1852.
Fire-arms, breech-loading	Rd. S. Lawrence	Windsor, Vt.	Jan. 6, 1852.
Fire-arms, method of priming	Christian Sharps	Hartford, Conn.	Oct. 5, 1852; in England, April 22, 1852.
Fire-arms, revolving breech	Henry S. North and C. D. Skinner	Middletown, Conn.; Haddam, Conn.	June 1, 1852.
Lance, bomb, for killing whales. (See Class XXII.)			

Class XX.—*Surgical and medical instruments, including trusses, dental instruments, bathing apparatus, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Baths, portable shower	Ferdinand Holm	Brooklyn, N. Y.	Feb. 10, 1852.
Blow-pipe for dentists, &c	Julius Thompson	North Bridgewater, Plymouth co., N. Y.	Sept. 7, 1852.
Club feet, apparatus for the cure of	Zimri Hussey, M. D.	Chillicothe, Ohio	Dec. 14, 1852.
Cupping and breast glasses	Wm. S. Thomas	Norwich, Chenango co., N. Y.	Mar. 16, 1852.
Fractures, apparatus for treatment of	Zimri Hussey	Chillicothe, Ross co., Ohio	Dec. 14, 1852.
Inhaling powders, instruments for	Ira Warren	Boston, Mass.	Mar. 16, 1852.
Legs, artificial	B. F. Palmer	Philadelphia, Pa.	Aug. 17, 1852.
Legs, artificial	Jonathan Russell	Philadelphia, Pa.	Aug. 17, 1852.
Legs, artificial	John S. Drake	New York, N. Y.	Aug. 31, 1852.
Spoons for administering medicines	J. C. Taylor	West Liberty, Logan co., Ohio	Feb. 17, 1852.
Teeth, artificial, manufacturing	Wm. S. McIlhenney	Philadelphia, Pa.	Mar. 23, 1852.
Trusses	Fred. M. Butler	New York, N. Y.	Mar. 30, 1852.
Truss, hernial	A. J. Lounsberry	Somerville, Fayette co., Tenn.	Aug. 17, 1852.

IV.—*Classified list of patents issued*—Continued.

CLASS XXI.—*Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Button-backs, machines for forming	James C. Cooke	Waterbury, New Haven, Conn	July 27, 1852.
Buttons, cord, manufacturing	N. Perkins, assignor to Samuel Dow	Wawarsing, N. Y.; Westfield, Hampden co., Mass.	Aug. 17, 1852.
Buttons, glass	Arad W. Welton	Cheshire, Conn	Oct. 12, 1852.
Buttons, studs, &c	David Rait	New York, N. Y	April 6, 1852.
Clasp, belt	Albert M. Smith	Rochester, N. Y	June 29, 1852.
Cloth and other substances, graduated cutters for.	Halsey D. Wolcott	Boston, Mass	July 27, 1852.
Coat forms	Wm. B. Olds	Meriden, New Haven co., Conn	April 6, 1852.
Coats, block for stretching	Samuel M. Perkins	Springfield, Bradford co., Pa	July 27, 1852.
Fastenings for garments	Elbridge G. Belknap	Philadelphia, Pa	June 15, 1852.
Hats	Benjamin Sherwood	New York, N. Y	Aug. 10, 1852.
Port-monnaies, manufacture of	Benj. S. Stedman	West Meriden, New Haven co., Conn.	Sept. 14, 1852.
Razor strops	John Demerit	Montpelier, Washington co., Vt	Mar. 30, 1852.
Sheers	J. C. Symmes	West Troy, N. Y	Jan. 27, 1852.
Suspender, encircling, for garments	Harris H. Tinker	New London, Conn	Mar. 2, 1852; antedated Dec. 3, 1851.
Tailors' measures	Wm. T. Wells	Shelbyville, Tenn	April 20, 1852.
Umbrellas	J. V. Tibbets	New York, N. Y	May 18, 1852.

CLASS XXII.—*Miscellaneous.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Awnings, shop	Wm. H. Bakewell	New York, N. Y	Mar. 23, 1852.
Bags of paper, machine for making	Francis Wolle	Bethlehem, Northampton co., Pa	Oct. 26, 1852.
Bells, method of ringing	Thomas V. Stran	New Albany, Ind	June 29, 1852.
Blubber, whale, machines for cutting	Lydoriann Ricketson, administrator of H. R. Ricketson.	New Bedford, Mass	Dec. 14, 1852.
Bottle stopper	E. and D. Kinsey	Cincinnati, Ohio	Nov. 16, 1852.
Boxes, opening, instruments for	Geo. C. Taft	Worcester, Mass	April 13, 1852.
Burglar alarms	L. J. Worden and E. H. Space	Clinton, Oneida co., N. Y	Jan. 27, 1852.
Cigars, machines for making	William Dawson	Huntington, Conn	June 15, 1852.
Fire-escape ladders	John C. F. Salomon	Georgetown, D. C	June 1, 1852.
Fish, spinning bait for catching	Julio T. Buel	Whitehall, Washington co., N. Y	April 6, 1852.
Lance, bomb, for killing whales	Christopher C. Brand	Ledyard, New London co., Conn	June 22, 1852.
Rattan, machines for splitting	Joseph Sawyer	Royalston, Worcester co., Mass	Jan. 20, 1852.
Rat trap	James Sheward	Somerset, Perry co., Ohio	Mar. 30, 1852.
Rat trap	John J. Vedder	Schenectady, N. Y	June 8, 1852.
Sand-paper holder	A. H. Copeland	West Bridgewater, Mass	Jan. 27, 1852.
Skates	Nath'l C. Sanford	Meriden, Conn	June 29, 1852.
Swings	Edward Maynard	New York, N. Y	May 18, 1852.
Tally board	Francis N. Clark	Chicago, Cook co., Ill	Aug. 13, 1852.
Tobacco, machines for pressing	Ephraim Parker, assignor to A. L. Parker.	Rock Island city, Ill	April 27, 1852.
Water closets	Wm. S. Carr	New York, N. Y	Dec. 21, 1852.

IV.—*Classified list of patents issued*—Continued.

EXTENSIONS FOR 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of original patent.	Term of extension.
Gaft of sail vessels, mode of constructing the.	John Brown	Stonington, Conn.	Dec. 31, 1838	Dec. 11, 1852.
Planing plank boards and clap-boards, machine for.	Barnabas Langdon	Buffalo, N. Y	Jan. 9, 1838	7 years from Jan. 9, 1852.
Shingles, machine for shaving	Barnabas Langdon	Buffalo, N. Y	Jan. 9, 1838	7 years from Jan. 9, 1852

ADDITIONAL IMPROVEMENTS GRANTED DURING THE YEAR 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.	Improvements added.
Heddles, weavers'	Jacob Senneff	Philadelphia, Pa	Jan. 13, 1852	July 20, 1852.
Horse-shoe-nail machine	Marshall Burnett	Boston, Mass	April 1, 1851	April 13, 1852.
Hot-air furnaces	Geo. S. G. Spence	Boston, Mass	Aug. 17, 1852	Dec. 28, 1852.
Washing maize, process of	Frederick Seitz	Easton, Pa	Jan. 20, 1852	July 13, 1852.

DISCLAIMERS ENTERED DURING THE YEAR 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.	Disclaimers entered.
Dyeing, apparatus for	Edwd. Brierly, assignor to Jno. Holt	Lowell, Mass	Dec. 11, 1849	Mar. 6, 1852.
Violins	Wm. B. Tilton	Late of Carrollton, Pickens co., Ala	Sept. 2, 1851	Mar. 5, 1852.

REISSUES DURING THE YEAR 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.	Reissued.
Batting of cotton or other fibrous material	Hamilton B. and Hiram T. Lawton	Troy, N. Y	Mar. 13, 1849	June 22, 1852
Bedsteads	Nathaniel Colver	South Abington, Mass	April 24, 1849	July 6, 1852
Boilers, steam, and apparatus to be used on board of steamboats to prevent the explosion of boilers.	Cadwallader Evans	Pittsburg, Pa	April 15, 1839	Nov. 23, 1852
Brakes, self-detaching	John Lahaye	Reading, Berks co., Pa	April 10, 1847	April 13, 1852
Bullets, &c., manufacture of	George W. Campbell	New York, N. Y	Nov. 20, 1847	Aug. 3, 1852
Freezers, cream	E. C. Seaman	Philadelphia, Pa	April 3, 1848	Nov. 30, 1852
Furnaces for smelting iron ore, construction of	Augustus Roth	Philadelphia, Pa	Oct. 31, 1839	April 6, 1852
Lampblack	J. G. Mini	Philadelphia, Pa	Nov. 30, 1844	Aug. 24, 1852
Lock, powder proof	Wm. Hall	Boston, Mass	Aug. 1, 1848	Mar. 30, 1852
Paper-cutting and trimming-books, machine for	Frederick J. Austin	New York, N. Y	Dec. 16, 1840	June 22, 1852
Parti-coloring yarns, apparatus for	Alexander Smith	West Farms, N. Y	June 18, 1850	May 11, 1852
Planing machines	Chas. A. Spring and Peter Boon	Kensington, Pa	July 30, 1850	Jan. 13, 1852
Planter, seed, seeding apparatus of a	Lewis Moore	Bart, Lancaster co., Pa	July 2, 1850	Oct. 12, 1852
Planing, tonguing, and grooving, machines for	Joseph Powell, Nelson Barlow, and Edward Holden, assignors to Robert G. Eunson.	St. Louis, Mo.; New York, N. Y.	Feb. 27, 1847	Mar. 9, 1852
Planter, gearing of a seed	Marshall J. Hunt	Rising Sun, Cecil co., Md	June 3, 1851	Mar. 30, 1852
Stoves, machine for dressing	Isaac Judson	New Haven, Conn	May 1, 1847	Mar. 9, 1852
Tonguing boards, machines for	H. D. Edgecomb, assignor to R. Crosby, and R. Crosby, assignor to R. Crosby, jr.	New York, N. Y	April 13, 1852	July 13, 1852
Washing apparatus	James T. King	Baltimore, Md	Oct. 21, 1851	April 13, 1852
Welding cast iron to malleable iron or steel	Mark Fisher and Wm. Martin, jr	Newport, Me	Oct. 16, 1847	Nov. 30, 1852

IV.—*Classified list of patents issued*—Continued.

DESIGNS.

Designs.	Patentees.	Residence.	Date of patent.
Camera stand	W. A Allen	New York, N. Y	Sept. 21, 1852.
Comb, hair	James Shields	Fishkill, Dutchess co., N. Y	Feb. 3, 1852.
Comb, ladies' hair	William Redheffer	Spring Garden, Pa	May 25, 1852.
Comb, ladies' hair	James Blackman & Chas. Skidmore	Newtown, Fairfield co., Conn	Feb. 17, 1852.
Cradle, cast-iron	P. M. Hutton	Troy, N. Y	Oct. 26, 1852.
Curb, pump	John W. Wheeler and O. B. Latham	Seneca Falls, N. Y	Nov. 2, 1852.
Fence, wire	Francis Kilburn	Lancaster, Pa	Sept. 21, 1852.
Floor oil-cloths	Jas. Patterson, assignor to Jas. Albro	Elizabethtown, Essex co., N. J	Jan. 13, 1852.
Forks, spoons, &c	Robert Taylor and R. D. Laurie	Philadelphia, Pa	Oct. 19, 1852.
Furnace, portable	Jas. G. Abbott & Archilus Lawrence	Philadelphia, Pa	April 27, 1852.
Girandole	Robert E. Dietz	New York, N. Y	Dec. 28, 1852.
Grate frames	James L. Jackson	New York, N. Y	Feb. 3, 1852.
Grate frames	James L. Jackson	New York, N Y	Oct. 12, 1852.
Grate frame	James L. Jackson	New York, N. Y	Feb. 3, 1852.
Grate frame and fender	James L. Jackson	New York, N. Y	Aug. 10, 1852.
Grate frame and fender	James L. Jackson	New York, N. Y	Aug. 10, 1852.
Grate frame, summer piece and fender	James L. Jackson	New York, N. Y	Aug. 10, 1852.
Grate frame and summer piece	James L. Jackson	New York, N. Y	Feb. 3, 1852.
Grate frame and summer piece	James L. Jackson	New York, N. Y	Feb. 17, 1852.
Grate frame and summer piece	Adam Hampton	New York, N. Y	Oct. 5, 1852.
Grate, parlor	Joseph Pratt, assignor to Bowers, Pratt, & Co.	Boston, Mass	Nov. 16, 1852.
Grate, portable	David Thompson, assignor to New Market Iron Foundry.	Boston, Mass	June 8, 1852.
Grate, portable	Apollos Richmond, assignor to A. C. Barstow & Co.	Providence, R. I	July 13, 1852.
Hearth plate	Wager, Richmond, & Smith	Troy, N. Y	Dec. 21, 1852.
Mantle, grate frame, and summer piece	James L. Jackson	New York, N. Y	Feb. 3, 1852.
Medallion of Daniel Webster	Peter Stephenson	Boston, Mass	July 27, 1852.
Medallion of General Scott	Peter Stephenson	Boston, Mass	Sept. 7, 1852.
Medallion of Franklin Pierce	Peter Stephenson	Boston, Mass	Sept. 7, 1852.
Pedestal and column	Thos. Law, assignor to Levi Chapman	New York, N. Y	Nov. 9, 1852.
Railing, iron	Nicholas J. Horton	Cincinnati, Ohio	Dec. 14, 1852.
Range, cooking	Benj Wardwell & Ephraim R. Barstow	Fall River, Mass., and Providence, R. I	Oct. 19, 1852.
Spittoon	W. L. & S. W. Pearsall	New York, N Y	Dec. 21, 1852.
Spoons	Hy. Hebbard and John Polhamus	New York, N. Y	Jan. 6, 1852.
Stand, hat and umbrella	Charles Zeuner, assignor to M. Greenwood & Co.	Cincinnati, Ohio	July 13, 1852.
Stove	Jacob Beesley & E. Delancy, assignors to Wm. P. Cresson.	Philadelphia, Pa	Aug. 10, 1852.
Stove	Samuel H. Sailor, assignor to J. G. Abbott & A. Lawrence.	Philadelphia, Pa	Nov. 9, 1852.
Stoves	Jas. G. Abbott and Archilus Lawrence	Philadelphia, Pa	Jan. 6, 1852; antedated Dec. 11, 1851.
Stoves	Jas. G. Abbott and Archilus Lawrence	Philadelphia, Pa	Jan. 6, 1852; antedated Dec. 11, 1851.
Stoves	Sanford Burnum	Waterford, Saratoga co., N. Y	Jan. 6, 1852.
Stoves	J. Harvey Conklin, assignor to W. D. & F. Vredenburg.	Peekskill, Sing Sing, Westchester co., N. Y.	Jan. 6, 1852.
Stoves	William Savery	New York, N. Y	Jan. 6, 1852.
Stoves	James Wager, David Pratt, & Volney Richmond.	Troy, N. Y	Jan. 13, 1852.
Stoves	Conrad Harris & Paul Wm. Zoiner	Cincinnati, Ohio	Feb. 10, 1852.
Stoves	James Leffel	Springfield, Clark co., Ohio	Feb. 24, 1852.
Stove, box	Samuel D. Vose	Albany, N. Y	June 22, 1852.
Stove, box	Jas Wager, V. Richmond, & H. Smith	Troy, N. Y	Dec. 14, 1852.
Stove, cannon	Samuel H. Sailor, assignor to J. G. Abbott & A. Lawrence.	Philadelphia, Pa	Nov. 9, 1852.
Stoves, coal	John Burgess, assignor to Geer, Chaffee, and Richmond.	Troy, N. Y	Jan. 13, 1852.
Stove, coal	Samuel D. Vose	Albany, N. Y	June 22, 1852.
Stove, coal	W. L. Sanderson, assignor to R. R. Finch and R. R. Finch, jr.	Troy, N. Y.; Peekskill, Westchester co., N. Y.	Sept. 7, 1852.
Stove, coal	Gilbert Knapp and A. H. Neale	Honesdale, Wayne co., Pa	Dec. 14, 1852.
Stoves, cooking	Samuel M. Carpenter	Erie, Pa	Mar. 30, 1852.
Stoves, cooking	John J. Savage, assignor to A. Morrison and T. M. Tibbitts.	Troy, N. Y	April 13, 1852.
Stoves, cooking	A. J. Gallagher and J. J. Baker	Philadelphia, Pa	April 20, 1852; antedated Jan 17, 1852.
Stoves, cooking	S. H. Sailor, assignor to North, Harrison, & Chase.	Philadelphia, Pa	April 27, 1852.
Stove, cooking	Hosea H. Hundy, assignor to David T. Woodrow.	Cincinnati, Ohio	May 11, 1852.

IV.—*Classified list of patents issued*—Continued.

Designs.	Patentees.	Residence.	Date of patent.
Stove, cooking	Apollos Richmond, assignor to A. C. Burstow & Co	Providence, R. I.	May 11, 1852.
Stoves, cook	Thos. H. Herrick, assignor to Lemuel M. Leonard.	Boston, Mass.; Taunton, Mass	May 18, 1852.
Stove, cook	N. S. Vedder and W. L. Sanderson, assignors to P. J. Clute.	Troy, N. Y.; Schenectady, N. Y	May 18, 1852.
Stove, cooking	S. W. Gibbs, assignor to North, Harrison, & Chase.	Albany, N. Y.; Philadelphia, Pa	June 22, 1852.
Stove, cooking	J. H. Conklin, assignor to R. R. Finch, sen. and jr.	Peekskill, N. Y	June 29, 1852.
Stove, cooking	Wm. F. Pratt and Geo. W. Bosworth	Milford, N. H	July 13, 1852.
Stove, cooking	Samuel Eberly	Mechanicsburg, Cumberland co., Pa	Aug. 3, 1852.
Stove, cooking	G. Smith, H. Brown, and Julius Holzer, assignors to North, Harrison, & Chase.	Philadelphia, Pa	Aug. 3, 1852.
Stove, cooking	Russell Wheeler and Stephen A. Bailey	Utica, N. Y	Aug. 3, 1852.
Stove, cooking	Jacob Beesley, assignor to Richard Peterson.	Philadelphia, Pa	Aug. 10, 1852.
Stove, cooking	Frederick Schultz, assignor to Wm. P. Cresson.	Philadelphia, Pa	Aug. 10, 1852.
Stove, cooking	John S. Perry, assignor to Jagger, Treadwell, & Perry.	Albany, N. Y	Aug. 17, 1852.
Stove, cooking	John S Perry, assignor to Jagger, Treadwell, & Perry.	Albany, N. Y	Aug. 17, 1852.
Stove, cooking	Samuel D. Vose	Albany, N. Y	July 13, 1852.
Stove, cooking	Samuel D. Vose	Albany, N. Y	Sept. 14, 1852; antedated Mar. 14, 1852.
Stove, cook	Samuel D. Vose	Albany, N. Y	Sept. 14, 1852.
Stove, cooking	N S. Vedder	Troy, N. Y	Sept. 14, 1852.
Stove, cooking	Orin W. Andrews, assignor to Isaac Backus and John Pitt Barstow.	Providence, R. I.; Canterbury, Ct.; Norwich, Ct.	Sep. 21, 1852.
Stove, cooking	Charles B. Tuttle	Amherst, Hillsborough co., N. H	Oct. 5, 1852.
Stove, cooking	Elihu Smith	Albany, N. Y	Oct. 19, 1852.
Stove, cooking	Jas. Wager, V. Richmond, & H. Smith	Troy, N. Y	Oct. 26, 1852.

Designs.	Patentees.	Residence.	Date of patent.
Stove, cook	N. S. Vedder	Troy, N. Y	Nov. 2, 1852.
Stove, cooking	Jos. Pratt, assignor to Bowers, Pratt, & Co.	Boston, Mass	Nov. 2, 1852.
Stove, cook	Ripley & Vedder, assignors to Samuel McClure.	Troy, N. Y.; Rochester, N. Y	Dec. 7, 1852.
Stove, cooking	S. S Jewett and F. H. Root	Buffalo, N. Y	Dec. 21, 1852.
Stove, dining-room	Wm. L. Sanderson, assignor to R. R. Finch, sen. and jr.	Troy, N. Y.; Peekskill, N. Y	June 22, 1852.
Stove, Franklin	Samuel F. Pratt, assignor to Jagger, Treadwell, & Perry.	Boston, Mass.; Albany, N. Y	Nov. 30, 1852.
Stove, Franklin	Jos. Pratt, assignor to Bowers, Pratt, & Co.	Boston, Mass	Nov. 16, 1852.
Stoves, parlor	N. S. Vedder and W. L. Sanderson, assignors to Warren, Sweetland, & Little.	Half Moon village, Saratoga co., N. Y., assignees; Troy, N. Y., assignors.	Feb. 24, 1852.
Stove, parlor cook	Samuel D. Vose	Albany, N. Y	June 22, 1852.
Stove, parlor	Samuel D Vose	Albany, N. Y	June 22, 1852.
Stove, parlor	J. D. Green, assignor to Morrison & Tibbitts.	Troy, N. Y	July 6, 1852.
Stove, parlor	Ezra Ripley, assignor to N. S. Vedder	Troy, N. Y	Aug. 31, 1852.
Stove front, parlor	Samuel A. House, assignor to Hiram House.	Mechanicsville, Saratoga co., N. Y	Aug. 31, 1852.
Stove, parlor, top and front plates of a	Samuel A. House, assignor to Hiram House.	Mechanicsville, Saratoga co., N. Y	Aug. 31, 1852.
Stove, parlor	C. Harris and P. W. Zoiner	Cincinnati, Ohio	Sept. 14, 1852.
Stove, parlor	Jas. J. Dulley, assignor to Johnson, Cox, & Fuller.	Troy, N. Y	Sept. 14, 1852.
Stove, parlor	N. S. Vedder	Troy, N. Y	Oct. 12, 1852.
Stove, parlor	Samuel H. Sailor, assignor to J. G. Abbott and A. Lawrence.	Philadelphia, Pa	Nov. 9, 1852.
Stove, parlor	Washburn Race, assignor to H. C. Silsbey, W. Race, and B. Holley.	Seneca Falls, N. Y	Nov. 9, 1852.
Stove, parlor	Dutee Arnold	Providence, R. I	Aug. 17, 1852.
Stove, parlor	Dutee Arnold	Providence, R. I	Nov. 30, 1852.
Stove plates	S. S. Jewett and F. H. Root	Buffalo, N. Y	Dec. 21, 1852.
Stove plates	William M. Snow	Troy, N. Y	Nov. 2, 1852.
Stove plates	Samuel H. Sailor, assignor to J. G. Abbott and A. Lawrence.	Philadelphia, Pa	Nov. 9, 1852.
Stove plate, parlor	Samuel A. House, assignor to Hiram House.	Mechanicsville, Saratoga co., N. Y	Aug. 31, 1852.

IV.—*Classified list of patents issued*—Continued.

Designs.	Patentees.	Residence.	Date of patent.
Stove plates, parlor	Amos Paul	South New Market, Rockingham co., N. H.	July 20, 1852.
Stove, six-plate	Samuel F. Pratt, assignor to Jagger, Treadwell, & Perry.	Albany, N. Y.	Aug. 17, 1852.
Table frame and legs	Walter Bryent	Boston, Mass.	Oct. 5, 1852.
Towel stand	Nathaniel Waterman	Boston, Mass.	May 25, 1852.
Water-cooler	Patrick Malony	Cincinnati, Ohio	Aug. 3, 1852.
Window blinds	Nathan Chapin, assignor to N. Chapin and John F. Driggs.	New York, N. Y.	Nov. 30, 1852.

V.

ALPHABETICAL LIST OF PATENTS FOR THE YEAR 1852.

No.	Patentees.	Inventions or discoveries.	Class.
431	Abbot, James G., and Archilus Lawrence	Stoves	Design.
432	Abbot, James G., and Archilus Lawrence	Stoves	Design.
451	Abbot, James G., and Archilus Lawrence	Furnace, portable	Design.
	Abbot, James G., and A. Lawrence, assignees. (See S. H. Sailor, assignor.)		
	Abbot, James G., and A. Lawrence, assignees. (See S. H. Sailor, assignor.)		
	Abbot, James G., and A. Lawrence, assignees. (See S. H. Sailor, assignor.)		
	Abbot, James G., and A. Lawrence, assignees. (See S. H. Sailor, assignor.)		
9241	Adams, Federal C	Irons, smoothing	XVII.
9145	Adams, Henry W	Zinc, preparing from the ores	IV.
9175	Adams, Henry W	Gas, illuminating, processes for making	IV.
8714	Adams, John Jay	Brushes, shoe	XVII.
9127	Adkins, Orville G	Engines, fire	XI.
9064	Ager, Wilson	Hulling buckwheat	I.
9063	Ager, Wilson	Mill-stone dress	XIII.
9351	Akrill, John	Crucibles and other articles of earthenware, mode of forming	XV.
8993	Akrill, John	Retorts for chemical furnaces, construction of	IV.
9244	Albee, Simeon W	Chickens, apparatus for feeding	I.
	Albro, James. (See Paterson, assignor to Albro.)		
9111	Albro, Samuel	Tonguing boards, machines for	XIV.
8767	Albro, Stephen	Life-preservers	VII.
9257	Aldrick, Samuel	Clothes pins	XVII.
8952	Alford, William, and John D. Spear	Safes, iron	II.
9340	Allen, D. D	Boot soles, tools for cutting pegs out of	XVI.
503	Allen, W. A	Camera stand	Design.
	Allen & Robbins. (See Robbins, Charles A., and Harvey Allen.)		
9226	Alvord, Clark	Clay, mixing, and mashing vegetables, mill for	XV.
9089	Ames, Nathan, assignor to Walter Bryent	Square, centre, for finding the centre of a circle	VIII.
8963	Andrews, Albert F	Fuses, machinery for making	IX.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
505	Andrews, Orin W., assignor to Isaac Backus and John Pitt Barstow.	Cooking stove	Design.
8868	Andrews, Solomon	Punches, drop	II.
9267	Andrews, William H. and R. T.	Lamps, alarm time-piece for lighting	V.
8732	Armstrong, Francis	Furnaces, construction of grate bars for	V.
	Armstrong, Francis. (See Few & Armstrong.)		
475	Arnold, Dutee	Stove, cooking, the front and side plates of a	Design.
487	Arnold, Dutee	Stove, parlor	Design.
528	Arnold, Dutee	Stove, parlor	Design.
8715	Arrowsmith, Samuel Y. D.	Watch-chain swivels	VIII.
8916	Ash, William F.	Drills, rock	IX.
9268	Ashborn, James	Guitars, &c., tuning pegs for	XVIII.
	Ashcroft, E. H., and George Savage, assignees of E. H. Ashcroft, assignee of Charles Iles. (See Charles Iles.)		
8816	Ashenfelder, Josiah	Omnibus step	X.
9479	Atkins, Jearum	Harvesters, grain, rakes to	I.
8646	Aumock, Christopher	Knives and forks, machine for scouring	XVII.
218	Austin, Frederick J.	Paper, cutting, and trimming books, machine for	Reissue.
9338	Avery, Otis	Sewing machines	III.
9211	Ayres, J. N.	Bill registers	VIII.
	Babbitt, Avery. (See Sherwood & Babbitt.)		
8953	Bachelder, Asahel G.	Saw sets	XIV.
	Bachelder, A. G., and L. F. Thompson, assignors to H. Tanner. (See L. F. Thompson.)		
	Backus, Isaac, and John Pitt Barstow, assignees. (See O. W. Andrews.)		
9269	Bacon, Charles E.	Carving machines	XIV.
9161	Bailey, Charles P.	Car seats, railroad	X.
8834	Bailey, Thomas W.	Sausage stuffers	XVII.
8750	Bailey, Timothy	Knitting machines	III.
	Bailey, Stephen A. (See Wheeler & Bailey.)		
	Baker, George, & J. C. Forrest. (See J. C. Forrest.)		
	Baker, J. J. (See Gallagher & Baker.)		
8869	Baker, William	Hinges	II.
	Baker, William E., and W. O. Grover. (See W. O. Grover.)		

No.	Patentees.	Inventions or discoveries.	Class.
8817	Bakewell, William H.	Awnings, shop	XXII.
8900	Baldwin, Matthias W.	Valves for steam engines	VI.
9312	Baldwin, M. W., & David Clark	Boilers, apparatus for heating feed-water of steam	VI.
8819	Ball, E., assignor to J. N. McAbee	Ploughs	I.
8850	Ball, Thaddeus J., and John Post	Cultivators	I.
8820	Ball, William	Cannon, friction primers for	XIX.
8818	Ball, William	Ores, machines for stamping	XIII.
8835	Ball, William	Ores, mill for grinding	XIII.
9045	Barclay, Alexander	Gold, washing and amalgamating, &c., machine for	II.
8733	Barker, Abel	Pumps	XI.
8933	Barker, Samuel	Blind and shutter fastener	II.
9065	Barker, Samuel	Sail hank	VII.
	Barlow and others, assignors. (See Powell, Barlow, & Holden.)		
	Barnard, G. F., and others. (See J. R. St. John.)		
9398	Barnes, Charles L.	Bits, expanding	XIV.
9313	Barnett, Thomas	Mill stones	XIII.
8763	Barnhill, William	Boiler, steam, arrangement of	VI.
8622	Barnum, N. S., and L. Whitney	Ventilating railroad cars	V.
9177	Barr, William P., assignor to George Bruce	Type, casting	XVIII.
9352	Barrett, Luman	Boot crimps	XVI.
8623	Barry, S. S.	Hubs, carriage	X.
	Barstow, A. C., & Co., assignees. (See Apollos Richmond.)		
	Barstow, A. C., & Co., assignees. (See Apollos Richmond.)		
	Barstow, A. C., & Co., assignees. (See Apollos Richmond.)		
	Barstow, Ephraim R. (See B. Wardwell and E. R. Barstow.)		
9128	Bass, William L.	Car seats	X.
9046	Bassett, Joel R.	Pumps, valves for	XI.
9498	Bayles, Daniel S.	Vessels, yards of, parrel for	VII.
8796	Beales, Fordyce	Plane irons, double	XIV.
	Beardsley *et al.* (See Jennings *et al.*)		
8917	Beecher, Lewis W.	Gauges, leather	XVI.
485	Beesley, Jacob, and E. Delancy, assignors to William P. Cresson.	Stove	Design.
486	Beesley, Jacob, assignor to Richard Peterson	Stove, cooking	Design.
9011	Belknap, Elbridge G.	Fastenings for garments	XXI.
9397	Belknap, Moody, assignor to Moody Belknap and Lyman Kinsley.	Spike machinery, reciprocating die	II.
8918	Bentley, Alonzo	Potato washers	XVII.
9293	Bergey, Jacob	Grain separators	I.
9499	Bertolet, Maybery A., L. Kirk, and Andrew M. De Hart	Gold, &c., by amalgamation, method of obtaining	II.
9227	Best, Christopher G.	Furnace, reverberatory	V.
8851	Betteley, Albert	Lock	II.
8934	Betts, William C.	Bedsteads, portable cot	XVII.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
9363	Bigelow E B	Pile fabrics, pile wires, pincers for weaving	III.
8836	Bishop, Charles	Excavating machines	IX.
9314	Bishop, Charles	Ploughs, gang	I.
8821	Bishop, George G.	Felting cloth, machinery for	III.
	Bishop & Libbey, assignees. (See Boyd C. Leavitt.)		
446	Blackman, James, and Charles Skidmore	Comb, ladies' hair	Design.
8901	Blair, John Cust	File-cutting machine	II.
8882	Blake, Norman	Augers, submarine	IX.
8650	Blake, Philos	Lanterns	V.
9461	Blake, William P.	Safes, &c., iron, lining for	II.
8964	Blakely, Henry	Locks, tumblers of	II.
9162	Blanchard, Cornelius W.	Looms for weaving figured fabrics	III.
9212	Blanchard, R. J.	Stoves, cooking	V.
8670	Blasdell, Horatio	Grinding quartz, mill for	XIII.
9129	Blatchly, N.	Ploughs	I.
9429	Bliss, Jeremy W.	Vice, taper, attachment for converting the ordinary into a	II.
	Blood, Isaiah, A. J. Goffee, and R. Thomas, assignees. (See John Orelup.)		
	Blossom & Cramer. (See Cramer, R. S., and C. C. Blossom.)		
8624	Bollman, Wendall	Bridges, construction of	IX.
	Boon, Peter. (See Spring & Boon.)		
8954	Booth, Edmund	Saws in saw mills, straining	XIV.
9230	Booth, Geo. R.	Kilns for burning pottery	XV.
	Bostwick, John J., and Elbert White, assignees. (See Marshall & Cook.)		
	Bosworth, Geo. W., & Wm. F. Pratt. (See Wm. F. Pratt.)		
9163	Bourdon, Eugene	Gauges, pressure	VIII.
8651	Bowers, John W.	Glass, &c., ornamented painting on	XVIII.
	Bowers, Pratt, & Co., assignees. (See Jos. Pratt, assignor.)		
	Bowers, Pratt, & Co., assignees. (See Jos. Pratt, assignor.)		
	Bowers, Pratt, & Co., assignees. (See Jos. Pratt, assignor.)		
9280	Brackett, Joseph	Shoes and gaiter boots	XVI.
9360	Bradeen, John G., assignor to J. G. Bradeen and G. Perkins	Sewing machines	III.
9130	Bradway, Abel	Shingles, machines for shaving	XIV.

No.	Patentees.	Inventions or discoveries.	Class.
9090	Bradway, Abel, and E. Valentine	Bridges, construction of	IX.
9229	Bradway, A., and E. Valentine	Saw set	XIV.
9047	Brand, Christopher C.	Lance, bomb, for killing whales	XXII.
	Brierly, Edward, assignor to John Holt	Dyeing, apparatus for	Disclaimer.
9091	Briggs, John	Car seats	X.
8751	Bristol, Albert G., and Joel C. Jackson	Wheels, cast-iron car	X.
9246	Brenner, Frederick	Indian rubber, preserving	IV.
8852	Bronson, William C.	Saw mills	XIV.
9446	Brown, C. B.	Harvesters, grain and grass	I.
8680	Brown, George, assignor to G. Brown and J. Munro	Piano forte action	XVIII.
	Brown, John	Gaft of sail vessels, mode of constructing the	Extension.
9176	Brown, J. S.	Gates, double	IX.
9092	Brown, James S.	Turning engines	XIV.
9311	Brown, Lucien A., and Hubbard Bigelow, assignors to Henry K. W. Welch.	Churns	I.
	Bruce, George, assignee. (See Wm. P. Barr.)		
	Bruen, J. T., assignee. (See P. Saulnier.)		
508	Bryent, Walter	Table frame and legs	Design.
	Bryent, Walter, assignee. (See Nathan Ames.)		
9364	Bucher, Nicholas	Planes, edge, for shoemakers	XVI.
9426	Buck, Martin, James H. Buck, Aaron H. Cragin, and Franklin A. Tenney, assignors to Aaron H. Cragin.	Printing presses	XVIII.
9270	Bucklin, Theodore G.	Iron, coating, with copper	II.
8935	Buell, Abel B.	Car seats, railroad	X.
8853	Buel, Julio T.	Fish, spinning bait for catching	XXII.
9215	Bugbee, Aurin	Signals, railroad	IX.
8769	Bulkley, Henry G.	Driers, grain	V.
9381	Bullock, William	Planters, seed	I.
9438	Bunker, Robert	Pail bales, &c., machinery for bending	II.
439	Burgess, John, assignor to Geer, Chaffee, & Richmond	Stoves, coal	Design.
433	Burnam, Sanford	Stove	Design.
1620	Burnett, Marshall	Horse-shoe nail machine	Add'l imp't.
8936	Burns, William	Meat cutters	XVII.
8625	Bushnell, Upson	Cheeses, modes of covering	I.
8682	Butler, Egbert T.	Mill spindles	XIII.
8837	Butler, Frederick M.	Trusses	XX.
9228	Butler, Lester	Washboards	XVII.
9294	Butler, William	Vice	II.
8937	Byler, Jacob R., and George W. Senseenick	Faucets, measuring	XI.
8734	Callow, Edward	Compositions, explosive, for blasting rocks	IV.
9193	Camp, Mortimer M.	Ventilators	V.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
222	Campbell, George W.	Bullets, &c., manufacture of	Reissue.
9500	Canby, Samuel	Winnowing machines	I.
8735	Card, John	Fences	IX.
	Carman, James, assignee. (See William Moore, assignor.)		
9012	Cairncross, Jacob C.	Paddle wheels, valves or gates for oblique float	VII.
450	Carpenter, Samuel M.	Stove, cooking	Design.
9112	Carpenter, Seth P.	Nails, instrument for driving, in difficult places	XVI.
8965	Carpenter, W. B., assignor to W. D. Salisbury and S. Y. D. Arrowsmith.	Swivel watch-chain	XVIII.
9480	Carr, William S.	Water closets	XXII.
9131	Carson, Alfred	Motion, method of converting reciprocating rotary into reciprocating rectilinear.	XIII.
8736	Carter, Egbert P.	Railroad gates	X.
8716	Cary, A. W.	Coupling hose	XI.
9178	Case, Jarvis	Mills, cider	XIII.
9164	Castor, Thomas	Wagons, dumping	X.
9428	Caswell, John, assignor to Archibald C. Powell	Screwing bolts, &c., machinery for	II.
9179	Catlin, Henry W., administrator of Alexander Catlin	Stone, machines for dressing	XV.
9382	Chadwick, William P.	Presses, oil	XII.
9353	Chamberlain, Dexter H.	Drill, or bit, stock	II.
8966	Chambers, John B.	Mortising machines	XIV.
	Chandler, Henry P. (See Pearl & Chandler.)		
530	Chapin, Nathan, assignor to Nathan Chapin and John F. Driggs	Window blinds	Design.
	Chapman, Levi, assignee. (See Thomas Law, assignor.)		
9400	Chichester, Lewis S.	Flax pullers	I.
8700	Chichester, Lewis S.	Hemp brakes	III.
	Churchill, W. W., and Joseph Baxter, assignees. (See Thomas Walker.)		
	Clark, David, and M. W. Baldwin. (See M. W. Baldwin.)		
	Clark *et al.* (See Farnum, John P., assignor.)		
9165	Clark, Francis N.	Tally board	XXII.
8994	Clark, Terence	Glass, plate and window, manufacture of	XV.
	Clayton, Edwin B., & Sons, assignees. (See Stephen E. Parrish, assignor.)		

No.	Patentees.	Inventions or discoveries.	Class.
8671	Clement, Edwin B.	Churns	I.
9316	Clement, William H.	Sugar pans, scumming apparatus for	IV.
9315	Clement, William H.	Sugar boiling apparatus	IV.
8977	Cleveland, Charles	Pen-holder, fountain	XVIII.
8883	Clinton, Thomas G.	Mattresses	XVII.
9469	Clow, Charles N., Charles, and Abram	Scythe snaths	I.
	Clute, Peter J., assignee. (See Vedder & Sanderson.)		
9013	Cochran, John W.	Mill for crushing quartz	XIII.
8854	Cochran, John W.	Stone-cutting machines	XV.
9441	Coe, Charles W.	Drilling machines	II.
8709	Coleman, William and Stephen G.	Ship's blocks	VII.
	Collier *et al.*, assignees. (See Jennings *et al.*)		
8752	Collins, John J. G.	Valve, motion, duplex eccentric	VI.
9439	Colver, Lewis W.	Planters, seed	I.
220	Colver, Nathaniel	Bedsteads	Reissue.
9048	Colvin, Merrill	Radiators, heat	V.
9014	Compton, William	Piano-fortes	XVIII.
9213	Conant, Hezekiah	Lasting boots, instruments for	XVI.
9194	Conklin, John W., H. L. Sidman, and E. Whritner	File-cutting machinery	II.
468	Conklin, J. H., assignor to R. R. Finch, sen., and R. R. Finch, jr.	Stove, cooking	Design.
436	Conklin, J. Harvey, assignor to W. D. & F. Vredenburg	Stoves	Design.
8626	Cook, George	Carriage curtains, lock for	X.
9166	Cook, H. P.	Stereotype plates, casting	XVIII.
9146	Cook, James C.	Button backs, machines for forming	XXI.
8786	Cook, Samuel	Flour bolts	XIII.
9339	Cooper, Lewis	Lime and manure spreading	I.
8855	Cooper, M. T.	Doors, apparatus for closing	II.
8681	Copeland, A. H.	Sand-paper holder	XXII.
8995	Cormack, Jno. A. and George	Oakum, processes for preparing	III.
	Cornell, B., assignee. (See W. F. Davis, assignor.)		
8717	Cornell, M. H.	Horse powers	XIII.
9415	Couch, Joseph J.	Stone, drilling, machines for	XV.
	Cowles, James, assignee. (See Alexander Kelsey.)		
	Cragin *et al.* (See Bucks, Cragin, and Tenney.)		
8701	Craig, John A.	Grass burner	I.
8718	Cram, Smith	Grinding quartz, mills for	XIII.
9440	Cramer, R. S., and C. C. Blossom	Saw gummers	II.
9049	Crane, Aaron D.	Horse powers	XIII.
8797	Crawford, Benjamin	Gauge, pressure	VI.
8787	Crawford, Benjamin	Gauge, water, of boilers, &c.	VI.
8737	Crawford, John M.	Chains, machinery for making	II.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8647	Creighton, James R.	Blind and shutter operator	II.
9231	Creighton, James R.	Blind operator and fastener	II.
	Cresson, Wm. P., assignee. (See Beesley and Delancy.)		
	Cresson, Wm. P., assignee. (See Frederick Shultz.)		
9066	Crooker, Mathew A.	Propelling vessels	VII.
9050	Cross, Abraham V	Wagons, dumping	X.
	Crosby, R., assignor to Ransom Crosby, jr. (See H. D. Edgecomb.)		
	Crosby, R., assignor to Ransom Crosby, jr. (See H. D. Edgecomb.)		
8798	Crossby, Thomas	Carpets	III.
8838	Crum, John	Screw-blanks, rivets, &c., machinery for shaving the heads of	II.
8702	Cumberland, John	Planing machines, feeders for	XIV.
	Cummings, Wm. D. (See Taliaferro and Cummings.)		
9180	Curtis, M. S., and Edgar St. John	Frogs, railroad, method of securing movable points of	X.
9271	Daniels, Reuben	Drilling, hand, machine	II.
9015	Daniels, Reuben	Fuel, granular, the manufacture of, from brushwood and twigs	V.
9501	Danré, George, P. Nicholas, and F. Lopez	Gas, illuminating, process of making	IV.
8996	Darling, Cook	Cow-catcher	X.
8719	Davies, Thomas A.	Railroads, mode of preventing collisions on	X.
8938	Davis, Abbott R.	Brushes, manufacture of	XVII.
8919	Davis, Levis H., assignor to J. A. Dugdale	Lever jacks	XII.
9399	Davis, Levis H., and Saml. and Morton Pennock	Planters, seed	I.
9208	Davis, Washington F., assignor to B. Cornell	Paints, processes for making	IV.
9416	Davis, Wm. F. and N	Churns, swinging	I.
9470	Dawson, Joel	Straw cutters	I.
9016	Dawson, William	Cigars, machines for making	XXII.
8703	Day, Willard	Sewers, street	IX.
8939	De Bibory, L. S.	Boilers, cooking	V.
8770	Dechamps, F. O.	Omnibus registers	X.
9167	De Corn, Louis	Compositions for preserving butter	IV.
9442	Degen, Francis	Hats	III.
8630	De Guinon, R. V.	Lamps, camphene	V.
	De Hart *et al.* (See Bertolet, Kirk, and De Hart.)		

No.	Patentees.	Inventions or discoveries.	Class.
	Delancy and Beesley, assignors to Wm. P. Cresson. (See Beesley and Delancy.)		
9317	Delescluze, Charles	Distilling apparatus	IV.
8839	Demerit, John	Razor strops	XXI.
8720	Densmore, Byron	Harvesters, grain	I.
9183	Densmore, Joel	Printing presses	XVIII.
8902	Dewey, Daniel S	Shuttle for weaving hair-cloth, &c	III.
9067	De Witt, Henry G	Last-holder, revolving	XVI.
8903	Dickson, Perry	Sleds, hold-back for	X.
539	Dietz, Robert E	Girandole	Design.
8799	Dimpfel, F. P.	Grate bars, construction of	V.
9068	Disbrow, Caleb R.	Trucks, railroad car	X.
9051	Dodge, Daniel	Nail, wrought, machinery	II.
8683	Dodge, George H.	Spinner, ring	III.
8997	Dodge, George H	Spinning frames, cop	III.
8822	Dodge, Thos. H	Signals, marine	VII.
9384	Dodge, Thos. H	Signals, marine	VII.
	Donisthorp and Lister. (See Lister and Donisthorp.)		
8771	Donnall, Geo. O.	Chairs	XVII.
9017	Dorsch, Peter	Wheels, cast-iron car	X.
	Dow, Samuel, assignee. (See N. Perkins.)		
	Downs, Abel. (See Birdsill Holly, assignor.)		
8834	Doyle, Thos. J.	Winnowers	I.
9481	Dozier, A. S	Ventilator	V.
9232	Drake, John S.	Legs, artificial	XX.
8967	Draper, S. W. and R. M.	Stone-dressing machines	XV.
9447	Drescher, Louis	Battery, galvanic	VIII.
	Driggs, John T., and N. Chapin, assignees. (See Nathan Chapin.)		
9113	Duffey, James P.	Caissons, cast-iron	IX.
	Dugdale, J. A., assignee. (See Lewis H. Davis.)		
502	Dulley, James J., assignor to Johnson, Cox, & Fuller	Stove, parlor	Design.
9250	Dunn, Jno. G., and Alfred F. Howe	Composition of enamels	IV.
	Dupuy, Chas. M. (See Selah Hill and C. Dupuy, jr.)		
9018	Duryea, Townsend	Daguerreotype plates, polishing	XVIII.
9502	Dutcher, E and W. W	Looms, temples for	III.
8998	Eames, Albert	Spark deflector	X.
9147	Eames, Albert	Stone, sawing, saws for	XV.
8652	Eames, Albert, assignor to Chas. T. Shelton	Stone, machines for dressing	XV.
8753	Earl, Absalom B.	Straw-cutters	I.
8904	Earls, John M.	Smut machinery	XIII.
9132	Eastman, Robt., assignor to Seth Eastman	Stone, machines for dressing	XV.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
9181	Eaton, A. K.	Tanning	XVI
477	Eberly, Samuel	Stove, cooking	Design.
9168	Eccles, Samuel and James	Looms for weaving figured fabrics	III.
8870	Edgecomb, H. D., assignor of his interest to R. Crosby, and R. Crosby, assignor to Ransom Crosby, jr.	Tonguing boards, machines for	XIV.
221	Edgecomb, H. D., assignor of his interest to Ransom Crosby, and R. Crosby, assignor to Ransom Crosby, jr.	Tonguing boards, machines for	Reissue.
8905	Edson, Nathaniel T	Steering apparatus, relief	VII.
	Edwards, Rd., and Morris & Mathews, assignees. (See Nathan Mathews, assignor.)		
	Edwards, Rd., and Morris & Mathews, assignees. (See Nathan Mathews, assignor.)		
9258	Egbert, S. L., and S. W. Green	Washing machines or other purposes, connecting joints for	XVII.
8978	Eldridge, David	Corn-shellers	XIII.
9281	Elmer, H. O	Saw-gummer, jointed bed-plate	II.
8754	Emery, Horace L	Horse powers, endless chain	XIII.
9443	Emmons, Phineas	Tonguing and grooving apparatus	XIV.
	Eunson, Robert G., assignee. (See Powell, Barlow, & Holden.)		
225	Evans, Cadwallader	Boilers, steam, and apparatus to be used on board of steamboats, to prevent explosions of boilers.	Reissue.
	Evans & Walroth. (See Walroth, Daniel, & Lucius Evans.)		
	Everett, Edward, and Samuel T. Thomas. (See Thomas & Everett.		
8738	Fagin, Lewis	Bran dusters	XIII.
8963	Falkenaw, Albert and Morris, and Morris Pollak	Swivel hooks	XVIII.
9279	Farmer, Moses G	Clocks, galvanic	VIII.
8920	Farmer, Moses G	Electro-magnetic alarm bells	VIII.
9503	Farnum, John P., assignor to John P. Farnum, J. Jenkins, & C. B. Clark.	Cutting paper	XVIII.
9020	Farrand, Jehial T	Tubes, machinery for making sheet-metal	II.
8955	Farrell, James W	Boilers, steam	VI.
9417	Faulkner, Augustus	Pile-wires, pincers for operating	III.
	Faulkner, James. (See Wicks & Faulkner.)		
8885	Felton, Charles C	Sash stopper and fastener	II.

No.	Patentees.	Inventions or discoveries.	Class.
	Fergus, William F., & James M. Patton. (See James M. Patton.)		
	Fetter, William. (See Peters & Fetter.)		
8684	Few, William, and Francis Armstrong	Valves, the relief, in partially condensing engines, mechanism for operating.	VI.
9233	Field, S., and C. W. Heald	Oil cans	V.
9471	Field, William	Forging metals, &c., machinery for	II.
9402	Field, William	Thimbles for rigging, &c., machines for making	VII.
8653	Fillbrun, Henry	Winnowing machines, shakers of	I.
8886	Finch, A. L	Wheels and axles of cars, protecting, by encasing them	X.
	Finch, R. R., senior, and Finch, R. R., junior, assignees of J. H. Conklin. (See J. H. Conklin.)		
	Finch, R. R., senior, and Finch, R. R., junior, assignees. (See Sanderson, W. L.)		
	Finch, R. R., senior, and Finch, R. R., junior, assignees of W. L. Sanderson. (See W. L. Sanderson.)		
9430	Finney, William C	Hoes	I.
8871	Fisher, Mark, and John H. Norris	Welding steel, &c., to cast-iron, method of	II.
227	Fisher, Mark, and William Martin, jr	Welding cast-iron to malleable iron or steel	Reissue.
9247	Fitzgerald, Daniel	Harvesters, grain	I.
9182	Fitzgerald, Daniel, and John H. Smith	Harvesters, grain and grass	I.
9133	Flack, John J	Harness, cruppers for	XVI.
8627	Flanders, J. F., assignor to F. Roys and E. Wilcox	Metal disks, machine for turning up the edges of sheet	II.
9019	Fleischel, Charles	Locks, alarm	II.
9134	Forbush, Eliakim B	Harvesters, grass	I.
8721	Forman, James H	Ploughs, shovel	I.
9462	Forrest, James C., and George Baker	Trip-hammers	II.
9295	Foster, Charles	Printing presses	XVIII.
9069	Foster, John T	Potato diggers and stone gatherers	I.
9214	Foster, Walter K	Cheese, machine for cutting	XVII.
9318	Foulis, Robert	Gas, illuminating, apparatus	IV.
9183	Fox, Jonathan	Carriages	X.
	French, Ephraim. (See J. Holmes and E. French.)		
9052	French, James S	Planes, inclined, method of ascending	X.
8887	Furgang, William F	Piano-fortes, organs, &c., keys of	XVIII.
9148	Fyler, Orsamus R	Churn and butter-worker	I.
9482	Gale, Warren	Straw-cutters	I.
452	Gallagher, A. J., and J. J. Baker	Stoves, cooking	Design.
	Gallaher, James C., and William F. Tirado, assignees of Don Juan Ramos. (See Don Juan Ramos.)		
	Gallaher, James C., and William F. Tirado, assignees of Don Juan Ramos. (See Don Juan Ramos.)		

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
9021	Gambrill, Horatio N	Cotton-yarn, preparing, for the manufacture of duck and other coarse fabrics.	III.
9070	Garachon, Francis	Lock	II.
	Gardner, Albert, and Albus Gardner, administrators of W. L. Hunter. (See Hunter & Gardner.)		
	Gardner, George Arthur. (See Lemuel P. Jenks, assignor.)		
9169	Gardner, Mitchel C	Screw-cutting stocks, adjusting the chasers in	II.
8628	Garretson, Mahlon	Harvesters, clover	I.
9444	Gates, Stephen	Furnaces, hot-air	V.
9403	Gates, William A	Planters, cotton-seed	I.
9483	Gates, William A	Ploughs	I.
9445	Gaylord, Edward L	Carpet-bag frames, &c., machinery for bending	II.
	Geer, Chaffee, & Richmond, assignees. (See John Burgess.)		
9341	Geiser, Peter	Grain separators	I.
9022	Gemunder, Albert & George	Organs	XVIII.
9463	Gest, Joseph H	Rollers, field, for cutting stalks and weeds	I.
467	Gibbs, S. W., assignor to North, Harrison, & Chase	Stove, cooking	Design.
9114	Gilbert, Joseph G	Threshing machines	I.
9184	Gilliland, John	Lenses, glass, manufacture of	VIII.
9023	Goddard, Kingston	Axles, carriage	X.
9361	Goffin, F. C	Locks	II.
9376	Goffin, F. C	Vault and safe doors, &c., method of securing	II.
	Goodell, F. (See Marston & Goodell.)		
9319	Goodyear, Charles	India-rubber bat cloth, modes of making	IV.
	Goodyer, R. B., & B. H. Jenks, assignors. (See Jenks & Goodyer.)		
9170	Goolman, William P., and William Holtselaw, jr	Scales for weighing	XII.
8672	Goulding, Henry	Drilling stone, machines for	XV.
9171	Goulding, John	Looms, jacquard	III.
9024	Goulding, John	Looms, the motion of the lay in	III.
9234	Gordon, George P	Printing press	XVIII.
9448	Grant, George	Hinge for moulders' flasks	II.
469	Green, Jeremiah D., assignor to Messrs. Morrison & Tibbits	Stove, parlor	Design.
	Green & Egbert. (See Egbert & Green.)		
9377	Greenhalgh, James	Looms, mode of counterbalancing harnesses in	III.
	Greenwood, M., & Co., assignees. (See Charles Zeuner.)		

9093	Gridley, J. B	Bridges, construction of	IX.
9195	Griffiths, Robert	Chairs, wrought-iron railroad, machine for making	IX.
8888	Grilley, Charles T	Screws, capping of	II.
8629	Grimes, William C	Gauge, steam and water	VI.
9053	Grover, William O., and William E. Baker	Sewing machines	III.
9242	Guard, Chauncey H	Wheels, carriage, machines for making	X.
9342	Guernsey, Lucius T	Printing presses	XVIII.
9431	Guild, Joseph	Mortising machines	XIV.
9320	Gustin, John S	Electro-magnetic engines	VIII.
9291	Gustin, John S	Electro-magnetic engines	VIII.
9321	Guthrie, Alfred	Valves, safety	VI.
9404	Hadaway, J. B. S	Sash stopper and fastener	II.
	Hainakin, Christopher A., assignee. (See Sonnenburg & Rechten.)		
9296	Haldeman, D	Planters, seed	I.
8889	Hale, Daniel	Spikes, machine for drawing	X.
9272	Hall, J. H., and John Lowrey	Collars, horse	XVI.
9135	Hall, William	Brakes, railroad car	X.
212	Hall, William	Lock, powder-proof	Reissue.
8873	Hamilton, James	Casks, machinery for making	XIV.
8840	Hamilton, James	Dredging machines	IX.
8872	Hamilton, James	Sawing, mills for curvilinear	XIV.
9322	Hamilton, Walter	Seaming, double, machines	II.
9243	Hammer, Adolph	Refrigerators of wort	XVII.
9449	Hammit, John T	Chairs	X.
8800	Hammit, John T	Bedsteads, sofa	XVII.
507	Hampton, Adams	Grate frame and summer piece	Design.
9115	Hand, Furman, jr	Shingle machines	XIV.
9418	Harmon, E. C	Type, setting, spaces for	XVIII.
445	Harris, Conrad, and Paul William Zoiner	Stoves	Design.
499	Harris, C., and P. W. Zoiner	Stove, parlor	Design.
9297	Harrison, Alexander	Grates, rotary stove	V.
8755	Harrison, Alexander	Ink, vessels for making	IV.
9343	Hart, Edson	Planters, seed	I.
9419	Hartell, W., and J. Lancaster	Heat, mode of generating	V.
9243	Haskin, James P	Salt, common, manufacture of	IV.
8648	Haussknecht, Gustavus L	Carriages, running gear of	X.
9259	Hawkes, Charles W	Printing presses	XVIII.
8685	Hays, John P	Ranges, cooking	V.
8631	Hayden, Peter P. R	Chairs, railroad, manufacture of	IX.
	Heald, C. W., and S. Field. (See Field & Heald.)		
434	Hebbard, Henry, and John Polhamus	Spoons	Design.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Hemmingway *et al.* (See Jennings *et al.*)		
9149	Henderson, Thomas	Harness, fastenings for	XVI.
8773	Henson, William	Looms, knitting	III.
457	Herrick, Thomas A., assignor to Lemuel M. Leonard	Stoves, cook	Design.
9420	Hess, George	Iron fences, mode of fastening the palings to the rails in	II.
8632	Hess, George, assignor to Sylvanus Shimer	Railings, iron	IX.
	Hewit, Latham, Holly, & Downs, assignees. (See Birdsill Holly, assignor.)	Looms, knitting	III.
8739	Hildreth, Abel	Bran dusters	XIII.
9025	Hill, Selah, and Charles M. Dupuy, jr.	Derricks	XII.
	Hill, S., and Thomas Snook. (See Snook & Hill.)		
9249	Henrichs, Carl	Acid, sulphuric, manufacture of	IV.
9464	Hinton, Robert	Castors, ball, manufacture of	II.
9273	Hobart, Seth L.	Wardrobes, portable	XVII.
8704	Hochstrasser, Henry, and A. Masson	Door spring	II.
8722	Hodge, Amos	Switches, railroad	VII.
8979	Hodge, Nehemiah	Wheels, railroad car	X.
9054	Hodge, Nehemiah	Car, foot	X.
9344	Hodge, Nehemiah	Bilge water, &c., apparatus for elevating and discharging	X.
9365	Hodgkins, Christopher, assignor to Nehemiah Hunt	Sewing machines	III.
	Hodgson, Wm., and Geo. S. Stearns. (See Stearns & Hodgson.)		
8740	Hoit, L. B.	Looms, stop motions of	III.
	Holden and others, assignors. (See Powell, Barlow, & Holden.)		
8921	Hollingsworth, Christopher	Washing machines	XVII.
8730	Holly, Birdsill, assignor to Silas Hewit, Edward S. Latham, Birdsill Holly, and Abel Downs.	Brakes, railroad car	X.
9094	Holly, Birdsill	Planes, hand	XIV.
	Holly, B., W. Race, and H. C. Silsby, assignees. (See Washburn Race, assignor.)		
8723	Holm, Ferdinand	Baths, portable shower	XX.
	Holmes, John. (See Peter Stebbins and John Holmes.)		
8948	Holmes, Jonas, and Ephraim French	Carding by which variegated slivers are produced	III.
	Holtselaw, Wm., jr. (See Goolman & Holtselaw, jr.)		
9260	Homan, Herman H.	Lightning rods	VIII.

No.	Patentees.	Inventions or discoveries.	Class.
9484	Hopkins, L. E.	Hat bodies, machinery for manufacturing	III.
9450	Hopkins, Lansing E.	Hat bodies, machines for manufacturing	III.
9215	Hopkins, S. D.	Bed for invalids	XVII.
8940	Horne, Jos. B. & John R.	Soldering in a vacuum, apparatus for	II.
533	Horton, Nicholas T.	Railing, iron	Design.
8922	Hotchkiss, Andrew	Wrench, adjustable	II.
9072	Hotchkiss, Gideon	Mill spindles, hanging steps of	XIII.
9172	Hough, Ezra	Ox yokes	I.
494	House, Samuel A., assignor to Hiram House	Stove, front parlor	Design.
493	House, Samuel A., assignor to Hiram House	Stove, parlor, top and front plates of a	Design.
492	House, Samuel A., assignor to Hiram House	Stove plate, parlor	Design.
9505	House, R. E.	Telegraph, magnetic printing	VIII.
9465	Houston, Joseph U.	Picks, stone	XIII.
9141	Houston, J., and E. Ross	Brakes, railroad car	X.
9185	Howard, Charles	Motion, method of converting reciprocating into rotary	XIII.
8824	Howard, Charles	Swingle-trees	X.
8823	Howarth, John	Planing machines	XIV.
9282	Howe, George	Piano-forte action	XVIII.
	Howes & Dunn. (See Dunn & Howes.)		
9323	Hughes, James	Hominy mills	XIII.
9385	Hulbert, Abijah	Vices, jaw, turning	II.
9283	Hunt, Charles H.	Spinning machines, throstle	III.
213	Hunt, Marshall J.	Planter, gearing of a seed	Reissue.
	Hunt, Nehemiah. (See Swingle & Hunt.)		
	Hunt, Nehemiah, assignee. (See Hodgkins, assignor.)		
9362	Hunter, William L., Albert Gardner, administrator of, and Albert Gardner.	Ploughs, constructing	I.
456	Huntley, Hosea H., assignor to David T. Woodrow	Stove, cooking	Design.
9359	Huntley, Hosea H., assignor to David T. Woodrow	Stove, cooking	V.
8686	Huse, Samuel	Metres, water	XI.
9472	Hussey, Zimri	Club feet, apparatus for the cure of	XX.
9467	Hussey, Zimri	Fractures, apparatus for treatment of	XX.
514	Hutton, P. M.	Cradle, cast-iron	Design.
	Hutton, P. M., and R. H. Remsen. (See R. H. Remsen.)		
9026	Iles, Charles, assignor to E. H. Ashcroft, assignor to E. H. Ashcroft and George Savage.	Stone, imitation	XV.
8633	Insley, Henry E.	Daguerreotype pictures	XVIII.
8687	Isbister, Caleb	Nail plate feeder	II.
509	Jackson, James L.	Grate frame	Design.
440	Jackson, James L.	Grate frames	Design.
441	Jackson, James L.	Grate frames	Design.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
481	Jackson, James L.	Grate frame and fender	Design.
482	Jackson, James L.	Grate frame and fender	Design.
442	Jackson, James L.	Grate frame and summer piece	Design.
447	Jackson, James L.	Grate frame and summer piece	Design.
483	Jackson, James L.	Grate frame, summer piece, and fender	Design.
443	Jackson, James L.	Mantle grate, frame, and summer piece	Design.
	Jackson, Joel. (See Bristol & Jackson.)		
9298	Jackson, Robert M.	Planters, seed	I.
9136	Jacobs, Clark	Hullers, rice	I.
9150	Jacot, Charles E.	Escapements, duplex	VIII.
9357	Jacot, Charles E.	Watch keys	VIII.
9345	Jagger, Ira	Water wheels	XI.
	Jagger, Treadwell, & Perry. (See John S. Perry.)		
	Jagger, Treadwell, & Perry. (See John S. Perry.)		
	Jagger, Treadwell, & Perry. (See Sam'l F. Pratt.)		
	Jagger, Treadwell, & Perry. (See Sam'l F. Pratt.)		
9027	Jarosson, Leon	Archil, preparations of	IV.
8874	Jenks, B. H., and R. B. Goodyer, assignors to B. H. Jenks	Looms for weaving figured fabrics	III.
9379	Jenks, Lem'l P., assignor to Joseph W. Page, assignor to Geo. Arthur Gardner.	Stone, drilling, machines for	XV.
	Jenkins *et al.* (See Farnum, Jno. P., assignor.)		
8654	Jenkins, Henry	Iron fence, ornamental connexion of the parts of an	II.
8941	Jenkins, James	Printing oil-cloths, blocks for	XVIII.
9414	H. T. Jennings, C. S. Collier, and T. P. How, assignors to H. T. Jennings, C. S. Collier, Amengo Beardsley, and Allen Hemmingway.	Cordage machinery	III.
	Jenny, E., assignee. (See David Rood and E. Jenny.)		
536	Jewitt, S. S., and F. H. Root	Stove, cooking	Design.
535	Jewitt, S. S., and F. H. Root	Stove plates	Design.
9073	Johnson, Jasper	Bedstead fastenings	XVII.
9095	Johnson, Jasper	Hubs, &c., patterns for metal	II.
8649	Johnson, John, assignor to Elias Johnson	Piled fabrics, apparatus for cutting the pile of	III.
	Johnson, Cox, & Fuller, assignees. (See James J. Dulley, assignor.)		
8969	Johnston, George	Stills, worm-tubs for	IV.

No.	Patentees.	Inventions or discoveries.	Class.
9074	Johnston, James I.	Moulding hollow ware, &c	II.
	Jones, Chs., and J. Levy. (See John Levy and C. Jones.)		
8980	Jones, John	Copying manuscript	XVIII.
9173	Jones, John O.	Horse-shoe, elastic	II.
9485	Jones, J., and A. Lyle	Threshers, grain, and cleaners	I.
9405	Jones, Robert V.	Blind and shutter operator	II.
8756	Jones, Samuel T.	Zinc, white, manufacture of	IV.
8825	Joslin, Wm.	Cordage, machines for making	III.
8757	Judd, Oliver B.	Saw-mills	XIV.
211	Judson, Isaac	Staves, machinery for dressing	Reissue.
9192	Kane, Jno. W.	Mill dress	XIII.
9261	Keeler, Chas. and James	Smut machines	XIII.
	Kellar, Wm. C., and Thos. Mardock. (See Thos. Mardock.)		
	Kelley, Wm. S. (See Knott and Kelley.)		
9324	Kellogg, Daniel	Presses for bundling flocculent and other substances	XII.
8634	Kellogg, Edward	Wool-picking machines	III.
8908	Kelsey, Alexander, assignor to Jas. Cowles	Furnaces, warm-air	V.
9366	Kellsey, Franklin	Propellers, vibrating	VII.
9406	Kennedy, David	Tanning	XVI.
9029	Kennedy, Wm. S.	Saddles	XVI.
8949	Kennison, Geo. W.	Stoves	V.
9451	Ketchum, Richard	Lock	II.
8724	Ketchum, W. F.	Harvesters, grass	I.
9325	Kidder, Walter	Gas regulators	IV.
9326	Kidder, Walter	Gas regulators	IV.
9327	Kidder, Walter	Gas regulators	IV.
504	Kilburn, Francis	Fence, wire	Design.
8844	Killan, Harvey, and Geo. Valleau	Ploughs, gang	I.
9174	Kimball, Alpheus	Scythe fastenings	I.
8635	Kimball, Hiram	Shovels, construction of	I.
9299	Kimball, V. P. and B.	Spark arrester	VI.
215	King, James T.	Washing apparatus	Reissue.
	King, Obed and Ezra. (See S. C. Mendenhall and O. and E. King.)		
9186	Kingsland, Jos., jr., and Norman White	Paper, sized, mode of drying	III.
8826	Kinman, Nathan	Packers, flour	XIII.
	Kinsley, Lyman, and Moody Belknap. (See Belknap, assignor.)		
9452	Kinsley, Rhodolphus	Lock, pad	II.
9407	Kinsley, E. and D.	Bottle stopper	XXII.
	Kirk *et al.* (See Bertolet, Kirk, and De Hart.)		
8906	Klein, John F.	Switches, railroad	X.
534	Knapp, Gilbert, and A. H. Neal	Stove, coal	Design.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
9274	Knight, Robert	Bevelling the edges of skelps or metallic strips, &c., machinery for.	II.
9284	Knowles, Hazard	Saw-mills	XIV.
9151	Kraber, Adam	Planters, seed	I.
8899	Kraft, Benjamin	Brakes, railroad car	X.
8688	Kraft, Benjamin	Iron railings	II.
9055	Krausser, John	Harvesters, clover	I.
8999	Krupp, Alfred, assignor to Thos. Prosser	Spoons, forks, &c., machinery for making	II.
216	Lahaye, John	Brakes, self-detaching	Reissue.
9367	Laidlaw, John	Gas metres	IV.
9137	Lake, Jesse S. and David	Harvesters, grass	I.
8910	Lamb, Andrew, and Wm. Alltoft Summers	Boilers, sheet water space, stud brace for flues of	VI.
	Lancaster, J., and W. Hartell. (See Hartell and Lancaster.)		
	Langdon, Barnabas	Planing plank boards and clap-boards, machine for	Extension.
	Langdon, Barnabas	Shingles, machine for planing	Extension.
9300	Langstroth, Lorenzo L.	Bee-hives	I.
	Latham, E. S. (See Birdsill Holly, assignor.)		
8856	Latham, Henry B.	Collars, horse	XVI.
	Latham & Wheeler. (See Wheeler, Jno. W., & O. B. Latham.)		
9217	Latimer, Charles	Telegraphs, signal	VIII.
8801	Latta, A. B.	Joints around glass tubes for philosophical apparatus	VIII.
8802	Lattimer, James	Ploughs, shovel	I.
	Laurence, Samuel, assignee. (See Joseph Weight.)		
	Laurie, R. D. (See Taylor & Laurie.)		
521	Law, Thomas, assignor to Levi Chapman	Pedestal and column	Design.
8803	Laws, Thos. J.	Gins, cotton	III.
	Lawrence, Archilus. (See Abbot and Lawrence.)		
	Lawrence, Archilus. (See Abbot and Lawrence.)		
	Lawrence, Archilus. (See Abbot and Lawrence.)		
	Lawrence, A., and J. G. Abbot, assignees. (See Sam'l H. Sailor, assignor.)		
	Lawrence, A., and J. G. Abbot, assignees. (See Sam'l H. Sailor, assignor.)		
	Lawrence, A., and J. G. Abbot, assignees. (See Sam'l H. Sailor, assignor.)		

	Lawrence, A., and J. G. Abbot, assignees. (See Sam'l H. Sailor, assignor.)		
8637	Lawrence, Richard S.	Fire-arms, breech-loading	XIX
219	Lawton, Hamilton B., and Hiram T.	Batting of cotton or other fibrous material	Reissue.
9421	Lawton, Hiram T.	Wadding, machinery for making	III.
9159	Leavitt, Boyd C., assignor to Jos. S. Bishop and Rd. H. Libbey	Compounds for uniting steel and iron	IV.
9096	Leavitt, Charles	Mills, portable grain	XIII.
8890	Lebby, N. H.	Water, apparatus for raising	XI.
8781	Lee, Benjamin F.	Bridging navigable streams	IX.
9196	Leeds, J., G. H. Oat, jr., and A. A. Oat, assignors to J. Leeds	Spark arresters	VI.
448	Leffel, James	Stoves	Design.
9354	L'Homdieu, Charles	Daguerreotypes, gilding	XVIII.
8804	Lennig, Charles	Hydro-sulphurets, treatment of, and manufacturing carbonates and sulphur compounds.	IV.
	Leonard, Lemuel L., assignees. (See Thos. A. Herrick, assignor.)		
8725	Leonard, Wm. B.	Gas, apparatus for regulating and measuring the flow of	IV.
9301	Letton, R. E.	Piano fortes, upright	XVIII.
9453	Levy, John, and Chs. Jones	Glass, mode of frosting	XV.
9275	Lewis, Amza B.	Rakes	I.
8655	Lewis, Harrison W.	Planes, bevelling	XIV.
8774	Lewis, Lewis	Presses, cotton	XII.
9197	Lewis, Lewis	Presses, cotton	XII.
	Libbey and Bishop, assignees. (See Boyd C. Leavitt, assignor.)		
8775	Liebrick, Conrad	Locks, trunk, plates of	II.
8741	Lindsay, Wm. H.	Boilers, steam, metres for	VI.
9060	Lindsay, William H.	Metres, fluid	VI.
8788	Lindsley, William	Corn-shellers	I.
8678	Linton, William	Brick kilns	XV.
9356	Lister, S. C., and G. E. Donisthrop	Wool, machinery for combing	III.
	Little and others, assignees. (See Vedder and Sanderson.)		
9216	Livermore, Benj.	Lasting boots, instruments for	XVI.
9097	Livingston, Norman B.	Churns	I.
	Lombard, S. H., assigneee. (See A. M. Rice, assignor to Rice & Lombard.)		
8705	Longbottom, Abram	Gas purifying apparatus	IV.
9187	Longmaid, William	Gold minerals, reducing	II.
	Lopez *et al.* (See G. Danré, Nicholas, and Lopez.)		
9056	Loughborough, William S.	Axles, railroad car, divided	X.
9198	Lounsberry, A. J.	Truss, hernial	XX.
[illegible]	Lucas, Heman S.	Paints, processes for preparing	IV.
	Lyle, A., and J. Jones. (See Jones & Lyle.)		

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8875	Macy, E. & S.	Reeling machines	III.
9251	Magoon, Israel P.	Locomotives, &c., feed water of apparatus for heating	VI.
8776	Maillefert, Benjamin	Blasting rocks under water	IX.
8891	Maish, Andrew	Refrigerators	XVII.
9276	Mallory, James E.	Cutting paper, machine for	XVIII.
478	Malony, Patrick	Water-cooler	Design.
9138	Manning, William	Harvesters, grass	I.
9423	Manny, John H.	Harvesters	I.
	Marcellus, A. (See Stowell & Marcellus.)		
9386	Mardock, Thomas	Saddles	XVI.
9328	Mardock, Thomas, & William C. Kellar	Harness saddle-trees	XVI.
8970	Marsh, David	Flour bolts	XIII.
8815	Marshall, Hickford, and Seth S. Cook, assignors to John Bostwick, jr., and Elbert White.	Chain, jack, machinery, arrangement of	II.
8956	Marston, William H., and Frederick Goodell	Cartridges for breech-loading guns	XIX.
9116	Martin, Joseph P.	Brakes, railroad car	X.
9302	Martin, Joseph P.	Clothes, machines for wringing	XVII.
	Martin, William, jr., and Mark Fisher. (See M. Fisher.)		
	Marx, E., and A. Speer. (See Speer and Marx.)		
8971	Mason, William H.	Oils, lubricating	IV.
	Masson, A. (See Hochstrasser & Masson.)		
8898	Matthews, Nathan, assignor to Rd. Edwards, David A. Morris, and Nathan Matthews.	Circle plates, roses, &c., with dovetailed grooves, devices for casting.	II.
8857	Matthews, Nathan, assignor to Rd. Edwards, David A. Morris, and Nathan Matthews.	Knobs to doors, &c., method of attaching roses for	II.
8656	Maxfield, Charles A.	Looms for weaving piled fabrics	III.
9218	Maxwell, Rufus	Churns	I.
	Maydole, David, assignee. (See Erasmus Smith.)		
8957	Maynard, Edward	Swings	XXII.
	McAbee, J. N., assignee. (See E. Ball.)		
9075	McCarty, Henry	Sheet-iron while in process of manufacturing, method of heating	II.
9303	McCarty, James	Puddling iron, &c., apparatus for	II.
8923	McClintic, John	Safety-valves, defferential	VI.
	McClure, Samuel, assignee. (See Ripley & Vedder.)		

No.	Patentees.	Inventions or discoveries.	Class.
8828	McCollum, John	Cracker machines	XVII.
9152	McCord, William	Soaps	IV.
8827	McCray, Thomas H.	Smut machines	XIII.
9454	McCreary, John	Type, wooden, manufacturing	XVIII.
9304	McDonald, James and John	Piano-fortes	XVIII.
9329	McElfatrick, Samuel	Railroads, apparatus for transporting trains on inclined planes of	X.
8829	McIlhenney, William S.	Teeth, artificial, manufacturing	XX.
8841	McKinlay, Peter	Hullers, rice	I.
9031	McLagan, William	Harvesters	I.
9117	McLaughlin, John	Churns	I.
8673	McLaughlin, John	Washing machines	XVII.
8924	McLaughlin, Thomas G.	Brakes, railroad car	X.
	Meacham, George A., assignee. (See Geltson Sanford.)		
9387	Mendenhall, Stephen C.	Looms, mode of throwing shuttles in	III.
9388	Mendenhall, S. C., Obed King, and Ezra King	Looms, hand	III.
8689	Miller, A. S.	Switches, railroad	X.
9139	Miller, Charles	Sewing machine	III.
9076	Miller, Samuel N.	Anchor, compound	VII.
8742	Millholland, James	Boilers, steam	VI.
9219	Mills, Cassius A.	Engine, rotary, abutment motion for reversible	VI.
223	Mini, J. G.	Lamp-black	Reissue.
9153	Minkler, Simeon	Track clearer, railroad	X.
9057	Minnies, Theodore S.	Mill-spindles, steps and bearings of	XIII.
8674	Moeser, Henry	Printing presses, hand	XVIII.
9432	Moffitt, John R.	Threshing machines, endless belts to	I.
9424	Montague, Charles	Printing presses	XVIII.
9098	Montgomery, William	Brakes, railroad car	X.
9160	Moore, Cyrus, assignor to F. S. Noyes	Brooms	XVII.
9032	Moore, Frederick H.	Blind rods, machine for wiring	II.
8777	Moore, Hiram W.	Wheels, cast-iron car	X.
224	Moore, Lewis	Planter, seed, seeding apparatus of a	Reissue.
9265	Moore, William, assignor to James Carman	Locks, door	II.
	Morgan & Seymour. (See William H. Seymour, assignor.)		
	Morris, David A., and Edwards & Matthews, assignees. (See Nathan Matthews, assignor.)		
	Morris, David A., and Edwards & Matthews, assignees. (See Nathan Matthews, assignor.)		
8726	Morris, Ephraim	Governors	XIII.
8706	Morris, Ephraim	Valves of oscillating engines upon their seats, method of keeping the.	VI.
	Morrison, A., and T. M. Tibbitts. (See J. J. Savage.)		

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Morrison & Tibbitts, assignees. (See Jeremiah D. Green.)		
9486	Morrison, William H.	Engines which use steam expansively, equalizing apparatus for	VI.
8772	Moulton, Orson	Wheels, cast-iron car	X.
8981	Mount, William S.	Violins	XVIII.
	Mower, Samuel, and Arad Woodworth, 3d. (See Woodworth & Mower.)		
9235	Mudge, Jarvis T.	Washing machines	XVII.
	Munro, J., and G. Brown, assignees. (See G. Brown, assignor.)		
8911	Murrow, Freeman	Brushes	XVII.
9033	Naracon, William H.	Mill-spindles, hanging	XIII.
	Neal, A. H., and Gilbert Knapp. (See G. Knapp and A. H. Neal.)		
8789	Neer, Charles	Canal lock gates	IX.
8942	Newell, Robert	Scales, platform	XII.
	New England Screw Company, assignees. (See Cullen Whipple.)		
	New England Screw Company, assignees. (See Cullen Whipple.)		
9034	Newhouse, A. S.	Bedstead fastenings	XVII.
	New Market Iron Foundry, assignees. (See David Thomson.)		
9330	Nichols, Oldin	Mills, grinding	XIII.
	Nicholas *et al.* (See George Danré, Nicholas, & Lopez.)		
8690	Nickerson, Charles V.	Fire-arms	XIX.
9305	Nicolay, John G.	Printing presses	XVIII.
9118	Noblet, Robert L.	Shingle machines	XIV.
8758	Norcross, Edmund D.	Furnaces, air-heating	V.
9058	Norcross, Nicholas G.	Planing machines	XIV.
	Norris, John H. (See Fisher & Norris.)		
8982	North, Henry S., and C. D. Skinner	Fire-arms, revolving breech	XIX.
	North, Harrison, & Chase, assignees. (See S. W. Gibbs.)		
	North, Harrison, & Chase, assignees. (See S. H. Sailor.)		
	North, Harrison, & Chase, assignees. (See Smith, Brown, & Holzer.)		
9408	Northrup, Joel G.	Printing press	XVIII.
8795	Nott, Benjamin, assignor to J. P. Pepper	Door knobs, manufacture of	II.
8759	Nott, Joel B., and William S. Kelley	Water-wheels	XI.
	Noyes, F. S., assignee. (See C. T. Moore.)		

8638	Nuckolls, Nathaniel	Straw-cutters, feeding rollers in	I.
8972	Null, Samuel	Hominy machines	XIII.
9306	Nutting, Mighill	Window-sashes, expanding	IX.
9331	Nutting, Mighill	Window-sashes, expanding	IX.
9468	Nycum, Henry	Planters, seed	I.
	Oat, G. H. & A. A., and Leeds, assignors. (See Leeds, Oat, jr., & Oat, assignors to J. Leeds.)		
8657	O'Brien, Bartholomew	Candy, sugar, machines for making	IV.
8805	Olcott, Austin	Lamps, Argand, burners for	V.
8858	Olds, William B.	Coat forms	XXI.
9000	Orelup, John, assignor to Isaiah Blood, A. G. Goff, and George R. Thomas.	Axes, process for making	II.
8658	Osgood, Horatio B.	Attaching pieces of metal to each other by casting, apparatus for	II.
8743	Osgood, R. T.	Harvesters, grain and grass	I.
	Ostrander, Wm. (See Woolcocks & Ostrander.)		
8973	Otis, E. G.	Trucks and brakes, railroad car	X.
9368	Otstot, J. D.	Saw gummers	II.
8606	Owen, J. Parsons	Bedsteads, machines for cutting screws on rails and posts of	XVII.
9099	Oxland, Robert & John	Sugar, processes for defecating	IV.
9290	Packard, Isaac T.	Reed instruments, bellows for	XVIII.
	Page, Joseph W. (See L. P. Jenks, assignor.)		
8842	Pagett, W. F.	Ploughs, shovel	I.
9119	Paine, Henry M.	Light, benzole	V.
8645	Paine, H. M.	Ventilating windows for railroad cars	V.
9200	Palmer, B. F.	Legs, artificial	XX.
9252	Palmer, E. A., and A. J. Simmons	Whiffletree hook	X.
8744	Palmer, William R.	Thresher, grain, feeding apparatus for a	
8676	Pannabacker, Jesse	Grindstone, self-sharpening	XIV.
8909	Parker, Ephraim, assignor to Alfred L. Parker	Tobacco, machines for pressing	XXII.
8691	Parker, Luther B.	Shingle machines	XIV.
8745	Parker, Robert W.	Pulleys, banding	XIII.
8830	Parish, Stephen E., assignor to Edwin B. Clayton & Sons	Books, machines for paging	XVIII.
438	Paterson, James, assignor to James Albro	Floor oil-cloths	Design.
9100	Patton, James M., and William F. Fergus	Planing, cutter heads for	XIV.
474	Paul, Amos	Stove plates, parlor	Design.
9506	Paye, Edward	Bolts, &c., machinery for heading	II.
8675	Pearl, Oliver, and Henry P. Chandler	Spinning machinery	III.
538	Pearsall, William L. & S. W.	Spittoon	Design.
9001	Pease, James H.	Lamps, reflector	V.
8983	Peck, G. S.	Smut machine	XIII.
9077	Peck, Jesse	Mortar, mixing	XV.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
9101	Peer, John W.	Cordage machines	III.
9346	Pemberton, Henry	Soda ash and carbonates of soda, making	IV.
	Pennock, Samuel & Morton, and Levi H. Davis. (See Davis & Pennock.)		
	Pepper, J. P., assignee. (See Benjamin Nott, assignor.)		
	Perkins, G., and J. G. Bradeen, assignees. (See Bradeen, John G., assignor.)		
9210	Perkins, N., assignor to Samuel Dow	Buttons, cord, manufacturing	XXI.
9154	Perkins, Samuel M.	Coats, block for stretching	XXI.
8692	Perley, Charles	Ships' davits	VII.
9040	Perry, David, assignor to Franklin & J. W. Slaughter	Cordage, machines for making	III.
498	Perry, John S., assignor to Jagger, Treadwell, & Perry	Stove, cooking	Design.
490	Perry, John S., assignor to Jagger, Treadwell, & Perry	Stove, cooking	Design.
9155	Perry, Samuel M.	Car seats, railroad	X.
8925	Peters, Charles, and William Fetter	Anvil	II.
9059	Peters, John R., jr.	Flocks, machines for preparing	III.
	Peterson, Richard, assignee. (See Beesley, Jacob, assignor.)		
8859	Phelps, E. W.	Bee hives, moth traps to	I.
8707	Phillips, David	Axletree arms	X.
9389	Phillips, L. D.	Steering submarine vessels	VII.
	Platner, G. W., Elizur Smith, J. Holmes, & E. French, assignees. (See J. Holmes and E. French.)		
8693	Plato, John T.	Yoke, neck	X.
8659	Platt, Alfred	Fans, buckwheat	I.
8950	Platt, Charles H.	Ship's block	VII.
	Plimpton, C. G., assignee. (See G. H. Richards, assignor.)		
8926	Plimpton, James L.	Grinding conical-edged knives, machinery for	II.
	Polhamus, John. (See Hebbard & Polhamus.)		
	Pollak, Moris. (See A. & M. Falkenaw and M. Pollak.)		
9466	Polley, Clark	Pumps, endless chain, buckets for	XI.
9277	Pond, Daniel F.	Crayon rubber	XVIII.
9455	Pond, Erasmus A.	Pill-making machines	IV.
9292	Poole, John M., assignor to J. Pasey and James Scott	Leather, machines for polishing	XVI.
	Post, John. (See Ball & Post.)		

No.	Patentees.	Inventions or discoveries.	Class.
9035	Potts, Joseph	Meat cutters	XVII.
	Powell, Archibald C., assignee. (See Caswell, John, assignor.)		
210	Powell, Joseph, Nelson Barlow, and Edward Holden, assignors to Robert G. Eunson.	Planing, tonguing, and grooving, machines for	Reissue.
	Pratt, David. (See Wager, Pratt, and Richmond.)		
527	Pratt, Jos., assignor to Bowers, Pratt, & Co.	Grate, parlor	Design.
516	Pratt, Jos., assignor to Bowers, Pratt, & Co.	Stove, cooking	Design.
526	Pratt, Jos., assignor to Bowers, Pratt, & Co.	Stove, Franklin	Design.
529	Pratt, Samuel F., assignor to Jagger, Treadwell, & Perry	Stove, Franklin	Design.
488	Pratt, Samuel F., assignor to Jagger, Treadwell, & Perry	Stove, six-plate	Design.
8639	Pratt, Ulysses	Bleaching ivory, processes of	IV.
470	Pratt, William F., and George W. Bosworth	Stove, cooking	Design.
9278	Prosser, Richard, assignor to Thomas Prosser	Joint tube, application of a free, in circumstances where it is exposed to external pressure.	II.
	Prosser, Thomas, assignee. (See Alfred Krupp.)		
9290	Pullinger, George B.	Rails, hand, machines for cutting	IX.
520	Race, Washburn, assignor to H. C. Silsby, W. Race, and B. Holly	Stove, parlor	Design.
8860	Rait, David	Buttons, studs, &c.	XXI.
8985	Rall, Daniel R.	Wheels, cast-iron car	X.
9086	Ramos, Don Juan, assignor to James C. Gallaher and William F. Tirado.	Sugar, apparatus for boiling	IV.
9087	Ramos, Don Juan, assignor to James C. Gallaher and William F. Tirado.	Sugar, processes for the manufacture of	IV.
9370	Randall, Charles	Planter, seed	I.
8641	Rapp, Adam William	Pens, gold	XVIII.
8640	Rauch, John H.	Pen and pencil cases	XVIII.
9201	Rawdon, Calvin L.	Yoke, neck, of horses	I.
9120	Reading, William	Corn shellers	I.
9487	Ream, Jacob L.	Harvesters, maize	I.
9036	Reany, Thomas	Ore stampers	II.
	Rechten, Philip. (See Sonnenburg & Richten, assignors.)		
459	Redheffer, William	Combs, ladies' hair	Design.
8960	Reid, Thomas N.	Ovens	V.
9078	Remsen, H. R., and P. M. Hutton	Engines, locomotive	VI.
	Renwick, James, and others. (See J. R. St. John, assignor.)		
8790	Reynolds, Ira	Planters, seed	I.
8694	Reynolds, Ira	Switches, railroad	X.
	Reynolds, Ira. (See P. E. Royse and Ira Reynolds.)		
8984	Reynolds, Rensselaer	Looms, power	III.
8677	Reynolds, Samuel G.	Nail machines	II.
8959	Rhodes, Clarkson	Churns	I.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
9353	Rice, Augustus M., assignor to A. M. Rice and S. H. Lombard	Furnaces, hot air	V.
9266	Richards, G. H., assignor to C. G. Plimpton	Forging machines	II.
9369	Richards, William T.	Ferrules, wire, manufacture of	II.
9262	Richards, William T.	Ferrules, wire, machinery employed in the manufacture of coiled	II.
9433	Richardson, Fortunatus E.	Ploughs, construction of	I.
9188	Richardson, Samuel	Looms for weaving piled fabrics	III.
9360	Richmond, Appollos, assignor to A. C. Barstow & Co.	Furnaces, hot air	V.
473	Richmond, Appollos, assignor to A. C. Barstow & Co.	Grate, portable	Design.
455	Richmond, Appollos, assignor to A. C. Barstow & Co.	Stove, cooking	Design.
	Richmond, Volney. (See Wager, Pratt, & Richmond.)		
	Richmond, Volney. (See Wager, Richmond, & Smith.)		
	Richmond, Volney. (See Wager, Richmond, & Smith.)		
	Richmond, Volney. (See Wager, Richmond, & Smith.)		
9409	Richter, Professor Adolphus	Drawing, perspective, apparatus	XVIII.
9478	Ricketson, Lydoriann, administratrix of Henry H. Ricketson	Blubber, whale, machines for cutting	XXII.
8958	Rider, E. P.	Cotton batting	III.
8992	Rider, John	Gutta percha, processes of manufacturing	IV.
8708	Rietsch, Franz G.	Beer material concentrated	IV.
491	Ripley, Ezra, assignor to N. S. Vedder	Stove, parlor	Design.
531	Ripley, Ezra, and N. S. Vedder, assignors to Samuel McClure	Stove, cook	Design.
9102	Rippon, William	Doors, double acting	IX.
9332	Robb, James	Plough-fastening devices	I.
9333	Robb, James	Planters, seed	I.
9253	Robbins, Charles A., and Harvey Allen	Mail bags, air-tight	XVI.
9263	Robbins, Horace T.	Loom, shuttle guides to	III.
8807	Robbins, Horace T.	Spinning machinery, connecting washers with spindles in	III.
9140	Roberts, Cyrus	Grain separators	I.
8746	Roberts, Peter	Capstans	VII.
9307	Robertson, William H.	Milling machines	II.
9103	Rogers, Enos	Valves, puppet, mode of grinding while the engine is in motion	VI.
9488	Rogers, S. W.	Cut-off valve motion	VI.
9028	Rood, David, and Edwin Jenney, assignors to E. Jenney	Staves, machines for jointing	XIV.
9003	Root, Frederick P.	Cultivators, wheel	I.
	Root, F. H., and S. S. Jewett. (See Jewett, S. S., and F. H. Root.)		

No.	Patentees.	Inventions or discoveries.	Class.
	Root, F. H., and S. S. Jewett. (See Jewett, S. S., and F. H. Root.)		
	Ross, E., and J. Houston. (See Houston & Ross.)		
9004	Ross, James P.	Planters, seed	I.
214	Roth, Augustus	Furnaces for smelting iron ore, construction of	Reissue.
9378	Rouse, Wanton	Mules, self-acting	III.
	Roys & Wilcox, assignees of J. F. Flanders. (See Flanders.)		
9142	Royse, Pleasant E.	Stone, machines for rubbing	XV.
8747	Royse, Pleasant E.	Cultivators, rotary	I.
9104	Royse, P. E., and Ira Reynolds	Stone, machines for rubbing	XV.
9005	Rugg, George H.	Harvesters	I.
9436	Ruggles, H. J.	Stoves, cooking	V.
8642	Ruggles, Robert B., and Lemuel W. Serrell, assignors to Robert B. Ruggles.	Gold beater, mechanical	II.
9410	Ruggles, Stephen P.	Printing presses	XVIII.
9221	Russell, David	Horse-power	XIII.
9202	Russell, Jonathan	Legs, artificial	XX.
9371	Saddler, Manly C.	Stove, cooking	V.
9425	Sadleir, David	Boot trees	XVI.
522	Sailor, Samuel H., assignor to A. G. Abbott and A. Lawrence	Stove, parlor	Design.
525	Sailor, Samuel H., assignor to A. G. Abbott and A. Lawrence	Stove plates	Design.
523	Sailor, Samuel H., assignor to A. G. Abbott and A. Lawrence	Stove, cannon	Design.
524	Sailor, Samuel H., assignor to A. G. Abbott and A. Lawrence	Stove	Design.
453	Sailor, Samuel H., assignor to North, Harrison, & Chase	Stoves, cooking	Design.
	Salisbury & Arrowsmith, assignees. (See B. W. Carpenter.)		
8987	Salomon, John C. F.	Fire-escape ladders	XXII.
8892	Samuels, Jesse	Brick machines	XV.
9006	Sanders, Benjamin D.	Planters, seed	I.
9007	Sanders, Zenas	Rakes, hay	I.
	Sanderson & Vedder, assignors. (See Vedder & Sanderson.)		
	Sanderson & Vedder, assignors. (See Vedder & Sanderson.)		
497	Sanderson, W. L., assignor to R. R. Finch and R. R. Finch, jr.	Stove, coal	Design.
466	Sanderson, William L., assignor to R. R. Finch, sr., and R. R. Finch, jr.	Stove, dining room	Design.
9037	Sanford, Gelston	Planters, seed, hand	I.
8927	Sanford, Gelston, assignor to George A. Meacham	Churning machines	I.
9434	Sanford, Horatio G.	Knitting machines, rotary	III.
9079	Sanford, Nathaniel C.	Skates	XXII.
8660	Sanford, S. T.	Punching sheets of metal, machinery for	II.
9334	Sargent, Rufus W.	Lamps, spirit-gas, burners for	V.
8661	Satterlee, Edward	Moulding in flasks, apparatus for	II.
9504	Saulnier, Pierre, assignor to J. T. Bruen	Planing metals, &c., mode of mounting the cutters of machines for	II.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
451	Savage, John J., assignor to A. Morrison and T. M. Tibbitts	Stoves, cooking	Design.
8778	Savage, Simeon	Printing floor-cloths, machines for	XVIII.
435	Savery, William	Stoves	Design.
8664	Sawyer, Joseph	Rattan, machines for splitting	XXII.
	Sayles, M. T. (See Slocum & Sayles.)		
9038	Schnebly, William and Thomas	Harvesters	I.
8748	Schnebly, William and Thomas	Weighing machines	XII.
8928	Schneider, Christen	Funnels	XI.
9189	Schoenherr, John	Brakes, railroad car	X.
9285	Schroeder, Richard E.	Brick kilns	XV.
	Scott, James, and J. Pasey, assignees. (See Poole, John M., assignor.)		
9121	Scoville, Hiram H	Wheels, cast-iron car	X.
226	Seaman, Eber C	Freezers, cream	Reissue.
9489	Seely, Jesse N	Potato diggers	I.
8665	Seitz, Frederick	Mashing maize, improved process of	IV.
	Seitz, Frederick	Mashing maize, process of	Add'l imp't.
8695	Semple, Amzi C	Windlasses	XII.
8662	Senneff, Jacob	Heddles, metallic	III.
	Senneff, Jacob	Heddles, weavers'	Add'l imp't.
	Sensenick, George W. (See Byler & Sensenick.)		
9122	Sergeant, Isaac A	Bedstead fastenings	XVII.
9476	Seymour, William H., assignor to Seymour & Morgan	Harvesters, grain and grass	I.
9039	Sharp, James	Label cards	XVIII.
8779	Sharp, Theodore	Horse-powers, endless chain	XIII.
9308	Sharps, Christian	Fire-arms, method of priming	XIX.
8861	Shaw, Daniel	Smut machines	XIII.
8845	Shaw, William	Bedstead fastenings	XVII.
9203	Shaw, William	Bedstead fastenings	XVII.
9156	Shaw, William C	Mortising machines	XIV.
	Shelton, Charles T., assignee. (See Albert Eames.)		
8663	Sherwood, Allen, and Avery Babbett	Turning prisms, &c	XIV.
9190	Sherwood, Benjamin	Hats	XXI.
9390	Shetter, Solomon	Horse-shoe machinery	II.

8846	Sheward, James	Rat trap	XXII.
444	Shields, James	Combs, hair	Design.
	Shimer, Sylvanus. (See George Hess.)		
484	Shultz, Frederick, assignor to Wm. P. Cresson	Stove, cooking	Design.
8760	Sickels, Frederick E	Cut-offs	VI.
8782	Sickels, Gerard	Clutches, friction	XIII.
8761	Sidle, Henry	Boring hubs, for boxes, apparatus for	XIV.
	Sidman and others. (See Conklin, Sidman, and Whritner.)		
9157	Siedhof, Charles	Lamps	V.
8988	Sievier, Robert W	Looms for weaving piled fabrics without the figuring wires	III.
	Silsby, H. C., W. Race, and B. Holly, assignees. (See Washburn Race, assignor.)		
9391	Silver, Harvey	Twisting tubes in the formation of roving	III.
9237	Silvester, John	Process for restoring shape and tempering articles of hardened steel.	II.
	Simmons & Palmer. (See Palmer and Simmons.)		
8876	Singer, Isaac M	Sewing machines	III.
	Skidmore, Charles. (See Blackman & Skidmore.)		
	Skinner, Chauncy D. (See Henry S. North and C. D. Skinner.)		
	Slaughter, Franklin and J. W., assignees. (See David Perry.)		
8912	Sloan, Thomas J	Gauge float, feed regulator, &c., for steam boilers, &c	VII.
9222	Sloan, Thomas J	Screw-blanks, &c., wood, mechanism for griping	II.
9105	Sloan, Thomas J	Screws, &c., combination of cutters for threading wood	II.
9223	Sloan, Thomas J	Screws, threading pointed wood	II.
9106	Sloan, Thomas J	Thermostat for regulating heat	V.
9392	Slocum, G., and M. T. Sayles	Metal bars, machinery for crimping	II.
9347	Smead, Daniel W	Bedsteads	XVII.
9080	Smith, Albert M	Clasp, belt	XXI.
217	Smith, Alexander	Parti-coloring yarn, apparatus for	Reissue.
511	Smith, Elihu	Stove, cooking	Design.
9209	Smith, Erasmus, assignor to David Maydole	Bits to braces, fastener of	II.
9335	Smith, Erasmus	Water-wheels, packing	XI.
480	Smith, G., H. Brown, and Julius Holzer, assignor to North, Harrison, and Chase.	Stove, cooking	Design.
9286	Smith, Henry C	Lathe machine	XIV.
9309	Smith, Henry C	Window frames	IX.
	Smith, H. (See Wager, Richmond, and Smith.)		
	Smith, H. (See Wager, Richmond, and Smith.)		
	Smith, H. (See Wager, Richmond, and Smith.)		
9348	Smith, James D	Sash stopper and fastener	II.
	Smith, Jno. H. (See Fitzgerald and Smith.)		
9459	Smith, Rev. Wm. H	Furnaces, slags, of utilizing	V.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8974	Smolinski, Joseph	Cooking apparatus	V.
9490	Snook, Thos., and S. Hill	Lamps for locomotive engines	V.
518	Snow, William M	Stove plates	Design.
	Snyder and Winslow, (See Winslow, J. F., and J. Snyder.)		
8443	Sonnenburg, Albert, and Philip Rechten, assignors to Christian A. Hainakin.	Whaling apparatus, electric	VIII.
8961	Soule, Charles R	Rakes, hay	I.
8929	Southwell, William	Grinding or polishing saw-blades, &c., machinery for	II.
9412	Southworth, D. H	Serving mallets	VII.
	Space, E. H., and L. J. Worden. (See Worden and Space.)		
8893	Spaulding, H. C., and G. Stickney	Pumps, rotary	XI.
	Spear, John D. (See Alford and Spear.)		
9237	Speer, A., and E. Marx	Piano fortes, &c., sounding boards of	XVIII.
9411	Speer, Cornelius	Card-teeth, bracing and supporting	III.
8729	Speiker, Charles F	Gold, processes for dissolving	II.
8780	Speissegger, S. L	Brick machines	XV.
103	Spence, Geo. S. G	Hot-air furnaces	Add'l imp't.
9204	Spence, Geo. S. G	Furnaces, hot-air	V.
9393	Spence, Geo. S. G	Range, cooking	V.
9473	Sprague, Harvey	Plough regulators	I.
8930	Spratt, James	Lightning rods	VIII.
209	Spring, Chas. A., and Peter Boon	Planing machines	Reissue.
	St. John, Edgar. (See Curtis and St. John.)		
9008	St. John, John R	Soap boilers	IV.
8785	St. John, John R., assignor to Jas. Renwick, G. F. Barnard, and E. B. St. John.	Compasses for determining variation from local causes	VIII.
9224	Stanley, Edwin	Truck, railroad	X.
8808	Stearns, Daniel	Planing machines	XIV.
9236	Stearns, Geo. S., and Wm. Hodgson	Engine, steam, governor for	VI.
8989	Stebbins, Peter, and Jno. Holmes	Trip-hammers, vertical	II.
9264	Stedman, Benj. S	Port-monnaies, manufacture of	XXI
9126	Stephenson, Marcus R., assignor to Edwin Holman	Locks, door	II.
476	Stephenson, Peter	Medallion of Daniel Webster	Design.
496	Stephenson, Peter	Medallion of Franklin Pierce	Design.

No.	Patentees.	Inventions or discoveries.	Class.
495	Stephenson, Peter	Medallion of General Scott	Design.
	Stickney, G., and H. C. Spaulding. (See Spaulding and Stickney.)		
8862	Stillman, J. D. B	Harpoon	II.
9456	Stoddard, William	Shingle machines	XIV.
8831	Stoddard, William	Shingles, machines for jointing	XIV.
9288	Stow, Orson W	Tubes, sheet metal, machinery for forming	II.
8913	Stowell, B. T	Cart, self-loading and dumping	X.
8877	Stowell, B. T., and A. Marcellus	Planters, seed	I.
8762	Strait, Hiram	Water-gun for extinguishing fires	XI.
9081	Stran, Thomas V	Bells, method of ringing	XXII.
9394	Strawbridge, Henry H., and Dan'l Tyson	Brick machines	XV.
8763	Strode, Thomas T	Winnowers and weighers, grain	I.
8863	Stubbs, Matthew	Eccentric, adjustable, mechanism for actuating an	VI.
8791	Sturges, J. S	Rakes, hay	I.
	Summers, Wm. Alltoft. (See Lamb and Summers.)		
8792	Swan, A. L	Melodeons	XVIII.
9061	Swartz, David	Ploughs	I.
9143	Sweeney, Peter	Tuyeres, water-pipes of	II.
8727	Swett, James H	Crusher, quartz	XIII.
	Sweetland and others, assignees. (See Vedder and Sanderson.)		
9491	Swindell, John	Soda, chromate of, manufacture of	IV.
8914	Swingle, Alfred, and Nehemiah Hunt	Steering apparatus	VII.
9457	Switzer, Jacob W	Screw-drivers	II.
8996	Symmes, J. C	Shears	XXI.
8878	Taft, Geo. C	Boxes, opening, instrument for	XXII.
9435	Tainter, Daniel	Knitting machines, rotary	III.
8848	Taliaferro, N., and Wm. D. Cummings	Irons, smoothing	XVII.
	Tanner, Henry, assignee. (See L. F. Thompson and A. G. Batchelder.)		
8943	Tatham, Benjamin	Lead pipe machinery	II.
8710	Taylor, Henry D	Cars, railroad, running gear of	X.
8991	Taylor, Isaac	Engraving surfaces	XVIII.
8749	Taylor, J. C	Spoons for administering medicines	XX.
512	Taylor, Robt., and Robt. D. Laurie	Forks, spoons, &c	Design.
8944	Taylor, Timothy H	Tables	XVII.
8990	Taymon, Benjamin J	Turning and polishing, machines for	XIV.
	Tenney *et al.* (See Bucks, Cragin, and Tenney.		
9310	Terry, Silas P	Time pieces	VIII.
9349	Tukesberry, Geo. P	Life-preserving seat	VII.
8832	Thatcher, J. M	Stoves, air-heating	V.
	Thayer, B. B., assignee. (See Thomas Walker.)		

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
8810	Thomas, Sam'l T., and Edw'd Everett	Looms, jacquard, pattern cards for	III.
8809	Thomas, Wm. S	Cupping and breast glasses	XX.
8931	Thompson, Daniel H	Window-blind machinery	XIV.
8697	Thompson, James H	File-cutting machines	II.
8864	Thompson, John	Grain separators	I.
9254	Thompson, Julius	Blow-pipe for dentists, &c	XX.
9109	Thompson, L. F., & A. G. Bachelder, assignors to Henry Tanner	Brakes, railroad car	X.
8865	Thompson, Sardis	Boot jack	XVI.
461	Thomson, David, assignor to New Market Iron Foundry	Grate, portable	Design.
8847	Thomson, John	Wells, artesian, apparatus for boring	IX.
8975	Thurston, Stephen	Wheels, cast-iron car	X.
8951	Tibbetts, J. V	Umbrellas	XXI.
	Tibbitts, T. M., and V. Morrison. (See J. J. Savage)		
	Tilton, William B	Violins	Disclaimer.
8783	Tinker, Harris H	Suspender, encircling, for garments	XXI.
8666	Tolhurst, G W	Planing machines	XIV.
9372	Townsend, Francis	Planters, seed	I.
9474	Trayser, Philip P	Spike machines	II.
9336	Trempor, John	Governors	VI.
9373	Trevitt, Constant S	Planters, seed	I.
9255	Tucker, Hiram	Marble, imitation of, preparing stone in	XV.
9507	Tucker, William	Looms, shuttles for	III.
8698	Turner, George William	Paper, making and sizing, machines for	III.
8915	Turner, Henry	Boxes for journals	X.
9144	Turner, James	Car coupling, railroad	X.
9123	Turner, Jonathan S	Clocks, alarm	VIII.
8811	Turton, William	Registers, hot air	V.
506	Tuttle, Charles B	Stove, cooking	Design.
	Tyson, Daniel. (See H. H. Strawbridge and D. Tyson.)		
9492	Underwood, William E	Fulling mills	III.
8866	Urmy, Jesse	Planters, seed	I.
	Valentine, E., and A. Bradway. (See A. Bradway.)		
	Valentine, E., and A. Bradway. (See Bradway & Valentine.)		
8867	Valentine, John	Wheels, car, and rails	X

No.	Patentees.	Inventions or discoveries.	Class.
	Valleau, Geo. (See Killam & Valleau.)		
9240	Van Anadall, Henry	Electro-magnetic fire alarms	VIII.
8784	Van Bunschoten, Isaac	Lamps, camphene	V.
8879	Van Doren, Francis	Planters, seed	I.
8667	Van Fossen, Thomas	Harvesters, grain	I.
8894	Van Hoesen, William C	Gates, balance	IX.
9401	Van Riper, John A	Looms, carpet	III.
9009	Vedder, John J	Rat trap	XXII.
519	Vedder, N. S	Stove, cook	Design.
501	Vedder, N. S	Stove, cooking	Design.
510	Vedder, N. S	Stove, parlor	Design.
	Vedder, N. S., and E. Ripley, assignors to Samuel McClure. (See Ripley & Vedder.)		
	Vedder, N S., assignee. (See Ezra Ripley, assignor.)		
449	Vedder, N. S., and W. L. Sanderson, assignors to Warren, Sweetland, & Little.	Stoves, parlor	Design.
458	Vedder, N. S., and W. L. Sanderson, assignors to Peter J. Clute	Stove, cook	Design.
8711	Verleger, C. F	Carriages, running gear of	X.
9374	Vermillion, Henry	Planters, seed	I.
9082	Ver Valen, R. A	Brick machines	XV.
8945	Vine, William	Gold-beating machinery	II.
8668	Virdin, W. W	Canal locks	IX.
464	Vose, Samuel D	Stove, box	Design.
463	Vose, Samuel D	Stove, coal	Design.
500	Vose, Samuel D	Stove, cook	Design.
471	Vose, Samuel D	Stove, cooking	Design.
498	Vose, Samuel D	Stove, cooking	Design.
462	Vose, Samuel D	Stove, parlor	Design.
465	Vose, Samuel D	Stove, parlor cook	Design.
	Vredenburg, W. D. & F., assignees. (See J. Harvey Conklin.)		
9010	Wade, Robert M	Grease cocks	VI.
437	Wager, Jas., David Pratt, and Volney Richmond	Stoves	Design.
532	Wager, Jas., V. Richmond, and H. Smith	Stove, box	Design.
515	Wager, Jas., V. Richmond, and H. Smith	Stove, cooking	Design.
537	Wager, Richmond, & Smith	Hearth plate	Design.
9289	Wagner, J. Z. A	Omnibuses, registers for, and for other purposes	X.
8812	Walber, Thomas	Brakes, railroad car	X.
9205	Walber, Thomas	Hat bodies, machines for forming	III.
9158	Walcott, Halsey D	Cloth and other substances, graduated cutters for	XXI.
9083	Walker, Alfred	Bedsteads, sofa	XVII.
9225	Walker, Andrew, jr	Boilers, apparatus for feeding	VI.

V.—*Alphabetical list of patents issued*—Continued.

No.	Patentees.	Inventions or discoveries.	Class.
	Walker & Willey, jr. (See Willey, Calvin, jr., assignor.)		
	Walker & Willey, jr. (See Willey, Calvin, jr., assignor.)		
9088	Walker, Thomas, assignor to B. B. Thayer, assignor to W. W. Churchill and Jos. Baxter.	Boot heels, revolving	XVI.
9493	Walroth, Daniel, and Lucius Evans	Furnace cinders, method of separating iron from	V.
9494	Walworth, Caleb C.	Irons, flat, steam	XVII.
9508	Ward, William E.	Screw blanks, rivets, &c., method of heading	II.
513	Wardwell, Benjamin, and Ephraim R. Barstow	Range, cooking	Design.
9107	Ware, Elijah	Spring, pneumatic	X.
8813	Warren, Ira	Inhaling powders, instruments for	XX.
	Warren, Sweetland, & Little, assignees. (See Vedder & Sanderson, assignors.)		
9084	Waterbury, Charles	Cars, railroad	X.
9509	Waterman, Henry	Boilers, steam, safety apparatus for	VI.
460	Waterman, Nathaniel	Towel stands	Design.
8669	Waters, John	Mattresses, spring	XVII.
9108	Watson, William	Planing machines	XIV.
9085	Webster, Daniel A.	Cocks, with pipes, connecting	XI.
8764	Weed, T. E.	Driers, grain	V.
8880	Weeks, George S.	Paddle wheel, oblique bucket	VII.
8636	Weight, Joseph, assignor to Samuel Lawrence	Felting cloth	III.
8962	Welch, B. S.	Cements	IV.
	Welch, Henry K. W. (See Brown & Bigelow, assignors.)		
9375	Wells, David	Ventilators	V.
9475	Wells, Moses D.	Planters, seed	I.
8895	Wells, William T.	Tailors' measures	XXI.
9337	Welton, Arad W.	Buttons, glass	XXI.
517	Wheeler, John W., and O. B. Latham	Curb, pump	Design.
8712	Wheeler, Norman W.	Steering apparatus	VII.
	Wheeler, N., A. B. Wilson, A. Warren, and G. P. Woodruff, assignees. (See Allen B. Wilson.)		
479	Wheeler, Russell, and Stephen A. Bailey	Stove, cooking	Design.
9191	Whipple, Cullen	Screws, machinery for threading wood	II.

No.	Patentees.	Inventions or discoveries.	Class.
9477	Whipple, Cullen, assignor to New England Screw Company	Screw blanks, mechanism for pointing and threading, in the same machine.	II.
9460	Whipple, Cullen, assignor to New England Screw Company	Screws, &c., wood, machinery for making	II.
9110	Whipple, Cullen, assignor to New England Screw Company	Screw-threading machinery	II.
8896	Whipple, R. B.	Hame tugs	XVI.
8713	White, Ammi	Bridges	IX.
	White, Elbert, and John Bostwick, jr., assignee. (See Marshall & Cook.)		
8643	White, John L.	Trucks for locomotives	X.
9256	White, Luther C.	Lamp tops, rivets, &c., method of making	V.
	White, Norman. (See Kingsland, jr., and White.)		
8679	White, Robert	Blind, cast and wrought metal	II.
9206	Whitemarsh, Samuel	Calorifers	V.
8881	Whitney, Joel	Planing machines, feed apparatus for	XIV.
	Whitney, L. (See Barnum & Whitney.)		
8793	Wickersham, John B.	Iron fences	II.
8728	Wicks, Edward	Planters, seed	I.
8946	Wicks, Robert, and James Faulkner, jr.	Mash tuns	IV.
8897	Wilbar, Francis	Level, reflecting spirit and square	VIII.
9495	Wilder, Aretus	Planing machines	XIV.
8731	Willey, Calvin, jr., assignor to Calvin Willey, jr., and Urial Walker.	Excavating and dredging machines	IX.
8907	Willey, Calvin, jr., assignor to Andrew J. Brown, of Chicago, and Robert L. Dunlap, of Dunlap's Prairie, Illinois, executors of the estate of Calvin Willey, jr., deceased, and Urial Walker.	Gins for long staples of cotton	III.
9427	Williams, De Witt C.	Whiffle-tree	X.
8765	Williams, Orrillus T.	Docks, floating	IX.
8766	Williams, Orrillus T.	Vessels, apparatus for lightening	VII.
9207	Willoughby, James D.	Curriers' beam and knife	XVI.
9062	Wilmot, S. R.	Time-pieces	VIII.
9041	Wilson, Allen B., assignor to N. Wheeler, A. B. Wilson, A. Warren, and G. P. Woodruff.	Sewing machines	III.
9124	Winger, Jacob G.	Presses, cotton	XII.
9239	Winship, Ebenezer	Engines, steam, metallic stuffing-box, packing in	VI.
9510	Winslow, J. F., and J. Snyder	Chairs, railroad, machinery for making	IX.
9395	Winslow, Seth E.	Fans, automatic	XVII.
9437	Wise, Jacob and Freeman	Stone and earthenware, manufacture of	XV.
9413	Wiswell, Daniel H.	Car seats, railroad	X.
9355	Wolle, Francis	Bags of paper, machine for making	XXII.
9396	Wood, A. H.	Burners, gas	V.
8947	Woodbury, Nathaniel	Butter from firkins, implement for cutting	XVII.

V.—*Alphabetical list of patents issued*—Continued]

No.	Patentees.	Inventions or discoveries.	Class.
8976	Woodcock, Dennison	Staves, machines for jointing	XIV.
9042	Woodcock, Virgil	Ores, machine for stamping	II.
	Woodrow, David T., assignee. (See Hosea H. Huntley.)		
	Woodrow, David T., assignee. (See Hosea H. Huntley.)		
8644	Woodruff, H. W	Wheels, cast-iron car	X.
9125	Woodward, Joshua	Planters, seed	I.
8794	Woodward, Joshua	Plough	I.
9238	Woodworth, Arad, 3d, and Samuel Mower	Brick machines	XV.
9496	Woodworth, William H	Cloth on the beam, method of measuring	III.
8932	Woolcocks, Thomas J., and William Ostrander	Speaking tubes	XVII.
8814	Woolson, Charles J	Stove doors, &c., hinges for	V.
8699	Worden, L. J., and E. H. Space	Burglar alarms	XXII.
8849	Wortendyke, C. A	Candle-wicks	IV.
9458	Wright, W. W. & C. C	Harvesters, reels for	I.
9043	Wright, Wendell	Clutch, friction	XIII.
	Whritner and others. (See Conklin, Sidman, & Whritner.)		
9497	Yale, Linus, jr	Lock, safety	II.
9350	Yale, Linus, jr	Plates, burglar-proof, for doors, safe-walls, vaults, &c	II.
9511	Yarnell, William	Daguerreotyping	XVIII.
9044	Yellott, George	Harness from horses, detaching	XVI.
8833	Young, James	Oil, paraffine, making	IV.
472	Zeuner, Charles, assignor to M. Greenwood & Co	Stand, hat and umbrella	Design.
	Zoiner, Paul Wm. (See Harris & Zoiner.)		
	Zoiner & Harris. (See Harris & Zoiner.)		

VI.

INVENTIONS AND CLAIMS

FOR THE YEAR 1852.

No. 8622.—*Improvement in Ventilating Railroad Cars.*

What we claim as our invention, and desire to secure by letters patent, is the employment of the shaft, O, sliding boxes, *g*, and the springs, K; the whole operating in combination with the pulleys, R, T, in the manner and for the purpose herein set forth.

NOBLE P. BARNUM.
LEWELLYN WHITNEY.

No. 8623.—*Improvement in Carriage Hubs.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the conical bearing point, F, (fig. 2,) the female centre or step, D, the thimble, N, rollers, M, and flange, L, arranged in the manner substantially as described, and for the purpose set forth.

SAM'L P. BARRY

No. 8624.—*Improvement in the Construction of Bridges.*

Having thus fully described my improved construction of bridges, what I claim therein as new, and which I desire to secure by letters patent, is the combination of the tension rods, *e*, connecting the foot of each strut with each end of the stretcher, substantially as described, by which an independent support is given to the strut carried back directly to the abutment, while at the same time no lateral force or strain is brought upon the abutment, as herein fully set forth.

WENDEL BOLLMAN.

No. 8625.—*Improvement in mode of Covering Cheeses.*

I claim as my invention, and desire to secure by letters patent, the spring cylinder with cleats, and open at the side, in combination with the framed stool, with circular opening, to admit and hold the cylinder within the sack while the cheese shall be passed through; all as herein described, and for the purposes stated.

UPSON BUSHNELL.

No. 8626.—*Improvement in Locks for Carriage Curtains.*

What I claim as my invention, and desire to secure by letters patent, is the constructing or manufacturing of coach curtain locks, each consisting of a polygonal knob, and an eyelet having a polygonal central aperture of corresponding form and size, so that at certain relative positions the knob head will pass freely through the eyelet, while in other relative positions the knob cannot pass through the eyelet, on account of the prominence of its angles.

I also claim attaching the knobs and eyelets to the articles which are to be thereby connected in such relative positions that the knob-head cannot be made to pass through the eyelet, either for the purpose of connecting or disconnecting, unless the eyelet or knob is turned from its ordinary and proper position; both the knob and eyelet being constructed in the manner and for the purpose herein described.

GEORGE COOK.

No. 8627.—*Machine for turning up the edges of Sheet Metal Disks.*

I do not claim as my invention the use of cylindric rollers, for either bending or beeding circular tin-plate, when held between and rotated by holders or gripers; but what I do claim is the employment of the spherical segmental bending roller, K, in connexion with the conic frustrum roller, *a*, to operate together, and so as to enable me either to turn down the flanch at a right, acute, or obtuse angle, all essentially as specified, and at the same time dispense with the necessity of having several sets of holders or gripers to bend the tin-plate against, as heretofore practised.

J. F. FLANDERS.

No. 8628.—*Improvement in Clover Harvesters.*

Having thus described my improvements in the clover-head harvester, what I claim therein as new, and desire to secure by letters patent, is the lateral projection, J, whose ends are fitted into the mortises, or recesses, K, in the shanks of the cutters, D, and whose upper front edges are made sharp; said projections serving the two-fold purpose of interlocking with the contiguous cutters and acting as cutters themselves, as described, for severing the heads from the stalks.

MAHLON GARRETSON.

No. 8629.—*Improved Steam and Water Gauge.*

What I claim herein as my invention, and desire to secure by letters patent, is the combination of the elevated glass syphon, containing a portion of air, above, with the metallic tubes, containing water, below, arranged with respect to each other, and the index, as herein described, for the purpose of showing or indicating the height of the water, and also the pressure of the steam, in steam-boilers, at an elevation above, or at the desired distance therefrom.

WM. E. GRIMES.

No. 8630.—*Improvement in Camphene Lamps.*

What I claim as my invention, and desire to secure by letters patent, is constructing lamps with a lever chamber, M, or equivalent receptacle thereto, such chamber or receptacle being connected with the reservoir near its top by a tube or passage, N, or other similar communication, substantially in the manner and for the purpose set forth.

R. V. DE GUINON.

No. 8631.—*Improvement in the manufacture of Railroad Chairs.*

What I claim as my invention, and desire to secure by letters patent, is rolling iron plates, for railroad chairs, upon rollers so constructed that the portions intended to form the lips of the chair shall have a greater thickness than the rest of the plate, substantially as herein set forth.

PETER P. R. HAYDEN.

No. 8632.—*Improvements in Iron Railings.*

I do not claim as my invention any of the parts of the within described railing, nor any of its minor combinations separately; but I do claim a combination consisting of the following enumerated parts, viz:

The top rail, with its notches and end hooks; the lower rail, with its notches, and hooks, and groove; the paling, with its notches, hooks, and T's; the ports, with their openings for the ends of the rails; and the key-bar, by which the rails, ports, and paling are firmly fastened together; the whole constructed and arranged substantially as herein described.

GEO. HESS.

No. 8633.—*Improvement in Daguerreotype Pictures.*

What I claim as my invention, and desire to secure by letters patent' is the contracted opening to the mercury bath, and the separating or raising the plate from the contractor during the operation of mercurializing; thus graduating the mercury upon the plate, producing the various tints, and gradually blending the outer edges of the gauge.

H. E. INSLEY.

No. 8634.—*Improvement in Wool-picking Machines.*

I do not claim any improvement in the feeding-table, ratchet feed roller, main picking cylinder, or any separate parts of the above described machinery. What I do claim as new, and as my invention, is the application and use of the comb-plate to the upper and forward edge of the shell, when combined with the compound shell, to hold the comb-plate as above described; the several parts thereof being combined for the purpose aforesaid.

And I claim the small recess just below the upper edge of the shell for the purpose described and set forth.

EDWARD KELLOGG.

No. 8635.—*Improvement in the construction of Shovels.*

What I claim as my invention, and desire to secure by letters patent, is an improvement in the construction of the common shovel, as follows, to wit:

First. The attachment of malleable iron, or other metal, consisting of the lip, the flange, and the socket, and the mode of fastening the same to the blade, as herein-before described.

Second. The mode of fastening the lower end of the stock of the handle, by means of a socket and single strap, with the ends deflected upwards, on the front and back side of the stock, and thus connecting the handle with the blade of the shovel.

Third. The construction of the upper end of the handle, consisting of the socket, the ribs, the cylinder, and the rivet; and the mode of connecting the same with the upper end of the stock, by means of the socket, as substantially and fully herein-before set forth.

HIRAM KIMBALL.

No. 8636.—*Improvements in Felting Cloth.*

Having thus described my improvements in the manufacture of felted fabrics, I shall state my claim as follows:

I do not claim the manufacture of felted cloth generally, nor do I claim the use of flat platens in felting cloth; but what I do claim, and desire to have secured to me by letters patent, is the felting of wool or other fibrous materials upon a woven or netted fabric, substantially as hereinabove set forth.

And I also claim the use of one or more moving platens, having a reciprocating rectilinear motion, in the direction of the length of the cloth to be made, over one or more stationary platens, in combination with the endless cloth bands, operated substantially as described, for carrying forward and regulating the motion of the material while under the action of the said platens, substantially as set forth.

JOSEPH WEIGHT.

No. 8637.—*Improvement in Breech-loading Fire-arms.*

What I claim as my invention, and desire to secure by letters patent, is mounting the barrel on a spindle attached to or projecting from the breech piece, so that the barrel can be turned thereon, to carry the bore to the side of the breech, for the insertion of a cartridge, and back, to close the bore against the breech-piece, substantially as herein described; but this I only claim in combination with the stationary breech-piece, provided with a cutting edge at the side, to cut off the rear end of the cartridge, and with a projection at top, extending over the barrel, and grooved transversely, to receive a lip from the barrel, to bind the barrel to the breech piece, to resist the force of the discharge, all as herein described.

RICHARD S. LAWRENCE.

No. 8638.—*Improvement in Feeding-rollers in Straw cutters.*

Having thus fully described my improved straw-cutter, what I claim therein as my invention, and for which I desire to secure letters patent, is the enlargement of the knife-grooves, *n*, on the feeding cylinder, in the manner and for the purpose set forth.

NATHANIEL NUCKOLLS.

No. 8639.—*Improvement in processes of Bleaching Ivory.*

I do not claim the bleaching of ivory upon a frame exposed to the rays of the sun, passing through glass placed above the same; but what I do claim as my invention, and desire to secure by letters patent, is the improvement in the process of bleaching ivory, as set forth in the specification; that is to say, the raising up of one edge of the piece of ivory above the plane of the frame which supports it, and sustaining it in its place, in the manner described.

ULYSSES PRATT.

No. 8640.—*Improvement in Pen and Pencil Cases.*

I do not claim the extension case, as a sliding tube working in a case has been previously invented; neither do I claim a slide case for both pen and pencil, as that is at present in use. But what I claim as my invention, and desire to secure by letters patent, is the collar, G, encompassing and sliding freely on the pencil tube, E, said collar having a slot or recess (*g*) cut through it, as shown and described, through which a spur (*e*) of the pencil slide, F, may pass; by which arrangement either the pencil slide, F, or pen-holder, H, may be operated without interfering with each other; the collar being prevented from turning on the pencil tube, E, by means of the spur (*h*) working in the slot (K) in the sliding tube, D, and also by which arrangement I combine the extension case with the slide case, for both pen and pencil, substantially as set forth.

JOHN H. RAUCH.

No. 8641.—*Improvement in Gold Pens.*

What I claim as my invention and improvement in the gold pen, and desire to secure by letters patent, is reducing or thinning the sides of the pen at *a*, between the shoulder, A, and split, *c*; whereby the advantages above stated are fully attained, and the gold pen made to possess the qualities of the quill pen.

A. WM. RAPP.

No. 8642.—*Improved Mechanical Gold-beater.*

We do not claim the hammer, or the means of moving or actuating the same; neither do we claim the use of cams to move the mould. But what we desire to secure by letters patent of the United States, is—

First. We claim the arrangement and application of the vibrating fork, *g*, to take a definite amount of motion from the vibrating part, g^1, of the hammer, for the purposes and as described and shown.

Second. We claim lifting the "mould," or its equivalent, from the anvil, and simultaneously or subsequently turning the same, by competent mechanical means, substantially such as herein described, or their equiv-

alents; so that it is replaced with the slide that was previously on the anvil, exposed to the blows of the hammer.

Third. We claim the arm, n^1, latch, 30, levers, o, and o^2, chains, 33, and crank, o^3, or their equivalents, in combination with a weighted arm or its equivalent; whereby a sudden partial rotation is given to the shaft, o^1, and then the lever, o, is returned behind the latch, 30, for the purpose and as described.

Fourth. We claim, in combination, the lever, q, latch, 41, cranks, 35, frame, t, and links, 38, or their equivalents, whereby the "mould," or its equivalent, is lifted from the anvil, turned, and replaced as described.

Fifth. We claim the application of the rollers, 71, 72, 73, and 74, or other suitable mechanical means, set and moving at right angles with each other, and to the centre of the cam shaft, to take and communicate the motion given by a properly formed groove, or bead, in or on the face of the cam, H, to the mould, so as to place it in the proper position to receive the blows of the hammer, to beat each successive quarter of the mould, as described and shown.

Sixth. We claim moving the mould, or its equivalent, over areas of different size, by means of the same cam, through the agency of mechanical contrivances, substantially such as herein described, applied to the devices which transmit motion from the cam to the mould.

Seventh. We claim the arrangement of the slides, y y^1, rollers, 68, forks, 70, with the cranks, w^2, w^3, and v, v^1, and levers, w and x, to communicate the motion given by the cam, H, to the rollers, 71, 72, 73, and 74, to the "mould," through its frame, s, substantially as described and shown.

Eighth. We claim the adjustable fulcrum, 53, and slides, v^4, in combination with the levers, w and x, for the purposes specified.

Ninth. We claim the parallel motion bars, u, and slotted bar, u^2, in combination with the slots, 46 and 47, in the frame, s, whereby the "mould" and frame has a free motion, at the same time that it is kept parallel with the sides of the anvil, or the slotted bar, u^2.

Tenth. We claim the arrangement of the forked springs, w^4 and x^1, and pins 58, 59, and 62, 64, or their equivalents, as applied to the purpose of returning the "mould" to its central position, when commencing to beat each quarter of the "mould," as described and shown.

ROBERT B. RUGGLES.
LEMUEL W. SERRELL.

No. 8643.—*Improvement in Trucks for Locomotives.*

Having thus fully described my improved truck, what I claim therein as new, and which I desire to secure by letters patent, is the joint connecting the truck with the boiler, consisting of a long semi-cylindrical bearing, and an adjustable eccentric for putting the truck in line, substantially in the manner and for the purposes set forth.

JOHN L. WHITE.

No. 8644.—*Improvement in Cast Iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, casting a railroad car wheel, with a chilled rim and solid undivided

hub, connected by means of a plate, which is single and solid at certain parts, so that imaginary radial lines from hub to rim will pass through the said solid parts, and double, and bent in opposite directions, between the single and solid parts, and wholly or partly from hub to rim, substantially as specified; the whole constituting one casting, substantially as and for the purpose specified.

H. W. WOODRUFF.

No. 8645.—*Improvement in Ventilating Windows for Railroad Cars.*

But what I do claim as my invention, and desire to secure by letters patent, is the construction and arrangement of the windows of a car or carriage, in the manner and for the purpose set forth, by causing the parts of the window to stand at an angle outward, when closed, and opening inward to a line with the inside of the car, as described, whereby I insure ventilation, without the annoyance of dust, by means of the window alone, without the addition of other deflectors.

HENRY M. PAINE.

No. 8646.—*Improvement in Machine for Scouring Knives and Forks.*

I claim the construction of this machine, composed of two cylinder brushes, with their peripheries in contact, which causes the friction necessary for scouring or polishing, and at the same time keeps the cylinder brushes, which do the work of polishing or scouring, wet with the polishing substance continually, while the machine is in motion, by immersing the under side of said brushes in the liquid, as they revolve around on their axes, as above mentioned.

CHRISTOPHER AUMOCK.

No. 8647.—*Blind and Shutter Operator.*

What I claim therein as new, and desire to secure by letters patent, is the sliding extension rod, (f, g,) provided with the bent arm or hook, (e,) groove, (i,) notch, (k,) and tooth, (j,) as described, in combination with the staple, (d,) notch, (l,) and serrated neck, (o,) fitting into a corresponding socket in the plate, (p,) whereby the shutter or blind is opened or closed by manipulation from the inside, and retained in position, when opened, by the fallen bent arm in the staple, and, when closed, by the introduction of the bent arm into the notch, (l;) the serrated neck, (o,) with its corresponding socket in the plate, (p,) preventing the bent arm from being dislodged from either position by tampering from the outside.

JAMES R. CREIGHTON.

No. 8648.—*Improvement in Running Gear of Carriages.*

I do not claim the separate use of one segment on which the end of the perch rests; neither do I claim two pivots attached to the body. But what I do claim as my invention, and desire to secure by letters patent, is the placing the pivot in the rear of the forward axle, in combination with the two sets of segments or circles, viz: Segments A and segments D, seen at fig. 3, or their equivalents, substantially as above described.

GUSTAVUS L. HAUSSKNECHT.

No. 8649.—*Improvement in Apparatus for Cutting the pile of Piled Fabrics.*

What I claim as my invention, and desire to secure by letters patent, is the method of connecting the cutter (one or more) with the carrier by means of a joint, substantially as specified, in combination with the guide or feeler, (one or more,) substantially as specified, whereby the guide or feeler is carried down to determine the position of the cutter or cutters before it or they begin to cut, as described.

I also claim connecting the cutter or cutters, and the feeler or feelers, with the reciprocating carriage by means of a spring joint, substantially as specified, so that the tension of the spring, or its equivalent, shall draw the feeler or feelers against the range of loops to be cut, to insure the proper position of the cutter or cutters relatively to the range of loops to be cut, as specified.

And, finally, I claim the method of operating the cutters and guides or feelers towards and from the face of the cloth, and towards and from the lay, by connecting the ways on which the carriage runs, by arms, to the arms of a rock shaft, and to two inclined rocking joints, substantially as specified, whether the rock shaft be operated by the means specified, or the equivalents thereof.

JOHN JOHNSON.

No. 8650.—*Improvement in Lanterns.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a lantern of any construction with the additional appendage herein described and set forth, for the purpose of adapting the same to be carried on the top of the fore-arm, and of keeping it in an upright position thereon. And this I claim whether said appendage be constructed in the particular form and manner set forth, or in any other manner whereby the same object is accomplished by substantially the same means.

PHILOS BLAKE.

No. 8651.—*Improvement in Ornamental Painting on Glass, &c.*

What I claim as my improvement in ornamenting surfaces, consists in combining with the process of painting and ornamenting by metallic foil, that of corrugating or crimping the foil so as to impart to the figure or figures a power of reflecting light, so as to produce the sparkling scintillated appearance, as specified.

JOHN W. BOWERS.

No. 8652.—*Improvement in Machines for Dressing Stone.*

What I claim as my invention, and desire to secure by letters patent, is making the upper surface of the ways elastic, substantially as described, in combination with the cutter carriage, constructed and operating in manner substantially as specified, and for the purpose described.

I also claim the manner, substantially as described, of mounting the stone carriage on wheeled axles, so that it can be elevated and depressed in combination with the feeding platform running on ways, substantially as described, so that the carriage can be run on wheels to bring stones to, and remove them from, the machine, and be let down on the platform to receive the feed motion, as described.

And, finally, I claim the dogs jointed to, and in combination with, the jointed arms, substantially as described, so that, by means of wedges or their equivalents, the block of stone can be adjusted and secured in place, as described.

ALBERT EAMES.

No. 8653.—*Improvement in the Shakers of Winnowing Machines.*

What I claim as my invention, and desire to secure by letters patent, is the method of moving the shaker fingers in the manner and for the purpose herein set forth.

HENRY FILBRUN.

No. 8654.—*Improved ornamental connexion of the parts of an Iron Fence.*

Having thus fully described my improvements in manufacturing fence, what I claim therein as new, and for which I desire letters patent, is connecting the parts of a wrought-iron fence to each other by casting iron ornaments upon them, for the purpose of ornamenting and fastening the parts together, substantially in the manner herein described.

HENRY JENKINS.

No. 8655.—*Improvements in Bevelling Planes.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The adjustable gauge bar, (D,) and the vertical adjustable guide, (C,) in combination with the double-faced plane-stock, all constructed and relatively arranged as herein described.

Second. The combination of the guard-screws, (E,) guard-stock, (F,) adjustable guard, (I,) gauge-bar, (D,) vertical guide, (C,) and plane-stock, (A;) the whole being constructed and arranged substantially in the manner and for the purpose herein set forth.

HARRISON W. LEWIS.

No. 8656.—*Improvement in Looms for Weaving Piled Fabrics.*

Having thus described my invention and improvement in the loom for weaving pile fabrics, I wish it to be understood that it is not my intention to claim the use of the figuring or pile wires upon which the loops or pile are raised. But what I do claim to have invented, and desire to secure by letters patent, is—

First. The employment on each side of the loom of a wing, constructed substantially as described, when mounted upon either end of the lay rock shaft, E, moving independent thereof, and of each other, and vibrating alternately with each other, in the arc of a circle scribed from the said rock shaft, F, and upon which are mounted the ways, I, of the pile or figuring wires, whereby the said wires are carried rearward

to be reinserted into the open shed, and thence forward to the last pick of the woof or weft, as described.

Second. I also claim causing the wings to recede to carry the wires to the open shed, and then advance frontward with the wire to the woven pile alternately by the action of the lay itself, each wing being locked to the lay, B, at the proper moment, and disengaged therefrom on the insertion of the wire by the action of the carved lever, *l*, as described.

Third. I likewise claim pivoting the ways, I, of each wing, and furnishing the inner ends thereof with arms, *s*, projecting into openings in the breast beam, C, whereby the ways, with the figuring wires, are made to maintain a horizontal position during the vibration of the wings in the arc of a circle, as described.

Fourth. I also claim providing each wing with a holding lever, Z^2, pivoted to the frame and vibrating with the motion of the wing, and locked by means of a spring plate, C^2, and pivoted arm, 5, actuated by the advance motion of the double arms, *i*, *i*, of the rock-shaft, *h*, when the wire is at rest in the warp, whereby the wing is retained steadily in its position until the withdrawal of the figuring wire.

Fifth. I also claim combining the intermediate sliding arm, O^2, horizontal rods, O^4, with the carrier, *n*, and wire, *w*, whereby the middle of the latter is sustained and prevented from trembling whilst being inserted and withdrawn from the web, as described.

CHARLES A. MAXFIELD.

No. 8657.—*Improvement in Machines for making Sugar Candy.*

What I claim as my invention, and desire to secure by letters patent, is making candy by machinery, substantially as set forth.

BARTHOLOMEW O'BRIEN.

No. 8658.—*Improvement in Apparatus for attaching pieces of metal to each other by Castings.*

What I claim as my invention, and desire to secure by letters patent, is the use of movable jaws attached to the permanent parts of the flask, for the purpose of holding the steel pivots or bearings of levers and beams of platform-scales, and other analogous articles, *firmly* in the *exact* position required for use, while the fused iron, or other metal, is being poured into the mould, so as to fix them securely in the lever, &c., and so that the movable jaws will readily yield to the shrinkage of the metal while cooling, and prevent any injury from straining any of the parts, when the whole is constructed, arranged, and fitted to operate, substantially as herein described.

HORATIO B. OSGOOD.

No. 8659.—*Improvement in Buckwheat Fans.*

What I claim as my invention, and desire to secure by letters patent, is the method of separating the hulls from the kernels of buckwheat by shaking them on a table or tables made slightly concave and rough, substantially as specified, in combination with a current or currents of air blown over the surface of such table or tables to carry off the hulls, whilst the kernels are retained or held back by the form of the surface of the table or tables, as specified.

ALFRED PLATT.

No. 8660.—*Improvement in Machinery for Punching Sheets of Metal.*

What I claim as my improvement is the combination of the hinged flaps, M, M, and their levers, N, N, restoring springs, and tripping studs, or equivalent mechanic contrivances, with the movable carrriage, F, and the punching cylinders or mechanism; the whole being arranged and made to operate substantially as herein-before specified.

SAMUEL T. SANFORD.

No. 8661.—*Improvement in Apparatus for Moulding in Flasks.*

Having thus fully described the parts, and combination of parts, and operation of the moulding machine, what I claim therein as my invention, is the making of moulds in sand by the alternate motion of a sifter; sliding knife to cut off the sand when the flask is filled; press and movable bed, connected with, and worked by, the continuous motion of a single shaft, substantially as described in this specification.

I do not claim the sifter or press as my invention.

I also claim as my invention the moving, stopping, and starting of the bed to and from the points where the operation of sifting, filling, and pressing the sand is done, by the continuous rotary motion of a single shaft, substantially as described in this specification.

I also claim the method of striking the surplus sand from the top of the flask after the curb is removed, by means of a self-adjusting bar or knife, substantially as described and set forth in this specification.

EDWARD SATTERLEE.

No. 8662.—*Improvement in Metallic Heddles.*

What I claim as my invention, and desire to secure by letters patent, is casting the eye on the wire which constitutes the heddle, harness, or heald, through which the warp passes, in the manner and for the purpose set forth, producing a heddle much superior to any other known or used, and which will remove many of the difficulties heretofore experienced in the use of the common twisted wire heddle.

JACOB SENNEFF.

No. 8663.—*Improvement in Turning Prisms, &c.*

What we claim as our invention, and desire to secure by letters patent, is the prismatic lathe herein described, consisting essentially of a rotating cutting instrument, whose cutters in rotating combine to describe a figure whose longitudinal sections are counterparts of the outline of the longitudinal sections of the figure to be produced, and of a carriage to hold the block in such a position that its axis is always parallel with that of the cutting instrument, and at the same time to move it transversely to the same for the purpose described, and allow it to be turned on its axis

at pleasure and to be held from turning while being acted upon by the cutters.

ALLEN SHERWOOD.
AVERY BABBITT.

No. 8664.—*Improvement in Machines for splitting Ratan.*

Having thus fully described my invention, I will now state what I claim as new, and desire to secure by letters patent.

I claim the employment, in combination with the cutters for splitting off the strand, of feed-rollers, or their equivalents, I, I, having grooves of the form of an angle or certain of the sides of a polygon, of which the edge or edges of the knife or knives form another side or other sides, substantially as and for the purpose herein described.

JOSEPH SAWYER.

No. 8665.—*Improved process of Mashing Maize.*

Now, what I claim as my invention and improvement in the brewing and distilling business, and desire to secure by letters patent, is the above specified preparation and boiling of the corn for brewing and distilling, boiling it to a jelly before the malt or rye is mashed into it, giving a much larger than the usual yield from cheaper material, by enabling me to use one-half to two-thirds corn for beer, ale, and porter, and to make nineteen quarts of whiskey from sixty pounds of corn, (including the usual quantity of malt only, and no rye,) and twenty-one quarts with rye, as specified.

FRED'K SEITZ.

No. 8666.—*Improvement in Planing Machines.*

Having thus fully described my invention, I would state that I am aware that the stocks and cutters of planing machines have been made to yield upon an axle, the centre of which is in line with the cutting edge of the knife. This I do not claim. But what I do claim, and desire to secure by letters patent, is hanging the stock at a line above the edge of the cutter to a spring or weighted lever in the manner described, in combination with the resting of the front part of the stock upon a fixed surface, so that when the back part of the stock is made to rise, the whole stock is thrown forward and upward, thus keeping the edge of the cutter at the same level, notwithstanding the change in its angle with the bed.

G. W. TOLHURST.

No. 8667.—*Improvement in Grain Harvesters.*

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is constructing the reel with hinged or jointed slats, having teeth projecting from them, whereby the grain is more effectually collected, raised, and drawn into the action of the cutters, substantially as described.

I also claim the combination of the teeth with the sliding platform, which teeth rise and fall at the desired time, alternately arresting and releasing the cut grain, whereby the reciprocating motion of the platform will keep the cut grain straight and constantly moving on the platform towards the trough, substantially as described.

THOS. VAN FOSSEN.

No. 8668.—*Improvement in Canal Locks.*

What I claim as my invention, and desire to secure by letters patent, is causing the weight of the descending boat to act as a supplying power to the higher level by the use of plungers or floats, (any number,) fitting in suitable chambers, provided with appropriate passages, and communicating with the higher and lower levels for operation, in the manner essentially as shown and described.

W. W. VIRDIN.

No. 8669.—*Improvement in Spring Mattresses.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the method herein described of securing the springs of spring mattresses to the frame and to each other, so as to leave the tops of the springs free to play or yield to any pressure, viz: by connecting them together by a riveted leather hinge, and allowing the longitudinal and cross pieces of the frame to pass through a slot in said leather hinges, the whole being combined and arranged in the manner and for the purpose set forth.

JOHN WATERS.

No. 8670.—*Improvement in Mill for grinding Quartz.*

Having thus described my mill for reducing gold quartz rocks to a powder or flour, what I claim as new, and desire to secure by letters patent, is the combination of the chilled hollow cylinder, R^2, and nut, S, of the form represented, and the grooved chilled rings, W, E^2, and horizontal circular channelled chilled ring plates, R, X, with the grooved concave, E, and runner, T_1 for breaking, pulverizing, and powdering gold quartz rock, the said chilled rings and plates being arranged and operating in the manner and for the purpose herein fully set forth.

H. BLASDELL.

No. 8671.—*Improvement in Churns.*

What I claim as my invention, and desire to secure by letters patent, is the application to dashers, for churns, of floats that shall close together at their appointed place when pressed downwards through the cream or milk through narrow spaces, and open again when raised from the bottom, claiming the right of composing the dasher of any materials, and in any combination of the above described parts, so as substantially to produce the same effects.

EDWIN B. CLEMENT.

No. 8672.—*Improvement in machines for Drilling Stone.*

Having thus described my improved drilling machine, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is—

First. Driving the drill forward and back by adjustable wheels, between the edges of which the drill shaft is placed, substantially as above described.

Second. I claim turning the drill by placing said wheels at an angle to each other, substantially as herein-above described.

Third. I claim feeding the drill forward, as the hole is deepened by making the bearing surface of the wheels which drive the drill in of greater length than that of the other wheels.

HENRY GOULDING.

No. 8673.—*Improvement in Washing Machines.*

Having thus fully described the nature, construction, and operation of my improved washing machine, what I claim therein as new, and desire to secure by letters patent, is—

1. The method of hanging and operating the plunger by means of the shackles, *(f, f,)* and the heavy counterpoise handle, *(d,)* as described.

JOHN McLAUGHLIN.

No. 8674.—*Improvement in Hand Printing Presses.*

What I claim as my invention, and want to secure by letters patent, is the tympan plate of a printing hand press, removable by hinges and counterbalanced, together with the manner of holding the tympan plate in its position, (when lowered down,) for the purpose of its resisting effectually the pressure exercised from below, substantially as described.

HENRY MOESER.

No. 8675.—*Improvement in Spinning Machinery.*

The principle of our invention is also applicable to the warp throstle frame, and it is intended to apply to the open or leg flier, whose driving whirl is situated below its legs, and in such a flier we do not claim to arrange the whirl below the nose of the flier.

But what we do claim as our improvement, is the arrangement of the whirl at the base of the flier, in combination with making the said whirl, and the bearing on which the whirl is placed and rotates, with a passage through them large enough to allow the bobbin to play within the same, and up and down between the flier legs, substantially in manner and for the purpose as specified.

OLIVER PEARL.
HENRY P. CHANDLER.

No. 8676.—*Improvement in Self-sharpening Grindstone.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a grindstone with a self-acting picker, by which the grindstone is sharpened by its motion or power, as herein described, or in any other manner, substantially the same.

JESSE PENNABECKER.

No. 8677.—*Improvement in Nail Machines.*

What I claim as my invention, and desire to secure by letters patent, in the making of wrought nails, is the employment of the cutter for cutting wedge-formed pieces from a previously rolled plate of equal, or nearly equal thickness, substantially as described, preparatory to, and in combination with the moulding dies, which receive the cut pieces by suitable conveying apparatus from the cutters, and mould them to the required form by pressure, substantially as specified, so as to give the form by spreading the metal between the dies instead of by elongation, as heretofore practised when making nails from cut blanks.

I also claim the vibrating cutter and the faces or dies for confining and compressing the nails arranged on both sides of the said cutter, substantially as described, when this is combined with the two stationary cutters, having a space between the two, through which the rod or plate of iron is fed, substantially as described.

S. G. REYNOLDS.

No. 8678.—*Improvement in Brick Kilns.*

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure letters patent, is forming air arches or openings in the kiln between the fire-beds, with lateral openings therein, through which a sufficient amount of air can be supplied equably to all parts of the fire-bed at the same time, substantially as herein described.

WILLIAM LINTON.

No. 8679.—*Improved cast and wrought metal Blind.*

I do not claim the combining cast and wrought iron; nor do I claim to be the first to have cast metal round cold metal and joining the same by that means. But what I do claim as new, and desire to secure by letters patent, is producing a new product or article of manufacture for shutters, doors, &c., whereby I am enabled to use wrought-iron slats, and prevent the contraction of the metal, in cooling, from warping the same by casting the top, centre, and bottom plates separate and distinct from the side plates, and running the side plates to the slats and plates, substantially as herein set forth.

ROBERT WHITE.

No. 8680.—*Improvement in Piano Forte Action.*

I therefore claim in the *upright or piccolo piano-forte action*, the arrangement of the back catch lever, L, in *front* of the back catch, and so that the rear side of the bearer shall operate in connexion with the front side of the back catch.

GEORGE BROWN.

No. 8681.—*Improvement in Sand Paper Holder.*

Having thus fully described my invention, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is the implement called the sand paper holder, constructed substantially as above described—that is, of two similar pieces of wood, with handles at the ends, the inner sides flat and the other sides rounded, joined together lengthwise by a hinge of cloth or leather, so that the flat sides can be brought together; the outer edges of the flat sides having small wire pins inserted in them, by which the sand-paper is held, and the two pieces being held together when closed by dowels in one of the flat sides entering corresponding holes in the other flat side.

AZEL H. COPELAND.

No. 8682.—*Improvement in Mill Spindles.*

Having thus fully described my invention, I claim—

First. Uniting the upper and lower parts of the spindle by means of the driving chuck or key, T, made substantially in the manner and for the purposes herein set forth.

Secondly. I do not claim the vibrating centre, L, separately; but I do claim it in combination with the driving chuck or key, T, and the method herein described of uniting the parts of the spindle.

EGBERT T. BUTLER.

No. 8683.—*Improvements in the Ring Spinner.*

What I claim as my invention, is the combination of the standard or projection, B, with the ring and traveller, substantially in manner and for the purpose of removing or loosening waste from the latter, as specified.

GEORGE H. DODGE.

No. 8684.—*Mechanism for operating the Relief Valve in partially condensing Engines.*

Having thus described the construction and operation of our invention, what we claim therein as new, and desire to secure by letters patent, is the arrangement and combination of the partial escape or relief valve, W^2, plate, Z, reciprocating lifting box, Y, connecting rod, I, crank lever, X, and rock shaft, T, whereby the said relief valve, W^2, is actuated simultaneously with the opening of either of the exhaust valves, and allowed to close again, as herein set forth.

WILLIAM FEW.
FRANCIS ARMSTRONG.

No. 8685.—*Improvement in Cooking Ranges*

Having thus described my improvement in cooking ranges, I shall state my claims as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is the combination of the pipes, arranged with fire spaces between them, with the hot air flues and diving flues of the brick work on the back and side of the oven, by which hot air is circulated through the oven and back again to the chamber about the fire-pot, and so on continuously; this hot air being used either for baking or for heating the apartments of the house.

Second. I claim the use of swing doors, arranged one on each side of the front of the fire pot, serving for radiating surfaces in connexion with said front of the fire pot for roasting purposes, and to admit the cold air when opened, as herein above described and set forth.

JOHN P. HAYES.

No. 8686.—*Improvement in Water Metres.*

What I claim as my invention, and desire to secure by letters patent, is combining with a cylindrical case, such as herein described, and provided with induction and eduction passages, and with a segmental stop and leather cap plate for packing, substantially as described, a series of hinged segmental pistons, hinged to arms projecting from a central shaft or hub, and hinged at about one-third of the distance from their inner ends, so that when thrown open their outer ends shall not bind against the inner periphery of the cylinder, and when closed to pass the segmental stop they shall be sustained by a rest projecting from the central shaft or its equivalent, having a space between them and the shaft and arms for the free flow of water or other fluid under the said pistons to admit of their closing freely; the whole being made and combined substantially in the manner and for the purpose specified.

SAMUEL HUSE.

No. 8687.—*Improved Nail-plate Feeder.*

What I claim as my invention, and wish to secure by letters patent, is—

First. The giving to the nail-plate an interrupted rotary motion, in the same direction, instead of the reciprocating partially rotating motion in opposite directions, usually given to said plate; and this I claim irrespective of the mechanical devices by which said motion is communicated.

Secondly. I claim the combination of the sectional cog-wheel, always moving in the same direction, with the cylindrical cog wheel, having irregular teeth working between guides, having a mouth piece, and with the springs and spring plate, or their equivalents, by means of which both an interrupted rotary and a rising and a falling motion is communicated to the nail plate.

Thirdly. I claim giving a continuous forward and an interrupted forward and backward motion to the nail plate, by means of the revolving shaft, screwed tube, cam, and guide pin, and nut, *w*, combined with each other substantially as herein described.

CALEB ISBISTER.

No. 8688.—*Improvement in Iron Railings.*

What I claim as my invention, and desire to secure by letters patent, is the method of constructing a self-adjusting and fastening fence, by forming the posts in two pieces, substantially such as herein described, making two sides of one part of the post, with mortises at the top and near the bottom for the reception of the rails and the other piece when in place, retaining them in position.

I claim the tongues, I, I, connecting the hollow cap, J, provided with a tongue, K, and groove, K, with the uprights or panels, *o*, *o*, said tongues passing between the rails, and with the cap, J, serving as a hook to sustain the uprights or panels.

BENJAMIN KRAFT.

No. 8689.—*Improvement in Railroad Switches.*

Having thus described the nature of my invention, what I claim, and desire to secure by letters patent, is placing the tumbler, figures 4 and 5, under the rails, L and K, in such a manner as to ease their movement, and when at rest operating as a brace or key to retain the rails in place.

ABRAHAM S. MILLER.

No. 8690.—*Improvements in Fire-Arms.*

Having thus described my improvement in fire-arms for loading at the breech, where the barrel is banded or secured to the stock, I wish it to be understood that I make no claim to being the original inventor of a fire arm or gun loaded at the breech, such as that patented in France to Mr. Tourrette, of Paris, on the 24th of November, 1834, described in "Brevets d'Invention, vol. 55," and in descriptions of other guns which are loaded at the breech, patented and unpatented; but what I do claim as new, and desire to secure by letters patent, is dividing the stock at the junction of the barrel and breech, and mounting the barrel, and that portion of the stock to which it is attached, with a sheath or case, upon a longitudinal bar or tongue projecting from the butt of the stock, as represented in the drawings, whereby the stock and barrel are allowed to have a movement from the breech for inserting the cartridge into the chamber thereof, and returned and locked by a catch to confine them together.

CHAS. V. NICKERSON.

No. 8691.—*Improvement in Shingle Machines.*

What I claim as my invention, and desire to secure by letters patent, is the application of the vibrating rod gauging the shingles. The shingle-blocks are laid on the bench, A, and are pressed against the vibrating rod, D, one end resting against the centre panel of the knife-sash, B; then, as the sash moves up and down, the shingles are cut off the block and finished at one stroke of the machine, while the block can be turned at leisure to suit the grain of the wood.

L. B. PARKER.

No. 8692.—*Improvements in Ships' Davits.*

I do not claim any of the separate parts themselves; but I do claim as new, and of my own invention, and desire to secure by letters patent of the United States, the application of the socket, *d*, on its hinge, 5, in combination with the socket, *c*, and davit, *e*, for the purposes and as described and shown.

CHARLES PERLEY.

No. 8693.—*Improvement in Neck-Yokes.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of the washers, C, the swivels, B or E, bolt, *a*, and nut, D, with the ordinary neck-yoke, arranged in the manner and for the purpose herein set forth.

JOHN P. PLATO.

No 8694.—*Improvement in Railroad Switches.*

I do not wish or intend to claim the placing or attaching of links, arms, or tumblers, under the switch rails or stay-bars, for the purpose of carrying them over; but what I do claim, and desire to secure by letters patent, is—

First. The attaching of the links or arms to the stay-bar or switch-rails and superstructure, for the purpose of holding the switch rails against the undue action of the levers, and securing them in a perfect and uniform motion when acted upon by the levers, also to act as a stay or lock which shall effectually hold and secure the switch rails in every position, substantially as set forth.

Second. I claim a combination of the pivoted levers, B and B[1], furnished with peculiar formed ways, A, with the operative shoe, *x*, so constructed and arranged that the switch-rails are moved upward, and laterally, in manner substantially as described.

IRA REYNOLDS.

No. 8695.—*Improvement in Windlasses.*

What I claim as my invention in the above described press, is winding the rope upon a screw with a concave score between the threads, that fits the rope and supports it in its proper form, thereby lessening the wear of the rope and its liability to be broken in the operation of pressing, when the said screw is made to work through a fixed nut so as to always draw the rope in the same position, substantially as described.

A. C. SEMPLE.

No. 8696.—*Improvement in Shears.*

What I claim as my invention, and desire to secure by letters patent, is making the pivot and the hole in one or both limbs in which it fits of such form, as exemplified at O, as to cause the edges of the blades to be drawn together sideways by the power applied in cutting, as herein fully set forth.

JNO. C. SYMMES.

No. 8697.—*Improvement in File-Cutting Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The travelling and revolving elongated elliptical cam, I, in combination with the connecting rod, I^2, or its equivalent, communicating a varying amount of motion to the rock shaft, which motion is conveyed, through suitable mechanism, substantially such as is described, to the screw, by means of which a varying rate of travel is communicated to the chisel.

Second. The inclined plane, or its equivalent, in combination with the jointed chisel stock, or its equivalent, pressed against said plane by the spring, E^2, or its equivalent, substantially as described.

Third. The springs, or their equivalents, to press the axis of the stock into the scores in the sliding bar.

Fourth. The springs, or slide and springs, whether used separately or combined, to press the cross against the pillars, so that the file may remain upon the bed in that position in which it is placed by one stroke of the chisel until it is struck again, thereby dispensing with the roller heretofore used to press the file against the bed.

JAMES H. THOMPSON.

No. 8698.—*Improvements in Machines for making and sizing Paper.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The application of the endless wire web in combination with, and passing round, the cylinder, and taking the pulp up from the vat and carrying it forward, and submitting it to the action of the dandy roller and pneumatic trough, taking the place of the fixed wire web and endless felt in the cylinder machines now in use, and the wire web upon which the pulp flows in the above mentioned Fourdrinier's machines. I am aware that a somewhat similar combination is found in Millburn's machine, reported in the Repertory of Patent Inventions, 5th series, vol. 9, page 325, dispensing with the cylinder, D; but that I do not claim.

Second. I claim the method of passing the paper through a trough of size between two endless felts or other fabrics, as above described, thereby obtaining a perfect and uniform saturation of the paper, and protecting the paper from all injury during the process of sizing and pressing.

GEORGE WILLIAM TURNER.

No. 8699.—*Improvement in Burglar Alarms*

We do not claim the clock movement, as that is a well known and old invention; neither do we claim the lever, K, for the purpose of operating upon the pallet, F^1. But what we do claim as new, and desire to secure by letters patent, is the securing of the lever, K, after it has been moved by the button, M, so as to allow the pallets, F, F^1, to be acted upon by the escape-wheel, D; said lever, K, being secured by the end (*m*) of the lever, N, fitting in a groove or recess (*o*) in the end (*j*) of the lever, K, the end (*m*) being forced into the groove or recess (*o*) by the spring, (*n*,) substantially as shown and described.

L. J. WORDEN.
E. H. SPACE.

No. 8700.—*Improvement in Hemp Brakes.*

What I claim as my invention, and desire to secure by letters patent, is making two or more breaking and cleaning cylinders with fixed rods at or near their peripheries, and radial plates made to slide radially, (or some of them fixed,) operated substantially as herein described, in the spaces between the rods, substantially as described—the two or more cylinders being geared together so as to turn with equal velocities, and so placed that in their rotation the rods and plates of one cylinder shall come opposite to those of the other cylinder, for the purpose and in the manner substantially as set forth.

And I also claim the combination of springs, substantially as described, with the sliding plates of the cylinder or cylinders, operated substantially as herein described, for the purpose of rendering the plates self adapting to the material introduced, and to insure its being properly griped and held, so as to admit of slipping without undue strain on the fibres, as described.

LEWIS S. CHICHESTER.

No. 8701.—*Improvement in Grass Burners.*

What I claim as my invention, and desire to secure by letters patent, is the application to the surface of the ground of flame for agricultural purposes, using for that purpose the above described machine, or any other substantially the same, which will, by heat, produce the intended effect.

JNO. A. CRAIG.

No. 8702.—*Improvement in Feeders for Planing-Mills.*

What I claim, and desire to secure by letters patent, is my above-described combination of a bed-piece with the springs, lever, connecting rod, arm, tumbler, and clicks, and its grooves, guides, and rack, with a movable platform, with the adjusting levers and ratchets for the production of a lateral traverse and lost motion, with its adjustable table, adjusted by springs, weights, screws, or other known means, with its head-wheels, rollers, vertical ratchets, and balance clicks, and of a frame with its pulley and half wheel for the purpose of delivering or receiving material thereon; the whole being constructed, combined, and operating as above set forth and described, and for the purposes mentioned.

JOHN CUMBERLAND.

No. 8703.—*Improvement in Street-Sewers.*

Having thus described the nature of my invention, and the manner in which it operates, what I claim as new, and desire to secure by letters patent, is the combination of the basin, C, placed at the bottom of the inclined drain, B, and at the side of the sewer, with a single man-hole so placed as to give access to both the basin and sewer.

WILLARD DAY.

No. 8704.—*Improved Door Spring.*

We do not claim the straight piece of steel for a spring as new; neither do we claim having the spring act most powerful when the door is closed

as new. What we do claim as new, and our invention or improvement, and desire to secure by letters patent, is the application and mechanical arrangement of a curve in connexion and combination with a spring and rollers, for the purpose of a door-spring, where power will be exerted more strongly when the door is closed than when open entirely or partially, as herein described.

HENRY HOCHSTRASSER.
ABRAHAM MASSON.

No. 8705.—*Improvement in Gas Purifying Apparatus.*

What I claim as my invention, and desire to secure by letters patent, is purifying the gas by passing it through a mixture of equal measures of quick lime and of animal charcoal, in the same retort in which the gas is generated, but at a temperature so regulated that at the lowest point, or where the gas enters the composition, the mass is at a low red heat, and at the top, or where it leaves the composition, the heat is below redness, substantially in the manner herein set forth.

ABRAM LONGBOTTOM.

No. 8706.—*Improved method of keeping the Valves of Oscillating Engines upon their Seats.*

What I desire to secure by letters patent is: I claim the pressure plugs, 5, or their equivalents, acting against the caps, *g*, or their equivalents, in combination with the steam chest, G, valve, e^1, and valve seat or seats, *e*, vibrating with the steam cylinder; said plugs, 5, operating to keep the valve or valves on the seat or seats of the same, as described and shown.

EPH'M MORRIS.

No. 8707.—*Improvement in Axletree Arms.*

What I claim as my invention, and desire to secure by letters patent, is constructing metallic arms for axletrees with sockets and ribs, as herein set forth, so that the arm can be attached to the wooden stock or body of the axletree without the employment of the hoops, clips, and screw-bolts heretofore employed, even when the stock is as small as, or of less diameter than, the arm.

DAVID PHILIPS.

No. 8708.—*Improvement in Concentrated Beer Material.*

What I claim as my invention, and desire to secure by letters patent, is the new and useful preparation of matter herein described, termed "Zeilithoid."

FRANZ G. REITSCH.

No. 8709.—*Improvement in Ships' Blocks.*

What we claim as our invention, and desire to secure by letters patent, is the method of making ships' blocks, by placing the metal straps edge-

wise—that is, with its greatest breadth in the direction of the plane of the axis of the sheaves, and extending from the sides of the sheave to the outside of the cheeks, substantially as specified—when this is combined with the attachment of the cheeks, in segments, to the wide faces of the straps, substantially as specified.

And we also claim making the cheeks of ships' blocks in segments of a ring, substantially as specified, whereby the elongated form is obtained by simply turning in a common lathe, whilst apertures are left each side of the straps to give admission for cleaning and oiling, and for checking or stopping the sheave, as fully set forth above.

WILLIAM COLEMAN.
STEPHEN G. COLEMAN.

No. 8710.—*Improvement in Running Gear of Railroad Cars.*

I do not claim the grooved inclined wheels, J, J, fitting to the rails in the manner described; but what I do claim as my invention, and desire to secure by letters patent, is the lower truck or frame, G, G, H, H, supported upon the rails, and prevented from rising by grooved inclined wheels, J, J, J, J, fitting to the edge of the rails, and connected to the trucks and body of the car by series of links and rods, substantially such as are herein described and represented by O, P, P, M, M, N, N, K, K, and Q, S, S, R, R, T, T, operating for the purpose set forth.

And I also claim the forked guards, V, provided with elastic bands, *l*, *l*, and attached to the lower truck, G, G, H, H, so as to move up and down freely, but formed so as to take a firm bearing or rest on the front axle, or any stationary part of the front truck, when brought into contact with any obstruction, substantially as and for the purpose herein set forth.

HENRY DAVIS TAYLOR.

No. 8711.—*Improvement in Running Gear of Carriages.*

Having thus fully described my improved running gear for four-wheeled carriages, and the advantages attained by the same over all others, when the object is to turn in as small a space as possible, without running the fore wheels under the body of the carriage, what I claim as new therein, and desire to secure by letters patent, is the combination of the segment plate, *c*, and the perch, *e*, sliding therein, and connected with the axles as described, with the segment plate, *h*, forming a part of the perch, *e*, and the plate, *i*, attached to the perch-block of the body, and sliding on the plate, *h*, in connexion with the rods, *a*, *a*, by which the other parts are regulated and governed in their action, constituting an arrangement of running gear, constructed substantially as in the manner herein fully set forth and represented.

C. F. VERLEGER.

No. 8712.—*Improved Steering Apparatus.*

Having thus described my improved steering apparatus, what I claim therein as new, and desire to secure by letters patent, is the combination of fast and moving circular racks of different diameters, with correspond-

ing planet-wheels or pinions, connected together and actuated by the hand-wheel, as herein set forth.

NORMAN W. WHEELER.

No. 8713.—*Improvement in Bridges.*

Having thus described the whole construction of the bridge, I wish it to be understood that I do not claim *separately* as new the mode of constructing the stringers, by splicing and securing planks in the manner set forth and shown; nor yet do I claim separately the use of diagonal planking crossed in layers, as described; nor yet again do I claim by itself increasing the width of the roadway and other parts of the bridge at the ends; neither the *mere* employment of side guards or braces; as all these, or similar devices or applications, belong to common carpentry, or ordinary bridge building: they, however, are necessary details, or contain principles essential to the construction of my bridge, involving a combination having the effects and advantages specified. But what I do claim as my invention, and desire to secure by letters patent, is—

First. The *combination* of parts constructed and arranged as *described* in formation of a *wooden tubular suspension bridge;* that is, the several suspension stringers, D, D, of catenary form, and constructed and united in pieces, as explained, (the outer ends of the extreme stringers being locked, as represented in the back stays;) the stringers, H, H, and I, for construction thereto or thereon of the inclined roof made of diagonal planking; the roadway stringers, G, G, connected by suspension rods to D, D, and H, H; the direct arch, M, united by suspension rods, and further direct arch, N, bearing under the upper stringers, together with the transverse floor timbers and roadway; the bridge, thus constituted, being formed—that is its stringers, arches, and coverings—of short pieces of wood, united, and having their fibres running in appropriate directions, as shown; and the bridge being in form wider at its extremities, gradually narrowing towards the centre, by which combination and arrangement of parts, the tensile strength of the wood in the suspension stringers is fully employed, vertical and lateral vibration are reduced, the roof more than assists towards the support of its own weight, and the bridge may be extended over a considerable span.

Second. The *continuous* angular side guards, formed by fender raves, P P, inclined rafters, Q, Q, diagonal plank covering, R, R, and extensions of the transverse roadway timbers, O, O; the said side guards projecting most, and being of greatest extent, at the extremities of the bridge, gradually diminishing towards the centre; and the specified side guards serving not only as braces to reduce lateral motion, but as a covered roadway, and to break the effect of wind upon the structure.

AMMI WHITE.

No. 8714.—*Improvement in Shoe Brushes.*

I therefore claim as my invention the brush as constructed substantially as represented in figure 2, and as above described; that is to say, with its polishing and blacking bristles arranged essentially as exhibited in the said figure, and as above explained.

J. J. ADAMS.

No. 8715.—*Improvement in Watch-chain Swivels.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The making swivels with a *central* spring to operate at *both* its ends against the knuckles of the joints, and for closing the openings, substantially as described.

Second. In combination with the swivel so made, I claim the swivel joint, made substantially as described.

SAMUEL Y. D. ARROWSMITH.

No. 8716.—*Hose Coupling.*

I do not claim as my invention the clasp in its general form, or as made to spring, and used with a screw. I claim, and desire to secure by letters patent, the clasp of the *particular* form above described, having a part of one or *both ends* extended beyond both places of fastening, so as to extend the contracting pressure directly around the entire circumference of an inserted tube, [see drawing, fig. 1st, letter *a*,] which *extension* I claim as a new and useful improvement on all clasps or bands used for coupling hose with which I am acquainted.

ALBIGENCE W. CARY.

No. 8717.—*Improvement in Horse-power.*

Having thus described my improved horse-power, what I claim therein as especially new, and for which I solicit letters patent, is the method of regulating the motion by means of a brake, worked by a governor, constructed substantially as herein described, so as to operate the brake with a force which increases with the velocity of the machine, until the motion is checked, and then instantly release the brake, so that no unnecessary labor may be imposed upon the animals when working at the proper speed.

MARTIN HARRIS CORNELL.

No. 8718.—*Improvement in Mills for Grinding Quartz.*

What I claim as my invention, and desire to secure by letters patent, is the crushing and grinding mill herein described, consisting of a trough and one or more rotating wheels, the acting surfaces of both the wheels and trough being formed as herein set forth, so that the former will run in the latter without tendency to run over its edges, except as it may be influenced by centrifugal force.

I also claim the combination of a double-ridged wheel-rim with a trough of corresponding form, whereby the lumps of quartz, or other substance being ground, are grasped by the wheel in its rolling between the angular groove or furrow contained between the two ridges, and, being thus prevented from escaping laterally, are crushed upon the ridge of the trough, with much less force, and greater effect, than if the angular action of the ridges was counteracted by the embedding of the lumps to be crushed among smaller granular and pulverized particles, which is always the case when the concave or inner angle is below, and the convex or

outer angle above, which is the converse of the combination to which this claim refers.

I likewise claim the method of constructing the wheels of a crushing and grinding mill of removable sections, substantially in the manner and for the purpose herein set forth.

SMITH CRAM.

No. 8719.—*Improved method of Preventing Collisions on Railroads.*

What I claim as new and original, and desire to secure by letters patent, is the application of a sound gatherer, with an ear piece, to a locomotive engine, or train of cars, arranged substantially as above described; so that the engineer, or another, can ascertain by sound the approach of a locomotive or train in time to prevent collision.

THOS. A. DAVIS.

No. 8720.—*Improvement in Grain Harvesters.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combination of the grooved cam, M, and reciprocating lever, K, so arranged with each other as to give to the rake, while in the act of clearing the platform of grain, an increased rapidity of motion, as compared with its backward movement.

Second. Controlling the motion of the rake by means of the combined action of the band, I, ratchet, *i*, and lever, R, as set forth.

Third. The arrangement of the double eccentric, U, for equalizing the power of the spring, *m*, on the lever, K, in the manner described.

Fourth. Forming supports for the vibrating blade or sickle by the plates, *f*, *f*, *f*, in sections separate from the fingers, to prevent choking, as described and represented.

BYRON DENSMORE.

No. 8721.—*Improvement in Shovel Ploughs.*

Having now described my invention, I will state what I claim and desire to secure by letters patent. What I claim, therefore, is the use of the fulcrum pin, *d*, and adjusting arrangement of the pin, e^2, in combination with the beam and stock of a plough, for the purpose of regulating the dip of the plough-share, substantially as set forth.

JAMES H. FORMAN.

No. 8722.—*Improvement in Railroad Switches.*

I claim the system of levers, lock bolt, and springs arranged substantially as herein described, in such manner that the switches are always locked securely in the proper position for the direct passage of a train along the main track, unless intentionally unlocked and shifted as described, and, when shifted, are automatically returned to their position in the line of the main track and locked there as soon as the force by which they were shifted is withdrawn.

In combination with the above, I claim the system of jointed levers, wedge-blocks, sliding-bar dogs, dog-lever, and hook-ended bar, or their equivalents, acting substantially as herein described, in such manner that the switch is shifted automatically to permit a train to pass from a branch of the main track, and is maintained in such position until the last car has passed off it, when it returns automatically to restore the continuity of the main track.

AMOS HODGE.

No. 8723.—*Improvement in Portable Shower Baths.*

Having now described my invention and its operation, I will proceed to state what I claim and desire to secure by letters patent:

What I claim, therefore, is the use of the box or tub for a portable shower-bath, made in two halves, in combination with the slide, C, leaves, D, D, &c., and slides, G, G, &c., substantially as set forth.

FERDINAND HOLM.

No. 8724.—*Improvement in Grain Harvesters.*

Having thus fully described my improvement, what I claim therein as new, and desire to secure by letters patent, is—

First. Sustaining the rack piece, D, in the manner set forth, by projecting a beam, C, from the frame above the grass and behind it, to which it is connected by the rods, E, as herein fully set forth.

And in combination therewith, I claim the shield plate, G, in connexion with the beam, C, for sustaining the rack piece, D, substantially in the manner and for the purpose above described.

WILLIAM F. KETCHUM.

No. 8725.—*Improvement in Apparatus for Regulating and Measuring the Flow of Gas.*

Having fully described my invention, I will proceed to state what I claim as new, and desire to secure by letters patent: I do not claim the indicating apparatus for showing the quantity of gas or fluid consumed in a given time; nor do I confine myself to the use of any particular mode of indicating it, as it may be performed in various ways; neither do I confine myself to the peculiar form of clock movement or mechanism for giving motion to the disk, F. But what I do claim is—

First. The employment, for the purpose of registering the flow of gases and fluids through an aperture, of a disk, F, receiving a constant rotary motion at a uniform speed, and giving motion to a wheel, J, in connexion with the indicating apparatus and the cock, B, or its equivalent, in the manner herein described, to wit: the wheel, J, being moved farther from or nearer to the centre of the disk, as the cock is opened or closed, so as to govern the speed of the wheel, and, consequently, the indicators, according to the area of the passage through which the gases or fluids are passing.

Second. The manner of stopping the clock movement when the cock or faucet is shut by the arm, *q*, on the spindle, O, being operated by the wheel, J, and the lever, *p*, substantially as herein shown.

Third. The manner of closing the valve, D, and shutting off the gas or fluid, when the clock is run down, by an arm, S, and spindle, *r*,

operated by a spring, *t*, and held back by a lever, U, stopped by suitable catches, and released by the unwinding of the main spring, substantially in the manner herein specified.

W. B. LEONARD.

No. 8726.—*Improvement in Governors.*

What I claim as new, and desire to secure by letters patent, is an incline, or inclines, between a hub and cylinder on a shaft, in combination with a resisting spring, or its equivalent, whereby the motion of the parts due to the compression of the spring, or its equivalent, by the inclines, produces motion to regulate the power in proportion to the resistance as described.

EPH'M. MORRIS.

No. 8727.—*Improvements in Quartz Crusher.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is in combination with a cylinder containing the quartz, &c., and rotating in one direction, for the purpose of loosening up the material to be ground or crushed, the curved arms arranged upon a shaft therein, rotating in a contrary direction, for the purpose of catching, carrying up, and throwing over the balls by which said material is ground or crushed; the whole being arranged and combined in the manner and for the purpose herein fully set forth.

JAMES H. SWETT.

No. 8728.—*Improvement in Seed Planters.*

I do not claim, *exclusively*, causing the distributing wheel (constructed with cogs or teeth as described) to enter the body of the hopper, as such has already been done. But what I do claim as my invention, and desire to secure by letters patent, is the employment of a slide, D, or its equivalent, through which the distributing wheel works, and that, by being movable, operates to avoid friction of the wheel upon the sides of the aperture, (communicating with the hopper,) as liable to be produced by the play of the shaft upon which the distributing wheel, C, is hung, essentially as herein represented and specified.

EDWARD WICKS.

No. 8729.—*Improvement in processes for Dissolving Gold.*

What I claim now as my invention, and desire to secure by letters patent, is the separating of gold from its ores, sands, or mixtures, in suitable apparatus, by the use of free chlorine gas, when absorbed by water alone, or by water in combination with an alkali or an alkaline, earthy or metallic chloride, containing an excess of chlorine, as set forth in the specification.

CHARLES F. SPICKER.

No. 8730.—*Improvement in Railroad Car Brakes.*

Having thus fully described the nature of my invention, and the construction and operation of its parts, what I claim as my invention, and desire to secure by letters patent, is the fixed and sliding rubbers upon the adjacent axles of a railroad car, in combination with the intermediate cog-wheels, the whole arranged and operating substantially as herein set forth.

BIRDSILL HOLLY.

No. 8731.—*Improvement in Excavating and Dredging Machines.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. So arranging the frame upon which the endless chain carrying the ploughs and buckets is supported and carried, as to allow said ploughs and buckets to work outside of the line of said frame, and thereby to sink to any desired depth without liability of the frame resting upon the bank to be removed, and limiting the depth to which the cutters may sink, as herein described.

Second. I claim so connecting the machinery for raising and lowering the frames carrying the ploughs and buckets with the driving power of the machine, that the buckets may be lowered automatically in such proportion to the motions of the other parts of the machine as the character of the bottom to be excavated may demand, in manner and for the purpose substantially as described.

CALVIN WILLEY, Jr.

No. 8732.—*Improvement in construction of Grate Bars for Furnaces.*

Having thus described my improvement in the construction of bars of grates of furnaces, and the manner of arranging them, and the effect produced by the use of the same, what I claim as new and of my invention, and desire to secure by letters patent, is the form and construction of the grate bars for furnaces, having jogs, *a*, in the blade of the bar, A, extending from the lower line or edge of the bar up to the level of the lower line, C, of the extension through the fire front; thereby securing the advantage of having said grate bars held permanently in their required position by the said jogs touching each other, and at the same time leaving all that section of the openings above the jogs free for the admission of a poker between the bars to remove any solid matter produced from the combustion of the fuel.

FRANCIS ARMSTRONG.

No. 8733.—*Improvement in Pumps.*

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the two barrels, A and B, and the pistons, E and F, in such a manner that the water shall flow *down* through the lower barrel and *up* through the upper barrel, thereby enabling one piston to act in *descending*, and the other in *ascending*, for

the purpose of producing a constant flow of water, substantially in the manner herein described.

I also claim the peculiar construction of the lower piston, F, by which its valve allows the water to pass downward, and closes by its own weight, either with or without magnetizing, substantially in the manner and for the purpose herein described.

ABEL BARKER.

No. 8734.—*Improvement in Explosive Composition for Blasting Rocks.*

What I claim as my invention, and desire to secure by letters patent, is the explosive compound herein described; but I would have it understood that some of the materials mentioned as component parts in my improved explosive compound have been used before by pyrotechnists and others in the manufacture of various fireworks, and that as regards such use, I do not claim anything in my invention except so far as regards the combination I have given and for the purposes also mentioned.

The shape and material of the cartridge cases have nothing to do with my invention, they being optional with the party using them. I have only given drawings of and described what I have found to be the most convenient for the purpose.

EDWARD CALLOW.

No. 8735.—*Improvement in Fences.*

What I claim as my invention, and desire to secure by letters patent, is the construction of the posts in pairs, and their combination with the rails in such a manner as to render the fence strong and firm, by balancing the weight of the fence by its construction, as herein above described, upon each side, equally, of the centre of each pair of the posts, and securing at the same time the advantages of a straight fence, and of posts standing upon the surface and secured from decay.

I do not claim as my invention the construction of the posts, as herein above described, either singly or in pairs, but the combination of the advantages above mentioned, as substantially described in the specification, and as above claimed by me.

JOHN CARD.

No. 8736.—*Improvement in Railroad Gates.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the method herein described for balancing a railroad or other gate, viz: by means of a spring coiled around a stationary axis, to which it is attached by one end, the other end being attached to the disk, which forms the hub or centre of the gate turning on said axis, substantially as herein described.

I also claim the use of the rock shaft, E, provided with the cam ledges, C, and straight ledge, K, to be operated upon by the wheels of the passing train, and the cams, *i*, *d*, for winding up the chains which draw up the gate; the whole being arranged in the manner and for the purpose heren substantially set forth and shown.

EGBERT P. CARTER.

No. 8737.—*Improvement in Machinery for making Chains.*

Having thus described the construction and operation of my machine for making chains, I wish to be understood that I do not claim to be the original inventor of "the combination of the parts, movements, and operations, in one machine, which are required to make jack chains, by one process, from straight wire after it is cut off in suitable lengths to the finished chain;" nor do I claim "the stud pin with a recess in it as a mandrel, around which the bow of a link is bent, while the bow of another link is held in the recess, thereby forming a continuous chain;" nor do I claim "a partly revolving mandrel with a stud pin and nipper, and other appendages for bending the last bow of each link, as combined, used, and constituting part of a machine" already patented. But what I do claim as new and of my own invention, and desire to secure by letters patent, is—

First. The combination of the welding dies, R, R^1, with the swage, N, for welding or uniting the lapped ends of the link, and dropping the latter upon the suspending arm, S, the advance of the die, R, moving the link to the face of the swage, where the operation of welding is performed.

Second. Attaching the vibrating arm, S^1, to the bed w^2, of the die, R^1, and operating the same in such manner as to receive the finished link, and suspend the same in a position to be seated.

Third. The combination of the slide bar, V, turning lever, W, and cross bar, g^2, constructed and arranged as described and represented—the said bar, V, and lever, W, operating to turn and push the finished link into its seat.

Fourth. The link seat, C, attached to the lever, *j*, beneath the swage, N, for receiving the finished link from the suspending arm, S^1, and holding the same until the wire or rod for the succeeding link is fed into the finished link, cut off, bent, and ready to be welded.

Fifth. The employment of the curved holding lever, Z, attached to the lever, *j*, in combination with the pendant cam bars, 4 and 5, short pendant arm, 9, arm, Y, pin, 3, and spring bar, X, constructed, arranged, and operating as described, whereby the finished link is held in its seat and liberated therefrom simultaneously with the advance of the die, R, to finish the succeeding link.

Sixth. The combination of the spring bar, X, with the shear cutter, L, whereby the pendant cam bars, 4 and 5, are actuated through the pin, 3, and spring, 8, 8, to hold or relieve the arm, Z, from the seated link, as described and shown in the drawings.

Finally. I claim making the grooves, *b*, *b*, in the bed dies, J, J^1, slightly oblique to their faces, for the purpose of canting the ends of the rod or wire, so as to allow them to lap when bent by the levers, P, P, as described.

JOHN M. CRAWFORD.

No. 8738.—*Improvement in Bran Dusters.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of my improvement in flour-bolting and bran-dusting machines, what I claim therein as new, and desire to secure by letters patent, are—

First. The arrangement of the vanes in the blast cylinder, substan-

tially as described in the specification, and illustrated by the diagram, fig. 6, whereby I attain a free escape for the blast, and effectually prevent the accumulation of flour within the blast cylinder, and thus keep the cylinder truly balanced on its shaft or axis.

Second. The insertion of vertical rows of beaters on each rib of the bolting cylinder, and on the vanes (No. 2) of the blast cylinder, from top to bottom, for the purpose of beating the offal at each successive rib and vane, and preparatory to each jet of blast, substantially as described.

LEWIS FAGAN.

No. 8739.—*Improvement in Bran Dusters.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement and combination of the several parts of a bolt or bran-duster, in such manner that the draught generated by the rotation of the beaters within the bolting screen shall act as a conveyor or elevator for the purpose of transferring the bran or meal from any portion of the mill to the bolting or dusting apparatus, and shall at the same time cool the bran or meal thus conveyed.

I also claim the scouring apparatus herein described, consisting of a series of pairs of toothed disks, arranged in vertical order above each other, at such distances apart as will admit of the free passage of the meal or bran between them alternately from the centre to the periphery between the disks of each pair, and from the periphery to the centre between the pairs of disks.

I likewise claim the method herein described of shielding the current of mixed air and meal or bran from the centrifugal action of the revolving disks by means of stationary diaphragms, arranged as herein set forth.

ABEL HILDRETH.

No. 8740.—*Improvement in Stop-Motions of Looms.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The forked lever, *g*, and spring, *m*, constructed and arranged substantially as herein described, in combination with the grid (or pins, *i*, *i*, *i*,) and slide, *b*, to release the slide when the weft is properly drawn across the grid, and to traverse it to stop the loom when the shuttle ceases to draw the weft across said grid.

Second. The spring, *q*, or its equivalent, to stop the prongs of the lever, *g*, and raise the catch, *n*, so as not to stop the loom when the shuttle is in the box at the opposite end; the parts being arranged substantially as herein described.

LORA B. HOIT.

No. 8741.—*Metre for Steam Boilers.*

I do not claim the special use of a plunger, piston or pistons, poppet valves, or well known cocks, the same being long known and used; but what I do claim as my invention, and desire to secure by letters patent, in constituting a new and useful improvement in the construction and operation of a fluid metre, is the means herein set forth for maintaining the feed to the boiler, &c, and the closing or cutting off the communication to and from the metre in case of accident, or from other causes, arranged and operating for the purpose and with the intent substantially as described.

WILLIAM HENRY LINDSAY.

No. 8742.—*Improvement in Steam-Boilers.*

Having thus described my improvements in locomotive boilers, what I claim therein as new, and desire to secure by letters patent, is the contracted grate in the fire box, in combination with a supplementary chamber of combustion, supplied with air, and situated at a point intermediate between the fire box and smoke box, which is connected with the former and the latter by flues, in the manner substantially as herein described.

JAMES MILLHOLLAND.

No. 8743.—*Improvement in Grain and Grass Harvesters.*

What I claim as my invention, and desire to secure by letters patent, is the manner of placing the toggle-joint purchase, fig. 4, (with the transverse acting joint, Y,) upon the end of the cutter arm, fig. 3, to act in conjunction with the other machinery, giving it, as it were, a double purchase by hanging the sweep so that the arm of the crank will be horizontal or parallel with the toggle-joint when straight, and giving the cutters its double motion by acting above and below this line. When the crank or hand, O, is up, the purchase is at the upper end of the sweep; when half way down, it is at the lower end or joint, varying like a circular or screw power.

ROBERT T. OSGOOD.

No. 8744.—*Improvement in Feeding Apparatus for a Grain Thresher.*

What I claim as my invention, and desire to secure by letters patent, is the method herein described of preventing accidents to the feeder of a threshing machine by interposing between him and the cylinder a roller, or the equivalent thereof, which is arranged across the throat of the machine, and is supported and guided substantially in the manner and for the purposes herein set forth.

WM. R. PALMER.

No. 8745.—*Improvement in Banding Pulleys.*

What I claim as new, and desire to secure by letters patent, is so arranging the driving pulley B in reference to pulleys E and F, that the band passing over these pulleys is not only pressed with any desired force against the periphery of the driver, B, but is also pinched between the pulleys B E and B F, they operating upon the band as feed-rollers, substantially in the manner herein described.

ROB'T W. PARKER.

No. 8746.—*Improvement in Capstans.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the following mechanical elements, viz: the vibra-

ting tumblers acted upon by hand spikes; the slide, D, with its racks; the cog-wheels, P and Q, the former formed also with the ratchet teeth; the ratchet wheel, G, and its hollow shaft; the pawls, M and N; the whole arranged within the base, B, and with respect to each other, and acting substantially as described.

PETER ROBERTS.

No. 8747.—*Improvement in Rotary Cultivators.*

What I do claim as my invention, and desire to secure by letters patent, is the construction of the teeth on the main or driving wheels of a chisel-formed bevel—that is to say, one face being a continuation of the line or plane of the radius of said wheel, while the other face is bevelled to meet it at an angle somewhat less than forty-five degrees, for the purpose of striking into and taking a firm hold of the ground, in the manner and for the purpose set forth.

PLEASANT E. ROYSE.

No. 8748.—*Improvement in Weighing Machines.*

What we claim as our invention, and desire to secure by letters patent, is the employment of the method or methods of securing the lever or levers connected with the platform by means of a stop or brake to hold the platform, substantially as described, when this is combined with the pendulous scale or balance, and the apparatus for registering the extent of motion of the said pendulous scale or balance, substantially as specified; by means of which combination we are enabled to register accurately the weight of bodies that roll, or slide, or are thrown on to the platform, and prevent the apparatus from registering, in addition to the actual weight, the momentum of the descending weight of the body to be weighed.

And, also, we claim the employment of the mechanism which registers the number of weighings, substantially as specified, when this is combined with the pendulous balance, or its equivalent, and its register for registering the sum of the weights weighed by the pendulous balance, substantially as described; whereby an accurate register is kept not only of the number of articles which have been weighed, but also of the whole weight of what has been weighed, as it is often important to ascertain not only the sum of the things weighed, but also the number of articles which make up that sum.

WM. SCHNEBLY.
THOS. SCHNEBLY.

No. 8749.—*Improvement in Spoons for administering Medicines.*

What I claim as my invention, and desire to secure by letters patent, is the particular construction of my spoon, with a sliding bottom, and a piston slide exactly fitting the cavity of the spoon, and the sliding-rod so arranged that it may be slid in at the same moment that the slide tongue or bottom is drawn out, thereby quickly emptying the spoon of its contents.

I do not claim that my spoon should be a graduating or measuring spoon, but merely for administering medicines already graduated by the physician.

I claim, also, that my spoon will secure, from its arrangement, the advantage of preserving the teeth, and administering all the medicines graduated by the physician—a difficulty often experienced in treating children.

J. C. TAYLOR.

No. 8750.—*Improvement in Knitting Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Releasing the hanging plates, *k*, from the lever, Q^1, by the inclined projections, 5, as they are drawn up, so as to let the uprights, *m*, and lever, U, raise the locking bar.

Second. The combination of the catch, *n*, (fastened to the upright, *m*,) spring, V^2, lever, U, operated by the groove, E, in the cam, to raise the locking bar, so as to allow the slur to operate and depress the sinkers, to divide the loops and form the stitches, and to raise the lever, Q^1, so as to be caught by the lip, 4, upon the plate, *k*, to lock down the locking bar.

TIMOTHY BAILEY.

No. 8751.—*Improvement in Cast-iron Car Wheels.*

What we claim as our invention, and desire to secure by letters patent, is the making of car wheels with double plates extending from the hub to the tread, the plate forming the face of the wheel to be slightly curved backwards, so that a section of it through the centre shall present a very flat arch, whose extremities abut against the rim of the wheel; the back plate, as it spreads from the hub, to be curved in the same direction as the front plate, but, as it approaches the tread, to be gradually depressed at equal intervals, till it meets the front plate—to be thus thrown into a fold or plait, forming two walls of a triangular cavity, of which the third side is made by the face-plate, and in this form to be continued till it meets and unites with the tread; the whole to be in the manner and form substantially as shown in the accompanying drawings.

A. G. BRISTOL.
J. C. JACKSON.

No. 8752.—*Duplex Eccentric Valve Motion.*

What I claim, and desire to secure by letters patent of the United States, is the employment of cogs on or to eccentric wheels, for giving motion to eccentrics, or their equivalents, on a second motion, in combination with the guards or framing attached to the clips or straps of the driving eccentric, and so formed and arranged as to unite both vibrating motions derived from the driving and driven eccentrics into one motion, for working the slide and other valves of steam engines, in the manner and for the purpose as specified.

JOHN J. G. COLLINS.

No. 8753.—*Improvement in Straw cutters.*

What I claim in the foregoing as new, and desire to secure by letters patent, is the method of cutting vegetable substances by a combined

chopping or percussive and shearing cut, produced by means of stationary knives at the mouths of the feeding troughs, moving knives carried on an oscillating lever, and revolving tappets, which actuate the oscillating lever as described.

A. B. EARLE.

No. 8754.—*Improvement in Endless Chain Horse Powers.*

Having thus fully explained my improvement and its purposes, what I claim as new, and desire to secure by letters patent of the United States, is the manner of constructing the converge gears, pinions, and pulleys of the endless chain horse-power, with their outer sides concave at their centres, sufficiently to receive their fastenings within the plane of the inner side of the arm spokes or faces of such of the gears and pulleys which, when confined upon one shaft and overreach, the other shaft may pass both shaft and fastening freely, the faces of the several couplings or shoulders upon the shafts, as also the ends of the shafts themselves, being in the same planes, and all the fittings and fastenings of shafts, gears, and pulleys agreeing with each other, for the purpose and in the manner substantially as described.

HORACE L. EMERY.

No. 8755.—*Improvement in Vessels for making Ink.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of and connecting together a series of vessels for manufacturing ink, in the manner and for the purposes herein set forth.

ALEXANDER HARRISON.

No. 8756.—*Improvement in the manufacture of Zinc White.*

What I claim as my invention, and desire to secure by letters patent, is the use of a porous or fibrous bag or receiving chamber, with porous sides or bottom, or an air tight chamber with a straining or porous bag, adapted to the inside thereof, and used in connexion either with a blowing or exhausting apparatus, so that the products of the distillation and oxygenation of zinc, or other volatile metals, may be separated from the accompanying air and gases, which latter will be forced or otherwise drawn through the pores of the cloth bag or chamber, and escape into the atmosphere.

S. T. JONES.

No. 8757.—*Improvement in Saw Mills.*

I do not claim the cannon carriage, as shown in the annexed drawing; but what I do claim, and desire to secure by letters patent, is simply and substantially raising the tail block, as above described, or in any other way substantially the same.

OLIVER B. JUDD.

No. 8758.—*Improvement in Heating Furnaces.*

Having thus fully described my improvement, what I claim therein, and desire to secure by letters patent, is arranging the fire plates in the manner set forth, so as to render them movable, in combination with the inclined sides of the furnace.

I also claim the combination of the air-pipes passing through the furnace, with the rear flanch, D, and with the arrangement for revolving the gases within the furnace backward and upward, thence passing them off in front, as described, the cold air being brought to the outside of that part of the furnace and tubes against which the heat first impinges, thus protecting it, and rendering the parts more durable, and more equally distributing the heat.

EDMUND D. NORCROSS.

No. 8759.—*Improvement in Water Wheels.*

We do not claim a water guide, as described in the foregoing specification, composed of a scroll, or sections of scrolls, or arcs of circles, or sections of polygons, as concentric with the wheel, to direct the action and impulse of the water upon the concentric wheel, having its guiding surface between parallel planes, as the scroll, and not spiral, as the screw; but what we do claim is a water wheel, composed of a scroll, or section of scrolls, or arcs of circles, or sections of polygons, substantially as above described, in combination with a fixed internal guide or guides, made in manner substantially similar to the float or floats of the wheel, but with the direction in reverse, there being sufficient space between the outer extremities of the guide or guides and the inner extremity of the float or floats to allow the water to pass between them in all positions, the space between them being substantially on the disk of the wheel, thus causing the diving current of water to pass between the two in the direction of the wheel's motion, and act directly upon the inner face of the wheel, propelling the wheel in the same direction with the current; the water being discharged, nevertheless, at the extremity of the scroll, helix or arcs of circles, or sections of polygons, or either of which the wheel may be composed, in a direction opposite to that in which the wheel revolves.

J. B. NOTT.
WILLIAM S. KELLEY.

No. 8760.—*Improvement in Cut Offs.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is operating the catch or hold, and liberating the valves of cut offs, on the movement to close, or return motion of the valve after it has been partially operated upon in opening, substantially in the manner as herein described, so as to leave as little of the catch to be operated to effect the liberation of the valve as may be desired to be accomplished on the return-movement, thus being enabled to liberate the valve and cut off the steam as near the first of the return-movement as may be desired.

FREDERICK E. SICKLES.

No. 8761.—*Improvement in apparatus for Boring Hubs for Boxes.*

What I claim as my invention, and desire to secure by letters patent, is the iron shaft, in two parts, with the socket and screw in the centre,

marked O, so as to increase or diminish the length of said shaft, and also to feed the bitts, as described, whereby a hub may be clamped, bored at both ends for the boxes, and removed from the machine without removing the cutters from the shaft, replacing them, or changing the ends of the hub or shaft.

HENRY SIDLE.

No. 8762.—*Improvement in Water Gun for extinguishing fire.*

What I claim as of my own invention in the fire gun, and wish to secure by letters patent of the United States, are—

First. The combination of the flange, cap, and guard, constructed and operating in a manner substantially as described.

Second. Constructing the barrel of the fire gun of successive layers of sheet metal, and casting the breech, trunnion ring, and flange thereto, in manner substantially as described.

HIRAM STRAIGHT.

No. 8763.—*Improvement in Grain Winnowers and Weighers.*

Having thus described my improvement in the combined weighing and winnowing machine, what I claim therein as new, and desire to secure by letters patent, is combining a balance lever weigher with the lower portion of the winnowing machine, whereby the grain, when cleaned, is weighed, and removed therefrom by a portable receiver, as described and represented.

I also claim constructing the balance lever weigher as represented, and mounting the same upon pivots or knife-edge bearings, *p*, whereby its rearward projecting ends, L, are made to serve as ways or inclined planes, upon which is mounted a portable receiver, O, so as to balance the weigher, whilst its frontward ends are graduated and furnished with weights, M, by which the number of bushels weighed at each time may be indicated as described.

THOMAS T. STRODE.

No. 8764.—*Improvement in Grain Driers.*

First. I claim the centre hollow shaft, B, B, for the double purpose—first, of forming the support in the centre for the steam chambers and pans as described; and, second, of forming a passage for the steam to pass into each of the chambers for heating the machine.

Second. I claim, substantially as described, the arrangement of the air-chambers, I, I, between the steam chambers and pans, with openings in them for a thin blade of air to escape in a circle from the centre, at a right angle, or nearly so, with the main shaft, B, B, and the pipe extending through the machine, as shown, for supplying the chambers with air, operating substantially in the manner and for the purpose as herein set forth.

T. E. WEED.

No. 8765.—*Improvement in Floating Docks.*

Having thus described my dock, and the various uses to which it is applicable, I will state that I do not claim forcing air into a vessel immersed or partly immersed in water, for the purpose of rendering it buoyant, or of admitting water for the purpose of allowing it to sink; but what I do claim as my invention, and desire to secure by letters patent, is so forming a cylindric or prismatic dock, as to perform the operation of elevating a vessel above the surface by combining the buoyancy obtained by injecting air into the cylinders, with the forced revolution of the cylinders on their axes while lying on the water, substantially as herein set forth.

Second. I also claim making the rigid, submerged elevator in such a manner as to be actuated by compressed air only so long as to get rid of the contained water, and to be freed from the interior pressure while sustaining its load above the surface of the water, whereby the liability to accident from the escape of air under high pressure is avoided, substantially as herein described.

Third. I also claim, in combination with a flexible tube for conveying injected air, the use of the revolving pipe directly connected therewith, whereby the pipe may be turned, as herein described, for varying the direction of the current of injected air by turning the flexible tube, as herein set forth.

Fourth. I also claim, in combination with the flexible tube for the injection of air, the opening in the bottom of the cylinder, and the vents in its top, whereby the dock is rendered buoyant while wholly immersed in water, and freed from interior pressure on rising to its maximum height on its surface, substantially as herein set forth.

Fifth. I also claim the double par-buckle, c, c^1, or analogous turning apparatus, whether a rope or a chain with friction rollers in its links (fig. 6) be used for the purpose of turning the opposite elevators, (B, B^1,) in opposite directions, for the purpose of raising the vessel above the water, in the manner substantially as herein set forth.

ORRILLUS T. WILLIAMS.

No. 8766.—*Improvement in apparatus for Lightening Vessels.*

What I claim as my invention, and desire to secure by letters patent, is the elevator formed by combining jointed frames of inflexible materials with flexible enclosures made air-tight above, and open below, when said jointed frames are so constructed as to attach themselves to the bottom of a vessel after being let down by its side, and the flexible enclosure so arranged as to admit of the injection and retention of air beneath it, for the purpose of buoying up the vessel, substantially as herein set forth.

Second. I also claim making jointed elevator frames in such a manner as to adjust themselves to the form of a vessel's sides, whereby the flexible enclosure for air is allowed to come in close contact with the outside of the vessel, in the manner and for the purposes herein set forth.

Third. I also claim, in combination with a flexible enclosure for retaining the air, the hook, D, upright or chain, C, brace, B, and stretcher, S, whereby the elevator is made capable of attaching itself to the vessel, and of raising the same without the necessity of passing a support beneath the keel, as herein set forth.

ORRILLUS T. WILLIAMS.

No. 8767.—*Improvement in Life Preservers.*

I claim as my own invention the sectional berth bottoms, as represented by figures 2 and 3, and as minutely described above.

STEPHEN ALBRO.

No. 8768.—*Improved arrangement of Steam-Boilers.*

What I claim, therefore, as my invention, and desire to secure by letters patent, is the arrangement of the cylindrical boiler, having return flues therein, within the flue of the main boiler, in such manner that the front end of said cylindrical vessel extends over the fire grates, and so that nearly its whole outer surface is exposed to the action of the flames, gases, &c., which, after their passage through the annular flue, proceed to the chimney through the small flues in said cylindrical vessel.

WM. BARNHILL.

No. 8769.—*Improvement in Grain Driers.*

What I claim as my invention, and wish to secure by letters patent, is the employment of an atmosphere of steam surrounding the article to be kiln-dried, and kept heated, substantially in the manner and for the purpose herein described.

HENRY G. BULKLEY.

No. 8770.—*Improvement in Omnibus Registers.*

What I claim as my invention, and desire to secure by letters patent, is the use of the ratchet wheel, E, and its pawl, or their equivalents, for the purpose, substantially as herein set forth, of preventing the possibility of giving a blow to the hammer by means of a recoil of the wheel, B.

I also claim the combination, substantially as herein described, of the toothed wheel, G, to which the dial plate, A^2, is affixed, with the notched cylinder, I, and click, H, whereby the dial plate, A^2, is impelled one notch at each revolution of the dial plate, A^1, for registering on the concealed dial plate, A^2, 24, or any number of fares marked on the dial plates, A and A^1, substantially as herein set forth.

F. O. DESCHAMPS.

No. 8771.—*Improvement in Chairs.*

What I claim as my invention, and desire to secure by letters patent, is the construction and application of a metallic combination to the back posts of chairs, so as to let the chairs take their natural motion of rocking backwards and forwards, while the metallic feet rest unmoved flat and square on the floor or carpet; or any other metallic affixion substantially the same, and which will produce the intended motion.

GEORGE O. DONNELL.

No. 8772.—*Improvement in Cast-iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, is connecting the hub and rim of railroad wheels by curved parts, A, A,

having raised or projecting ribs, *a*, *a*, and *b*, *b*, of cyma form on their inner sides, extending also across the inside of the rim; the said ribs on each plate being placed opposite the middle of the spaces between those on the opposite plate, and each rib terminating in the opposite plate to that on which it stands.

ORSON MOULTON.

No. 8773.—*Improvement in Knitting Looms.*

Having now described the construction and operation of my improved knitting loom, I disclaim the invention of warp-machines; also the invention of needles, guides, sinkers, presser, and the actuating cams or cut wheels for racking the guide bar; the same having been used prior to my invention. But what I do claim, and desire to secure by letters patent, is—

First. I claim the relative motions of the needles, hooks, and presser, as combined to form the looped or knitted fabric, in combination with the stops or guards on the hook bar, to prevent the presser from coming in contact with the hooks; the whole being constructed and arranged substantially as herein set forth.

Second. I claim the combination of mechanism for regulating the take-up motion, according to the quantity of fabric formed, without varying the tension of the fabric, substantially as described.

W. HENSON.

No. 8774.—*Improvement in Cotton Presses.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement, herein described, of a vertical revolving press, with toggle joints, *h*, *h*, operated by the toothed racks, I, I, and fixed pinion, J, substantially as herein set forth.

LEWIS LEWIS.

No. 8775.—*Improvement in Plates of Trunk Locks.*

What I claim as new, and desire to secure by letters patent, is the guard, C, constructed and applied as described, by which the lock is prevented from being wrenched or torn off from the article to which it is attached, and by which the hasp, E, is prevented from being pried or twisted so as to be freed from the bolt, F, thus obviating the necessity of the ordinary back plate, substantially as set forth.

C. LIEBRICK.

No. 8776.—*Improvement in Blasting Rocks under Water.*

What I claim as my invention or discovery is the blasting of rocks under water, by placing the explosive charge or charges on or against the surface of the rock to be blasted, and using the surrounding water as the means of resistance to the explosion, substantially as herein specified.

BENJAMIN MAILLEFERT.

No. 8777.—*Improvements in Cast iron Car Wheels.*

What I claim as my improvement in railroad car wheels is the concave rings, C and D, formed and located as described, in combination with the spokes or braces, *a*, in the exterior ring, D, and the concavo-convex plate or partition, F, arranged and combined substantially as herein set forth.

HIRAM W. MOORE.

No. 8778.—*Improvement in Machines for Printing Floor Cloths.*

What I claim as my invention is as follows: that is to say, I claim the arrangement of the printing mechanism, the stamping-down mechanism, and the mechanism for advancing the piece or strip of cloth or of material to be printed and pressed or stamped—such arrangement being as exhibited in the drawings, and as above described.

And I also claim the combination of the lip bar or plate, *y*, the series of bent levers, a^1, a^1, &c., the slide bar, R^1 or S, and the bar, C^1, as made and operated substantially in manner and for the purpose of seizing the selvage edge of the cloth and moving the piece as described.

And I also claim the combination of mechanism for operating the coloring carriage, or imparting to it its back and forth movements, and necessary intervals of rest—the said combination consisting of the rotating shaft, O, with its circular disks, Q, R, and their projections, *i, k*, the four hook bars, *l, l, p, p*, together with the vibrating bars, *n, o*, as applied together, and operated substantially as specified.

SIMEON SAVAGE.

No. 8779.—*Improvement in Endless Chain Horse-Power.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the bent links, *a, a*, the revolving drums, B, and the pinions, D, constructed and operating in the manner and for the purpose substantially as described.

THEODORE SHARP.

No. 8780.—*Improvement in Brick Machines.*

What I claim as my invention, and desire to secure by letters patent, is the employment of the plate, L, of the travelling mould table, operating simultaneously on the rods, *d, d*, and pistons, *c, c*, in the moulds, *b, b*, in combination with the pressing plate, N, of a steam or other press, for the formation and delivery of brick, as substantially set forth.

SAM'L L. SPEISSEGGER.

No. 8781.—*Improvement in Bridging Navigable Streams.*

What I claim as my invention, and desire to secure by letters patent, is the combination of canal, A, tunnel, B, bridge, and road, constructed and arranged substantially as above described.

BENJ'N F. LEE.

No. 8782.—*Improvement in Friction Clutches.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is—

First. The arrangement of the lever, C, and arms, *d*, d^1, for operating the segments, E, E, substantially as shown and described, by which arrangement the segments are made to bind in the V collar, F, or be relieved from it as desired—the segments when bound in the collar remaining in that state, the points or pivots, *e, e*, having passed the line of pressure, unless acted upon by some extraneous force, as the moving of the vibrating slide, G.

Second. I claim, in combination with the arrangement of levers and arms, the V collar, F, and segments, E, E, said segments being adjusted by screw rods, *h*, and nuts, *i*, as set forth.

GERARD SICKLES.

No. 8783.—*Improved Encircling Suspender for Garments.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the spring or belt, *a*, with the straps, *h, h*, and the circular pads, *k*, fig. 7, for the purpose of sustaining garments upon the human body, arranged substantially as set forth in the above specification.

HARRIS H. TINKER.

No. 8784.—*Improvement in Camphene Lamps.*

What I desire to secure by letters patent, is—

First. I claim the application of a suitable elastic packing between the wick tube, 5, and air tube, 3, attached in any convenient manner, in camphene lamps, for the purposes and as described and shown.

Second. I claim the application of a suitable ring or chamber around the wick tube, to receive or conduct water or other fluid to the wick, so that the light is extinguished in case of accident, as described and shown.

ISAAC VAN BUNSCHOTEN.

No. 8785.—*Improvement in Compasses for determining Variation from local causes.*

I do not claim the invention of a new mariners' or surveyors' compass, because these improvements can, in most instances, be added to compasses already in use; but I do claim as new, and of my own discovery or invention and improvements, and desire to secure by letters patent of the United States, the application of satellite or auxiliary needles to the magnetic compass, such needles being prepared, applied, and adjusted in the manner and for the purposes as herein set forth, including any merely mechanical variations that shall be actual equivalents of the means employed, as described and shown herein, and substantially the same as applied by me, for the purposes herein set forth.

JOHN R. ST. JOHN.

No. 8786.—*Improvement in Flour Bolts.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is in combination with a series of graduated stationary bolting disks in separate chambers, the rotating brushes placed above said disks, and the sweeps in a chamber below them, for the purpose of separating the bran, first and second middlings, and the flour, and conveying the meal, &c., through the machine, and for avoiding the use of a bran duster; the whole being arranged in the manner and for the purpose herein fully set forth.

SAMUEL COOK.

No. 8787.—*Improvement in the Water-gauge of Boilers, &c.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the glass index tube below the point at which the float-chamber is connected with the water in the boiler, the water-tube connecting with the boiler at some distance from the bottom of the latter, so that it is not liable to become obstructed; which renders the indications of the float certain, while the coolness and quietness of the water in the index tube leaves it transparent, so that the index can be seen clearly and conspicuously.

BENJAMIN CRAWFORD.

No. 8788.—*Improvement in Corn Shellers.*

What I claim as my invention, and desire to secure by letters patent, is the combination of stationary sectional spring shelling plates with a rotating sectional spring shelling disk, substantially in the manner herein set forth, the plates and disks having a wabbling or universal motion, caused by the constant varying of the space between them, to accommodate itself at the same time to ears of varying size and shape, by which means the cobs are less broken and more thoroughly stripped than in machines, as heretofore constructed, for shelling corn fed into them promiscuously and in mass.

WILLIAM LINSLEY.

No. 8789.—*Improvement in Canal-Lock Gates.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. The opening of the lower gates of a canal or river lock, outwards or down stream, in combination with the means described, or their equivalents, for operating them, for the double purpose of saving length in the lock chamber with the same walls, and for allowing the gates to be opened before the chamber is entirely empty, so that the escaping water may carry out with it the boat, raft, or other thing being passed through, with the least possible delay.

Second. I claim the stationary gate at the head of the lock, which forms, with the breast wall of the lock, with the top of which it is level, a recess or chamber, through which the lock chamber may be filled at any desired height above the bottom of the lock, and thus save length of lock-wall.

Third. I claim, in combination with the stationary gate, the sinking head-gate, extending across the lock, and reaching down a little below the top of the stationary gate, when the gate is shut, and which sinks or slides into the recess formed in part by said stationary gate, and is on a level therewith when open, for passing boats, &c., for the purpose of saving in the length of the lock chamber an amount nearly equal to the width of the gate.

Fourth. I claim the so placing of an adjustable batten or water-strip on the bottom of a lock, that it may be operated upon by the pressure of the water within the lock chamber, and be forced up against the gate when prevented from being closed tight by an intervening substance, substantially in the manner herein set forth and described.

CHARLES NEER.

No. 8790.—*Improvement in Seed Planters.*

But what I do claim as my invention, and desire to secure by letters patent, is: I claim the peculiarly formed curved lips, or feeders, and longitudinal grooves, or channels, so constructed and tightly fitted to the cast box, L, as to prevent any grain from passing into the chamber, except what is forced through the grooves by the lips or feeders, substantially as set forth.

IRA REYNOLDS.

No. 8791.—*Improvement in Hay Rakes.*

I disclaim suspending the head, so that each tooth acts separately, and the platform, L. What I do claim as my improvement, and for which I desire to secure letters patent, is—

First. The arms projecting from the axle, in combination with the joint, F, for the purpose of adjusting the position of the teeth to the surface of rough or smooth land.

Second. Hanging the arms to the axle, by means of the standard, I, and connecting rod; and also raising and lowering the arms, as the teeth may require, by means of the pin and holes in the connecting rod and arms, at J.

JAY S. STURGES.

No. 8792.—*Improvement in Melodeons.*

What I now claim as my invention, and desire to secure by letters patent, is—

First. Constructing the air receiving box of a melodeon or other keyed wind instrument of a similar nature, which is operated by an exhausting bellows or pump, with a vibrating or movable top, F, connected to it by wings or joints, *c*, *c*, which fold or bend, substantially in the manner described, towards the external air which acts upon them, whereby the external air acting upon said wings counteracts the inequality of the force exerted by the spring placed inside, to open or expand and enlarge the interior capacity of the box.

Second. The manner of hanging the treadle, L, for operating the bel-

lows, upon the two vibrating rods, M and N, attached to the floor, or to any object under the instrument, substantially as herein set forth.

A. L. SWAN.

No. 8793.—*Improvement in Iron Fences.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is so constructing the loops and mortises in the rails and posts of iron fences that, when in place, neither of them can be removed, using for this purpose single posts and rails, and neither bolts, wedges, keys, nor any other fastening, except what is afforded by the peculiar shape of the said loop and mortises; and this I claim, whether the same be constructed as herein described or by any other means essentially the same.

JOHN B. WICKERSHAM.

No. 8794.—*Improvement in Plough.*

Having thus fully described my weeding-plough, what I claim therein as new, and for which I desire to secure letters patent, is the plate, *e*, constructed, arranged, and combined with the plough, substantially in the manner and for the purpose set forth.

JOSHUA WOODWARD.

No. 8795.—*Improvement in the manufacture of Door Knobs.*

I claim, substantially as set forth in the above specification, in the manufacture of vitreous metal knobs and similar articles—

First. The application and use of a metal plug, to be entered into the socket, and fitting it; the plug passing up from or through the bottom of the mould, for the purpose of preventing the melted material from filling the socket during the pressing operations, and at the same time facilitating the centring and adjustment of the socket.

Second. I claim the invention of, and substitution in the place of pincers and polishing rods heretofore known, a polishing rod capable of polishing several knobs simultaneously and by one operation, substantially as above described.

BENJAMIN NOTT.

No. 8796.—*Improvement in Double Plane Irons.*

What I claim as my invention, and desire to secure by letters patent, is the new and improved mode of fastening and adjusting the cap to the iron by means of a projection and slot, forming a dovetail slide, giving new facilities for the operation; and also a level surface to the back of the iron. Also, the elongation of part of the width of the cap, and its occupying the place of a removed part of iron, giving the operator new facilities in nicely adjusting the cap to the edge of the iron, without removing it from the stock, the same as herein described, using for the purpose the aforesaid arrangements of parts, or any other substantially the same, and which will produce the same effect in like manner.

FORDYCE BEALS.

No. 8797.—*Improved Pressure Gauge.*

What I claim as my invention, and desire to secure by letters patent, is a closed pressure gauge, constructed substantially as herein described, so that equal increments of pressure will cause the indicating liquid to rise in the tube equal linear distances, or thereabouts, in combination with an adjustable scale, to indicate the degree of pressure, and a standard weight and blow off valve, by which the scale can from time to time be adjusted so as to give true indications of the pressure of the steam, substantially as herein set forth.

BENJ. CRAWFORD.

No. 8798.—*Improvement in Carpets.*

What I claim as my invention, or new or improved manufacture, is an ingrained plied printed carpet, made by a combination of the process of weaving in two or more plies, and ingraining the same, and subsequently printing the figure or figures on both sides of the same, as described; the discovery having been made by me that the plying process prevents the colors printed on one ply from penetrating the other ply, so as practically to injure its other surface to an extent which renders it unfit for the reception of colors, and use as a carpet, as hereinbefore stated—a great improvement in trade being the result of such.

THOMAS CROSSLEY.

No. 8799.—*Improvement in the construction of Grate Bars.*

What I claim as my invention, and desire to secure by letters patent, is the construction of grate bars for furnaces of clay, soapstone, or other refractory substance, for the purpose and in the manner herein specified.

F. P. DIMPFEL.

No. 8800.—*Improvement in Sofa Bedsteads.*

Having thus fully described my improved sofa bedstead, what I claim therein as new, and for which I desire to secure letters patent, is—

First. The combining the back of the sofa with the seat, by means of sliding pivots, in the manner and for the purpose set forth.

I also claim the sliding table and washstand, in combination with the sofa, substantially in the manner and for the purpose set forth.

JNO. T. HAMMITT.

No. 8801.—*Improvement in Joints around Glass Tubes for Philosophical Apparatus.*

I claim the method used for promoting the drying or evaporating of the liquid matter from the packing, by drilling the holes, 1, 1, 2, 2, and 3, 3, in the barrel, A, A, the said holes being afterwards filled with solder.

I claim the method of making the joint, *x*, *x*, at the end of the tube, which is effected by the friction of the packing around the tube, B, which forces the end of the tube against the bottom of the bore, and produces

a joint, when the stuffing-box, F, is forced to its place, as herein mentioned and set forth.

A. B. LATTA.

No. 8802.—*Improvement in Shovel Ploughs.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of the wing or half shovel plough and the adjustable scraper, arranged on different stocks, in the said beam, when said scraper is arranged on the land side, and rearward of the plough, and so that the grass, weeds, &c., shaved off by the scraper, will be thrown into the furrow made by the plough; the whole being arranged in the manner and specially for the purpose herein set forth and fully shown.

JAMES LATTIMER.

No. 8803.—*Improvement in Cotton Gins.*

I do not claim the use of a mote brush, D, in combination with gin saws, and the ordinary stripping brush, as I am aware that a cylindrical mote brush revolving in the same direction with mine has been used before; but what I do claim as new, and desire to secure by letters patent, is making the mote brush (revolving in the direction described) with wings, so as to act by a current of air, as well as by contact with the cotton on the teeth of the saws, substantially as herein set forth, in combination with the saws and grate.

THOMAS J. LAWS.

No. 8804.—*Improvement in the treatment of Hydro-sulphurets, and in manufacturing Carbonates and Sulphur Compounds.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the manufacture of carbonate of barytes and strontia by processes as above described, and, in combination therewith, employing the sulphuretted hydrogen gas evolved in the aforesaid process for the producing of sulphur or sulphuric acid.

CHARLES LENNIG.

No. 8805.—*Improvement in Burners for Argand Lamp.*

What I claim as my invention in the within described lamp is arranging the grooved tube for adjusting the wick, inside of the wick and outside of the screw—that is, between the wick and the screw, and extending the pin from the wick holder, through the groove in the tube, into the score between the threads of the screw, thereby dispensing with the perforated tube heretofore used upon the outside of the wick, and leaving the wick open on the outside, so that the material to be burned may have free and unobstructed access around the wick.

AUSTIN OLCOTT.

No. 8806.—*Improvement in Machines for Cutting Screws on Rails and Posts of Bedsteads.*

I do not claim, of themselves only, reversible cutter-heads, as such, or equivalent arrangements, have long been used—such as reversible cylinders, and similar devices; but what I do claim as my invention, and desire to secure by letters patent, is constructing the reversible cutter-heads, E and F, of arms placed at *right angles* to one another, and carrying reverse right and left hand cutters, *i*, *i*, and *k*, *k*, in *combination* with the eccentric snug, *g*, and flanch, *f*, of the screw spindle, C, for the purposes and advantages specified; all being constructed and operating as shown and described.

J. PARSONS OWEN.

No. 8807.—*Improvement in Connecting Washers with Spindles, in Spinning machinery.*

I therefore claim as my invention the spring, clasp, or holder, *a*, or its equivalent, either with or without teeth, in combination with the spindle, or as applied and used therewith, substantially in the manner and for the purpose of holding the washer, as specified.

HORACE T. ROBBINS.

No. 8808.—*Improvement in Planing Machines.*

What I claim as my invention, and desire to secure by letters patent, is constructing, arranging, and operating a reciprocating plane, which cuts off the shaving by its forward stroke, and feeds the board by its backward stroke, and the clamps and gripes, or stops, with which such a plane is connected, as herein described, so that the board is fed at the back stroke of the plane and planed at its forward stroke, a distance equal, or thereabouts, to the throw or stroke of the plane; whereby a greater length is planed by a given number of strokes of the plane than in reciprocating planes that feed themselves by their own motion, as heretofore constructed; and also the injurious shocks and strains are avoided, which, in those planes, are caused by the necessity of making the cut considerably shorter than the stroke.

DANIEL STEARNS.

No. 8809.—*Improvement in Cupping and Breast Glasses.*

What I claim as my invention, and desire to secure by letters patent, is the improved exhausting apparatus, herein described, for surgical and other purposes—said apparatus consisting of a combination of a tubular spring piston with a barrel, substantially as herein set forth.

WILLIAM S. THOMAS.

No. 8810.—*Improvement in Pattern-Cards for Jacquard Looms.*

What we claim, and desire to secure by letters patent, is the combination of the buttons with the metallic card, as described, the buttons being so riveted or attached to the card as to allow of their being turned, for

the purpose of closing or opening the holes to which they are respectively attached.

SAMUEL T. THOMAS.
EDWARD EVERETT.

No. 8811.—*Improvement in Hot-Air Registers.*

What I claim, and desire to secure by letters patent, is the crown-wheel, or section of a crown-wheel, in combination with the pinion-wheel, or section of wheel attached to the fans, as set forth.

WILLIAM TURTON.

No. 8812.—*Improvement in Railroad-Car Brakes.*

Therefore I claim as new, and desire to secure by letters patent of the United States—

First. I claim the arrangement of the followers, 3, 4, 5, and 6, with their brake blocks, 8, rods, *e* and *f*, and links, 9 and 10, whereby the power operating to separate the followers, 4 and 5, throws the brake blocks, 8, on to each side of each wheel, for the purposes and as described and shown.

Second. I claim the steam piston and rod, *i*, wedge, *k*, and nut, *n*, and screw, *o*, in combination with the brakes, 3, 4, 5, and 6, arranged and acting as described, whereby the said brakes can be actuated by steam from the locomotive, or by hand, as described.

THOS. WALBER.

No. 8813.—*Improvement in Instruments for inhaling Powders.*

What I claim as my invention, and desire to have secured to me by letters patent, is the instrument, above described, for inhaling powders, &c., into the throat and lungs—the said instrument consisting of a receiver, with holes in its bulb or end, covered by, and working loosely in, an exterior tube, which prevents any of the medicine from lodging in the mouth, substantially as above described.

IRA WARREN.

No. 8814.—*Improvement in Hinges for Stove-Doors, &c.*

What I claim as my invention, and wish to secure by letters patent, is the connecting and hanging of the door or doors upon the fronts of stoves or grates, so that they may be opened or closed without marring the beauty or affecting the convenience of the same, in either case, or exposing to view the hinges or inside of the door, as described.

CHARLES J. WOOLSON.

No. 8815.—*Improved arrangement in Jack-Chain machinery.*

What we claim as our invention, and desire to secure by letters patent, is the arrangement on the bed plate, A, of the nipping-jaw, G, the mandrel, E, and pin, F, with the turning lever, K, (furnished with pin, *f*,)

moving under the table, B, in the manner and for the purpose substantially as set forth and shown.

HICKFORD MARSHALL.
SETH S. COOK.

No. 8816.—*Improvement in Omnibus Step.*

What I claim as my invention, and desire to secure by letters patent, is the application of the inclined covering or protector to the outside of the omnibus door, as described, to prevent persons from standing, lying, or sitting on the steps, in combination with the brush or broom secured to the bottom of the covering or protector, so as to open and shut therewith, for the purpose of cleansing the step or steps; each step, if more than one, requiring a brush or broom attached, together with a back board, to protect the inside of the step, as described.

JOSIAH ASHENFELDER.

No. 8817.—*Improvement in Shop-Awnings.*

What I do claim as my invention, and desire to secure by letters patent, is the method of protecting the awning by the construction and arrangement of the cylindrical sheathing (or covering) in combination with the slats, in the manner and for the purpose as herein described and fully set forth.

WM. H. BRAKEWELL.

No. 8818.—*Improvement in Machines for Stamping Ores.*

What I claim as my improvement is as follows: I claim the combination of the washing basin or contrivance, L, with the stamp-rod and its bearing, so as to operate in manner and for the purpose as specified.

I also claim the deflective plate in the entrance-spout or hopper, as combined with the same and the mortar and stamper, and used for the purpose as specified.

I also claim the improvement in the stamp-head, or the making of it with a greater stamping surface on one side of its axis of rotation than it has on the other; the same being for the purpose of preventing packing of the charge, as specified.

I also claim the mode of applying the stamp head to the stamp-rod, viz: by means of the circular arcs or curves of the sides of the universal dovetail connexion with the wedge key, as described.

WM. BALL.

No. 8819.—*Improvement in Ploughs.*

What I claim as my invention, and desire to secure by letters patent, is connecting the beam to the plough-irons by means of a pivot and stay-bolt, G, and adjustable standard, F, the whole being constructed and arranged as described, so that the front end of the beam can be set towards either side, or either extremity raised or lowered, without changing the height of the other, or both extremities raised simultaneously and equally or unequally, substantially as set forth.

E. BALL.

No. 8820.—*Improvement in Friction Primers for Cannon.*

I claim the combining with the discharging string and tube of the primer, a cylinder or plug of leather, (*c*,) or other like substance, inserted and secured in the upper end of the primer, and having the exploding string passing through it, as above set forth; the said plug or cylinder serving the purpose of a breech to confine the charge when exploded, as a protector of the sand paper and priming against the absorption of humidity, and as a bearing for the string to draw over when pulled.

WM. BALL.

No. 8821.—*Improvement in Machinery for Felting Cloth.*

What I claim as my invention, and desire to secure by letters patent, is the method, herein described, of hardening the bat by alternate steaming and jigging, substantially as herein set forth, whereby one section of the bat is jiggered while an adjoining section is steamed preparatory to being jiggered.

I also claim the process of steaming and jiggering two or more bats simultaneously, whereby much labor and time are saved, and the texture of the cloth is improved.

I also claim constructing a machine for jiggering felt-bats in such manner that it will subject successive portions of the bats to equal amounts of jiggering, and then stop, whereby a greater uniformity of texture is secured in the cloth.

I also claim the arrangement of the steam pipes and adjustages in the steam-chamber, substantially in the manner and for the purpose herein set forth.

GEO. G. BISHOP.

No. 8822.—*Improvement in Marine Signals.*

What I claim as my invention, and desire to secure by letters patent, is the employment, for signalizing or indicating the course of a vessel, of two lights of different colors, attached to or hung in a cylinder or disk, which is capable of revolving on a fixed axis, so as to change the position of the lights; the position of either light relatively to the other being made to point the course in any manner, substantially as described.

THOMAS H. DODGE.

No. 8823.—*Improvement in Planing Machines.*

What I claim as my invention, and desire to secure by letters patent, is the reciprocating plane for scoring the face of the board transversely and reducing it to a uniform thickness, arranged substantially as herein described, in a compound frame which carries the plane back and forth across the board by a regular and positive motion, and back and forth lengthwise of the board by a motion dependent upon the reciprocal action of the board against the planes in one direction, and of springs against the frame in the opposite direction, substantially as herein set forth.

I also claim the method of smoothing the surface of boards or other lumber by plane-irons reciprocating endwise and operated in such manner that the tendency of one to draw the boards towards that side of the machine to which it is moving is counteracted in whole or in part by the tendency of one or more of the others to draw the board towards the opposite side of the machine, these several counter-tendencies being thus made to neutralize each other, substantially as described.

JOHN HOWARTH.

No. 8824.—*Improvement in Swingletrees.*

What I claim as my invention, and desire to secure by letters patent, is the flange, F, F, F, above set forth, wrought or cast, in combination with the ring, B, and link, C, for the purpose of forming attachments, substantially in the mode set forth above.

CHAS. HOWARD.

No. 8825.—*Improvements in Machines for making Cordage.*

What I claim as my invention, and desire to secure by letters patent, is the application of the fan, *j*, *k*, in combination with the pulleys, *f*, *h*, belt, *g*, gears, N, O, P, Q, and bobbin, M, as a drag or take up, as above described.

WM. JOSLIN.

No. 8826.—*Improvement in Flour-Packers.*

What I claim as my invention, and desire to secure by letters patent, in the above described machine for packing flour, is the friction roller clutch, constructed and arranged in the manner and for the purpose substantially as set forth.

NATHAN KINMAN.

No. 8827.—*Improvements in Smut Machines.*

What I claim as my invention, and desire to secure by letters patent, is the formation of a series of corrugated recesses within the periphery of the cylindrical casing of my improved smut machine, substantially of the forms represented in the drawings, when the said cylindrical casing is combined with a rotating beater, which has its beating surfaces, *a*, *a*, &c., arranged in positions which incline obliquely to the radii of the beater, for the purpose of throwing the smut and kernels of grain into the said series of corrugated recesses in such directions that they will, in entering and rebounding therefrom, be brought in contact with their entire surfaces, and thereby produce so great an amount of friction action as to break up the smut and white caps, and polish the kernels of grain without breaking the same.

T. H. McCRAY.

No. 8828.—*Improvement in Cracker Machines.*

What I claim, therefore, is the use of the bed plate resting upon or supported by springs or other equivalent devices, so that a yielding or re-

ceding action is obtained in the bed-plate while under the pressure of the cutters, or while the cutters are pressing down, for the purposes and in principle of construction and operation substantially as set forth.

JOHN McCOLLUM.

No. 8829.—*Improvement in Manufacturing Artificial Teeth.*

What I claim as my invention, and desire to secure by letters patent, is the formation of an artificial tooth or teeth from spar, silex, clay, sand glass, or any materials used for the above purpose, into a suitable condition for the finishing furnace, by the simple operation of moulding, thereby avoiding the tedious and uncertain process of enamelling.

WM. S. McILHENNEY, *M. D.*

No. 8830.—*Improvements in Machine for Paging Books.*

Having now described my invention and its operations, I will proceed to state what I claim and desire to secure by letters patent. What I claim, therefore, is—

First. The use of the type plates, having channel ways and springs in their faces, and holes in them, corresponding to the ten subdivisions of their peripheries, and their inner circumferences divided into ten equal sides, in combination with a barrel having stop-pins in its circumference for the type plates, and a changing plate attached thereto, and ratchet wheel, cap plate, and pawl and bent lever, for the purpose of operating a series of number plates, the said combination of parts being entirely distinct from any known mode of producing the same result, (that is counting,) which I lay no exclusive claim to, the principle being well known, and I therefore limit my claim to combination of parts, substantially as set forth.

Second. I claim the use of the rod, C, lever, E, inking-roller lever, J, and arm, I, in combination with the type-wheel, substantially for the purposes as set forth.

Third. I claim the use of the inking-roller frame and rod attached thereto, and rotating ink plate, in combination with the lever, J, slide, O, and type wheel and levers operating the same, substantially for the purposes as set forth.

Fourth. I claim the bed, R, with guides attached thereto, in combination with the table and type-wheel, substantially for the purposes as set forth.

S. E. PARRISH.

No. 8831.—*Improvement in Machines for jointing Shingles.*

Having thus described my improvements in shingle machines, I shall state my claim as follows:

What I claim as my invention, and desire to have secured to me by letters patent, is the arrangement of the horizontal sliding boxes which carry the jointing knives, by which they will cut the edges of any width of shingle; the shingle itself operating the devices for holding the boxes firmly, and in the proper position, while the shingle is being cut, as hereinabove set forth.

WILLIAM STODDARD.

No. 8832.—*Improvement in Air-Heating Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the inverted domes, or frustrums, F, I, M, and plate, P, with the short tubes, *b*, *b*, *f*, *f*, *i*, *i*, *l*, *l*, connecting them, substantially in the manner herein described, for the purpose of effecting the connexion between the lower ends of the fire or draught flues, and carrying the air through them to the spaces between the cylinders or tubes.

J. M. THATCHER.

No. 8833.—*Improvement in making Paraffine Oil.*

What I claim as my invention, and desire to secure by letters patent, is the obtaining of paraffine oil, or an oil containing paraffine, and paraffine, from bituminous coals, by treating them in manner hereinbefore described.

JAMES YOUNG.

No. 8834.—*Improvement in Sausage Stuffers.*

Having thus described my improved sausage stuffer, what I claim therein, and desire to secure by letters patent, is the combination of the three-cornered ovoid-shaped cylinder, D, with the curved spring scraper, G, operating in the manner and for the purpose substantially as herein fully set forth.

THOS. W. BAILEY.

No. 8835.—*Improvement in Mill for Grinding Ores.*

What I claim as my invention is the combination and arrangement of the two grinding or pulverizing wheels, one or two endless screws, and the troughs which such wheels and screw or screws revolve in, all made and applied so as to operate together in such manner as to raise the ore up and crush it between the two wheels, and not only return or move the heavier or too weighty particles towards or back to the wheels, but allow the lighter ones, or sufficiently reduced particles, to flow out of the machine, as described.

WM. BALL.

No. 8836.—*Improvements in Excavating Machines.*

I do not claim inclining the cutter cylinder; neither do I claim placing the horses within or upon ditching machines for the purpose of working them. But what I claim, and desire to secure by letters patent, is so constructing the inclined wheel, or cutting cylinder, E, that it is made also to serve the purpose of horse-walk, by which means the power of the horse is applied directly to the cylinder itself, without the intervention of other mechanism, substantially as herein described.

CHARLES BISHOP.

No. 8837.—*Improvement in Trusses.*

What I claim as my invention, and desire to secure by letters patent, is the application to trusses and supporters of the guard-spring pad, as above described.

FREDERICK M. BUTLER.

No. 8838.—*Improvement in machinery for shaving the heads of Screw Blanks, Rivets, &c.*

What I claim as my invention, and desire to secure by letters patent, is the movable stop which determines the position of the screw blanks between the jaws, and then returns to let said blanks fall through, substantially as specified, in combination with the vertical hollow spindle, or mandrel, as specified. And, finally, I claim the feeding tube which conducts the screw blank, &c., to the hollow spindle, substantially as specified, in combination with the cam on the cutter head, or its equivalent, for moving the said tube out of the way of the cutter, as described.

JOHN CRUM.

No. 8839.—*Improvement in Razor Strops.*

What I claim as my invention, and desire to secure by letters patent, is the mode of attaching the strop to the case, so that it will not be soiled by the faces of it coming in contact with the case, and so that it will revolve, as herein described; using for that purpose the aforesaid case, strop-bearing spring, and pivots, in combination.

JOHN DEMERIT.

No. 8840.—*Improvement in Dredging Machines.*

What I desire to secure by letters patent, is—

First. I claim the shovels or scoops, *h*, forming the bottoms of compartments in a proper frame, and moving, at one end, on a hinge or similar contrivance; the other end being lowered to cause the scoop, as the frame is moved along, to collect the sand or mud, or other material operated on, and retain the same by suitable mechanical means operating to lift the scoop and close the bottom, as described and shown.

JAMES HAMILTON.

No. 8841.—*Improvement in Rice Hullers.*

I claim as my invention the combination of the concave fluted chambers with the smooth curved radial beaters for hulling rice, as set forth.

PETER McKINLAY.

No. 8842.—*Improvement in Shovel Ploughs.*

What I claim as my invention, and desire to secure by letters patent, is the construction of the handles, and the principle or mode of shifting the same, as the same are herein fully described, with their operation. The invention of the common shovel plough is, of course, disclaimed.

WASHINGTON F. PAGETT.

No. 8843.—*Electric Whaling Apparatus.*

What we claim as our invention, and desire to secure by letters patent, is the application of electric galvanic current, conveyed by a conductor to an instrument, which is to be thrown into sperm and right whales, as well as other animals of the sea, in order to secure them.

DR. ALBERT SONNENBURG.
PHILIP RECHTEN.

No. 8844.—*Improvement in Gang Ploughs.*

But what we do claim as our improvement, and desire to secure by letters patent, is mounting the tongue or pole, A^2, upon the timbers, D, E, and uniting the same by an intermediate jointed connecting rod, W, to the horizontal coupling rod, L, which unites the front and rearward ends of the pivoted arms, J, J, of the axles K^2, whereby the direction or guiding of the gang of ploughs is regulated by the action of the team itself, in moving in any direction the attendant may require.

We also claim confining the tongue or pole, A^2, between the horizontal plate, S, and timber, D, by means of a fulcrum bolt, U, for the purpose of allowing the tongue or pole, A^2, to vibrate or move right or left with the direction of the team, whereby the required direction is given to the propelling and supporting wheels; and whereby the tongue or pole may be shifted or adjusted in its position to accommodate two or three horses, and yet maintain its central draught with the ploughs.

HARVEY KILLAM.
GEORGE VALLEAU.

No. 8845.—*Improvement in Bedstead Fastenings.*

What I claim as my invention, and desire to secure by letters patent, is the combined action or the combination of the link and wedge, as above described, for fastening bedsteads.

WILLIAM SHAW.

No. 8846.—*Improvement in Rat Traps.*

But what I claim as my invention, and desire to secure by letters patent, is the manner of constructing a machine for the killing of animals and throwing their bodies from the trap, and self-setting the same, substantially as described and shown.

JAMES SHEWARD.

No. 8847.—*Improvement in Apparatus for boring Artesian Wells.*

What I claim as new, and wish to secure by letters patent, is the spring or brace, as above described, or its equivalent, with the twisted flat bar, or other device, turning systematically the boring instrument whilst using a rope, instead of rods, while sinking a bore-hole in the earth in search of water or minerals.

JOHN THOMSON.

No. 8848.—*Improvement in Smoothing Irons.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of our improved smoothing iron, what we claim herein as new, and desire to secure by letters patent, is the application (substantially as described) to a self heating smoothing iron of a tube or chamber (*j*) at the bottom of the fire box, provided with a registered mouth, or inlet, (*i*,) some distance above the bottom and at its lower portion, with distributing apertures (K) communicating with the fire, whereby the draught is applied from beneath, and equally at every part, and placed under the control of the operator, without permitting the escape of ashes, or other refuse of combustion.

NICHOLAS TALIAFERRO.
WILLIAM D. CUMMINGS.

No. 8849.—*Improvement in Candle-Wicks.*

I claim a candle-wick, manufactured by the method herein specifically described.

CORNELIUS A. WORTENDYKE.

No. 8850.—*Improvement in Cultivators.*

What we claim as our invention, and desire to secure by letters patent, is the construction of the long metallic inclined blades, *e*, *e*, *c*, on the after-part of the machine, for cutting the sods and lumps, and pulverizing the ground, as set forth.

T. J. BALL.
JOHN POST.

No 8851.—*Improved Lock.*

What I claim as my invention, and desire to have secured to me by letters patent, is—

First. Holding the tumblers rigidly, so that they cannot be moved when the key-hole is exposed, by means of a cam placed on the same shaft with the cam which moves the bolt.

Second. I claim so arranging the tumblers with the key that the tumblers will form themselves into the right position, so that the bolt can be withdrawn, by dropping, by their own weight, or being pressed by springs upon the key, as herein-above described.

ALBERT BETTELEY.

No. 8852.—*Improvements in Saw-Mills.*

What I claim as my invention, and desire to secure by letters patent, is the construction of a saw-frame or gate, of metal tubes, B, B, constituting the guides, as well as the uprights, of said frame, and cross pieces or heads, C, C^1, united to said uprights, in the manner set forth.

I also claim the arrangement of the cross hook, *a*, bar, E, and hooks, *m*, *m*, on the ends of the saws, in combination with the sustaining side bars, F, F, and upper open plate, D, for the purpose and in the manner substantially set forth in the foregoing specification and accompanying drawings.

WM. C. BRONSON.

No. 8853.—*Improvements in Spinning Bait for Catching Fish.*

What I claim as new, and desire to secure by letters patent, is—

First. Constructing a bait with an air-tight chamber, which chamber is provided with an aperture, or apertures, for the admission of air when fishing light near or on the surface of the water, and for the admission of water when it is desired to fish deep under the surface of the water, substantially as described.

Second. I do not claim passing the line loosely through a cork or float that the float may move freely upon the line; neither do I claim attaching a spinning bait to the line by means of a swivel. But what I do claim, and desire to secure by letters patent, is passing the line through a tube in the body of a spinning bait, in manner substantially as described, to enable the bait to twirl freely without twisting the line.

JULIO T. BUEL.

No. 8854.—*Improvements in Stone-cutting Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Cutter-jaws, or their equivalents, combined with and carrying a cutter across the stone in the segment of a circle; the cutter being so set that the part of its periphery in contact with the stone when cutting inclines towards, and the part of the periphery opposite thereto from, the axis or centre of motion of the cutter-jaws, for the purpose set forth.

Second. The application of revolving cutters to dressing stone, moving and cutting in a curved line across the stone, and on a convex edge of the undressed portion of the surface formed by the line of cut and cutting towards the centre of motion of the cutters in such curved line.

Third. The combination or a rock-shaft with cutter-jaws to carry the cutters over and clear from the undressed portion of the stone, substantially as described, and for the purposes set forth.

Fourth. The combination of the rock shaft, guide-table, and friction rollers, and their equivalents, substantially as described, and for the purpose set forth.

Fifth. The combination of the rock-shaft and cam and roller, to produce the rocking or tumbling motion, substantially as described.

J. W. COCHRAN.

No. 8855.—*Apparatus for Closing Doors.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the heavy roller upon a vibrating arm with the turning railway or inclined plane—the former attached to the door and the latter to the casing—and the whole operating substantially in the manner and for the purpose herein described.

MINARD THURSTON COOPER.

No. 8856.—*Improvements in Horse Collars.*

What I desire to secure by letters patent is—
First. I claim the spring, 9, and staples, 10, to connect the upper ends of the hames, as described and shown.
Second. I claim so constructing and fitting the collar and hame that the hame shall work or slide on the collar by any jerk or lurching of the harness for the purpose of relieving the animal—said collar and hame being fitted with the rivets, 1 and 2, or their equivalents, to allow the one to slide on the other, and being connected by the bolts, 5, or their equivalents, as described and shown.

HENRY R. LATHAM.

No. 8857.—*Improved method of Attaching Roses for Knobs to Doors, etc.*

I claim as new, and desire to secure by letters patent, the combination, substantially as described, of the circle plate, A, having dovetails, *b*, *b*, on its inner face, the dovetails, *c*, *c*, which are fast on the door or other object, and the shank or socket, C, of the knob, or, what is equivalent, any spindle or shaft attached to the knob or handle.

NATHAN MATTHEWS.

No. 8858.—*Improvement in Coat Forms.*

What I claim as my invention, and desire to secure by letters patent, is the bow, C, in form substantially as described, suspended by a shank, *b*, at a point distant horizontally from its vertex, on a pivot, B, or its equivalent, which is stationary in a bracket, or any suitable standard or pendant, so placed or constructed as to allow the bow to turn round in any direction, as and for the purposes herein set forth.

WM. B. OLDS.

No. 8859.—*Improvement in Moth Traps to Bee Hives.*

I claim the peculiar construction of the moth trap, as herein described, composed of a slide, having the centre groove and two side grooves, and the metallic-hinged cover, arranged all as set forth in the specification.

EBENEZER W. PHELPS.

No. 8860.—*Improvement in Buttons, Studs, &c.*

What I claim as my invention, and desire to secure by letters patent, is making a stud-button or other similar fastening or article of jewelry in two parts—one part carrying a tube, *a*, and the other part, *b*, with two snap springs, *c*, *c*, operating in the manner substantially as set forth.

DAVID RAIT.

No. 8861.—*Improvements in Smut Machines.*

Having thus fully described the construction and operation of my combined smut and grain separator, what I claim therein as new, and desire to secure by letters patent, is the offset—that is to say, enlarging the space of the hollow trunk on the opposite side thereof from that at which the grain is admitted—in combination with the screen, spout, *f*, and the passage and valve, g^1, for taking the dust, &c., into the fan-case, whereby the cheat and light grain, which will pass up the spout with the impurities, is effectually separated and delivered through the spout, *f*, substantially as herein fully set forth.

DANIEL SHAW.

No. 8862.—*Improved Harpoon.*

I do not claim making the flukes separate from the point, or causing the latter to enter deeper than the former into the body of the whale. But what I do claim as my invention, and desire to secure by letters patent, is the combination of the sliding and unlatching flukes with the lance, and the lines, or their equivalents, by means of which the point is driven deeper by the drag or traction on the line, substantially in the manner herein described.

J. D. R. STILLMAN.

No. 8863.—*Improved mechanism for actuating an Adjustable Eccentric.*

Having thus described the nature of my improvements in the valve-gearing of steam engines, I wish it to be understood that I make no claim to an adjustable sheave, nor to the use of a screw in this connexion. But what I claim herein as new, and desire to secure by letters patent, are the herein-described devices for the adjustment of an eccentric sheave—that is to say, the sheave stock, (*g*,) arranged so as to traverse a bed plate, (*e*,) at right angles to the shaft or axle, and operated by a hand bar, (*u*,) through the medium of suitable levers, (*t*,) and yoke, (*s*,) connected with a sliding collar, (*p*,) from which projects a rack, (*o*,) which gears into a pinion, (*n*,) upon the screw, (*k*,) which actuates the sheave; and this I claim, whether or not the same be combined with the vibrating arm, *d*, and shifting pin, *x*, as herein represented for variation of the throw.

MATHEW STUBBS.

No. 8864.—*Improvement in Grain Separators.*

Having thus fully described my improved thrashing machine, what I claim therein as new, and desire to secure by letters patent, is the novel arrangement for separating the grain from the straw, by which the slats, *h*, *h*, *h*, *h*, provided with teeth, have a rotary and lateral motion—said motion produced substantially as described, or in any equivalent manner, in combination with the inclined slats, *e*, *e*, *e*, *e*, whereby by their combined action the grain is perfectly and rapidly separated from the straw—operating in the manner and for the purpose herein fully set forth.

JOHN THOMPSON.

No. 8865.—*Improvement in Boot-Jacks.*

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is—
First. The heel-gripper and stirrup, in combination with the lever,

to draw the stirrup over and hold the toe of the boot, in the manner and for the purpose set forth.

Secondly. I claim the movable heel-gripper, in combination with the connecting rod and stirrup, constructed and operating substantially the same as described and represented.

SARDIS THOMSON.

No. 8866.—*Improvement in Seed Planters.*

Having thus fully described my improved machinery for seeding, what I claim therein, and desire to secure by letters patent, is the jointed tooth attached to the beam, as shown in fig. 7, in combination with the swivelling bifurcated spout to direct the corn, as above specified, for ribbed seeding.

I also claim the combination and arrangement of the counter (2) with the clutch, as described, so that the counting shall stop when the seed is not delivered.

I also claim the finger register, (*f*, *i*,) and its appurtenances, as above described, for regulating the quantity of seed delivered.

I also claim, in combination with the seeding apparatus, the pulverizer for guano, &c., constructed and arranged as set forth.

JESSE URMY.

No. 8867.—*Improvement in Rails and Car Wheels.*

What I claim, therefore, as my invention, and desire to secure by letters patent, is the guide wheels, in combination with the rail, constructed as described, and the carriage,—said wheels having their circumferences bevelled so as to expose two surfaces to roll upon, one to project against the side of the rail, and the other to come in action upon the surface of the inner strip, forming part of the chair when the guide-wheels become burthen-wheels, as described; the whole being constructed and operating substantially in the manner as herein set forth.

JOHN VALENTINE.

No. 8868.—*Improvement in Drop Punches.*

I do not claim constructing the hammer with a long stem, and making the same serve as a guide; but I claim as my invention, and desire to secure by letters patent, the hammer, or drop, provided at the same time with a stem to serve as one of its guides, and one guide on each side at or near its lower end, substantially as herein described.

I also claim, as my invention, the manner of lifting and discharging the hammer, or drop, by means of the cogs in its stem, and the pinion operating therein,—the fall of the hammer, or drop, bringing the said pinion into gear with the motive power, and its upward motion releasing or discharging it therefrom at any given point, substantially as herein described.

SOLOMON ANDREWS.

No. 8869.—*Improvement in Hinges.*

I do not claim as new, simply constructing the window-blind hinge, with its screw-plates, so arranged as to be screwed to the back of the blind and the outside of the window casing. But I claim the bridge or inclined plane at the base of the pin, and the corresponding elongation of the eye operating upon and in connexion with the hook and catch attached, and connected in the manner described, the whole forming a fastening, and the mode of operating the same—the fastening taking hold of and pulling directly upon the window casing and the blind, and thus relieving the hinge as described.

I claim the use of the bridge or inclined plane at the base of the pin, and the elongation of the eye, as described, for disengaging the blind fastening, independent of its connexion with my fastening, as above described, and whether the fastening is connected with the hinge or not; the whole being constructed and arranged substantially in the manner above set forth.

WM. BAKER.

No. 8870.—*Improvement in Machines for Tonguing Boards.*

Having thus fully described our apparatus, what we claim therein as new, and which we desire to secure by letters patent, is the arrangement of two *sets* of stationary rebating cutters for tonguing boards in separate stocks, substantially as herein described, with a space between them for the escape of shavings—the sides of the stock being substantially parallel to the face of the board and each other, and the surfaces of their soles being substantially perpendicular thereto; the plane irons being inclined in the usual way to the soles and backs of the stocks, and the cutters in their length being substantially parallel to the sides thereof. We are aware that two sets of cutters, in separate stocks, have been differently arranged, and for an analogous purpose; and we therefore do not claim them except in the arrangement and position substantially as above described.

RANSOM CROSBY.
HENRY D. EDGCOMB.

No. 8871.—*Improvements in the method of Welding Steel, etc., to Cast Iron.*

Having thus fully described our improved apparatus for the manufacture of articles of cast iron, with steel or wrought iron welded thereto, what we claim as our invention, and desire to secure by letters patent, is—

First. The metal box, or frame, for sustaining the steel in place and forming the cell below it; and

Secondly. Securing the steel in place by means of the clamps, in the manner above described.

M. FISHER.
JOHN H. NORRIS.

No. 8872.—*Improvements in Mills for Curvilinear Sawing.*

What I claim as my invention, and desire to secure by letters patent, is connecting the supporting roller (*a*) with the lever which forces it up against the under side of the log, by means of a joint and a segment slot, and securing bolt, or the equivalents thereof, substantially as specified; so that the said roller can be inclined in any desired direction from a horizontal line to suit the inclination of the under side of the log, and there secured, to give efficient support, as set forth.

I also claim extending the chucks for supporting the ends of curved logs below the head and tail blocks, so that the ends of such logs, in siding, may be supported below the surface of the head and tail blocks to bring the upper curved part within the range of motion of the saw, substantially as specified, when this is combined with the middle supporting rail on which the lower part of the chucks rests, and by which they are supported during the operation, as set forth.

And, finally, in the method of indicating the bevels, and keeping the log to them as it is being sawed, I claim the index hand, whose axis of motion is in a line, or nearly so, with the axis of rotation of the log, substantially as specified, in combination with either of the side levers, which have the same axis of motion as the index hand, and the adjustable or shifting inclined ways, substantially as specified, so that, as the carriage advances with the log, the passage of the side lever (whether on one side or the other) on the inclined plane, set to the required bevel, will shift the index hand and indicate the true bevel, to enable the operator to turn the log to correspond, as set forth.

JAMES HAMILTON.

No. 8873.—*Improvements in Machinery for Making Casks.*

What I claim as my invention, and desire to secure by letters patent, is as follows, viz: The sawing of two staves from one block, by means of two saws, which in succession enter the same kerf, then in succession diverge in opposite directions, and finally converge and pass out of the same kerf, substantially as specified, the two saws being mounted substantially as specified, so that they can be moved laterally in opposite directions, in combination with the templates, or their equivalents, for giving the required lateral motions to the saws, as the block of wood is moved forward towards the saws, substantially as specified. In the machinery for boring holes for dowel pins, I claim the arrangement of the mandrels carrying the bits on separate slides, to admit of varying their distance apart, substantially as specified, in combination with the reversible fence or gauge hung to a rock-shaft, mounted on a slide between the mandrels, and provided with the means of adjustment, substantially as specified, by means of which the bits can be set at pleasure, to bore the holes at any desired distance apart, and on the two edges to correspond, the distance being gauged from the same end, with the view to economize timber, as specified.

In the machinery for jointing staves, I claim, in combination with the circular saw and the hinged carriage—which is governed by guides, to determine the form to be given, as described—the employment of the gauging apparatus, to determine the quantity of stuff to be cut off, and

the gauge piece, with its two points, and made adjustable on the carriage, substantially as specified, by means of which combination the quantity of stuff to be cut away from each edge is regulated, to prevent waste, and an equal width of the two ends secured, when cutting the second edge, as set forth.

In the machine for setting up the staves and driving on the hoops, I claim the spring-arms jointed to the weight or head on the sliding shaft, or the equivalents thereof; the said arms being formed with lips inside, to support the hoop whilst setting up the staves, as specified, when the said arms are combined with the cam-plate, or the equivalent thereof, for the purpose of liberating the arms from the hoop, that they may be employed for driving on the hoop, substantially as specified.

And, finally, in the machinery for turning the heads, I claim, in combination with the face-chuck, for receiving the head, and the clamping piece, for clamping it against the chuck, substantially as specified, or the equivalents thereof, the employment of the jaws operated by screws, or their equivalents, for the purpose of forcing together the different pieces constituting the head, preparatory to clamping them on the chuck, and turning the head, substantially as and for the purpose specified.

JAMES HAMILTON.

No. 8874.—*Improvements in Looms for Weaving Figured Fabrics.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The method of moving both picker sticks of a loom simultaneously and at each beat of the lay, by the mechanism herein described, or the equivalent thereof, whereby a shuttle may be thrown from either side of the web at each beat of the lay, and the momentum of the picker motion at one side of the loom is counterbalanced by that of the other picker motion at the opposite side of the loom, the mechanism operating in such manner that both the pickers are free to retreat to the outer ends of the shuttle-boxes the instant the shuttle is thrown, substantially as specified.

Second. The combination of the pattern-wheel, (U,) arm, (W,) double-armed lever, (R,) cross-head, (M,) and stop, (L,) operating substantially as herein set forth, to effect the shifting of the shuttle-boxes, as herein set forth.

Third. The combination of the forked marches, reciprocating levers, pattern drum, and evening pin, substantially as herein set forth, to effect the working of the heddles to form the shed, as herein set forth.

Fourth. The combination of the supplementary arms on the cam-shaft, and pins upon the star-wheel, or the equivalent thereof, operating substantially as herein set forth, to vary the number of changes which the heddle mechanism is susceptible of.

Fifth. The combination of a fork and grid motion, for effecting the stopping of the loom when the weft thread breaks, as the shuttle is moving towards one side of the loom, with the shifting-plate lever operating substantially as described, for preventing the loom from being stopped by the fork and grid motion, when the shuttle is thrown towards the side of the loom furthest therefrom.

Sixth. The combination of the long rock-shaft on the lay, with its arms, toes, and levers, and of the chain lever and chain with the breast beam lever, or the equivalents thereof, operating substantially as described, to effect the stopping of the loom, when the shuttle is not in its proper shuttle box at the time the lay is beating up, and also whenever the shuttle has not been ejected from its box at the time the lay is completing its back stroke, as herein set forth.

BARTON H. JENKS.
ROBERT BURNS GOODYER.

No. 8875.—*Improvements in Reeling Machines.*

We do not claim to have invented a self acting stop-motion, to stop the machine when a given length of yarn has been wound upon the reel, this having already been applied to machines similar to ours; but what we do claim, is constructing and arranging the stop motion, substantially as described, so that, by adjusting it, the length of yarn wound upon the reel before it is stopped may be regulated at pleasure, and all the skeins wound under the same adjustment will have the same length.

ELIAS MACY.
SIMEON MACY.

No. 8876.—*Improvements in Sewing Machines.*

Having thus fully described my additional improvements, what I claim therein as new, and for which I desire to secure letters patent, is—

First The cut-off friction pad, constructed and operating substantially in the manner and for the purpose set forth.

I also claim the construction and arrangement of the feeding apparatus as above described.

ISAAC M. SINGER.

No. 8877.—*Improvement in Seed Planters.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The application of the dibbles, *l, l,* &c., constructed and arranged as described, to the peripheries of the wheel, and operating in the manner herein set forth.

We also claim the peculiar arrangement for feeding the seed to the hills, consisting substantially of the pistons, *f, f,* and tubes, *e, e,* regulated by the coiled springs, *s, s,* and bars, *g, g,* and operating as herein set forth.

B. T. STOWELL.
A. MARCELLUS.

No. 8878.—*Improvement in Instrument for Opening Boxes.*

What I claim as my invention, and desire to secure by letters patent, in the above-described instrument for opening boxes, is the tapering score, I, cut in both jaws, but smaller in the upper one, or F, so constructed that when both jaws are driven in between the side and lid of a box, the points of the jaws pass on each side of the nail, which will be gripped in the score, I, so that as the jaw, F, is raised to take up the lid, it will draw the nail out of the side, and thus prevent the head of the nail from being drawn through the lid as it rises, while the jaw, G, rests upon the side of the box, substantially as described.

Second. Is the tapering score, I, in combination with the peculiar construction and arrangement of the jaws, F and G, the latter being furnished with a recess at H, into which the former closes, in the manner and for the purposes herein set forth.

GEO. C. TAFT.

No. 8879.—*Improvement in Seed Planters.*

Having thus fully described my improved seeding apparatus and cultivator, what I claim therein as new, and desire to secure by letters patent, is the hollow reversing tooth, constructed in the manner and for the purpose set forth.

FRANCIS VANDOREN.

No. 8880.—*Improved Oblique Bucket Paddle Wheel.*

I do not claim placing the paddles in oblique positions to the axis of the wheel, as this has been done before; nor do I claim two sets of paddles, inclining obliquely in opposite directions, and all at the same distance from the centre of the wheel. But what I do claim as my invention, and desire to secure by letters patent, is the arrangement of two series of adversely inclining oblique paddles, one within the other, in the construction of steamboat wheels, substantially as herein set forth.

GEO. S. WEEKS.

No. 8881.—*Improvement in the feed apparatus of Planing Machines.*

What I claim as my invention, and desire to have secured to me by letters patent, is the arrangement by which the upper feed-roll is allowed to yield to any inequalities in the board, and, at the same time, draw down upon the surface to which it has yielded in proportion to the resistance to the cutting tools—that is, connecting the fixed shaft with the vertical sliding bearings of the upper feed-roll by means of the swinging, inclined, and vertical arms; the gears on the fixed shaft operating the lower feed-roll, and also playing into the gears which move the upper feed-roll—said latter gears having their bearings in the intersection or joint of the said arms; the arrangement being substantially as herein above set forth.

JOEL WHITNEY.

No. 8882.—*Improvement in Submarine Augers.*

Having thus described my invention, what I claim and desire to secure by letters patent, is forming a pod-auger, with a hinge joint, E^1, in combination with connecting wires, substantially in the manner and for the purposes set forth and shown.

NORMAN BLAKE.

No. 8883.—*Improvement in Mattresses.*

What I claim, and desire to secure by letters patent, is the use of the hair of hides of cattle, treated after the manner of or steeped with the hides of cattle in the lime-vats of a tan-yard, or other suitable place, as described, with or without other animal or vegetable matter, treated or not treated conjointly therewith, or separately in the same way, and the use of other animal or vegetable matter, under like treatment and circumstances, as described, whether used conglomerately, conjointly, or separately, or their equivalents, when such animal or vegetable matter is of the kinds used for upholstering or sleeping purposes, in the articles of mattresses, ottomans, cushions, sleeping sofas, sacking bottoms, or analogous articles, whereby a new result is obtained, viz: an article obnoxious to bed-bugs, without the necessity of any temporary application of poisonous mixtures thereto; thus furnishing the world with a harmless antidote to a great nuisance, and abolishing the necessity for a great peril to human life in the domestic circle.

THOS. G. CLINTON.

No. 8884.—*Improvement in Winnowers.*

What I claim as my invention and improvements, and desire to secure by letters patent of the United States, is herewith set forth in detail:

Firstly. I claim, in combination with the side openings, discharge outlets, or passages, *o, o*, diagram, E, the invention, use, and application of the sliding diaphragm, with double sloping bottom, *p, p, p*, in diagram, E. This diaphragm bottom, as shown and used, has a double slope, or is a double inclined plane, outward, inclining from each side of its elevated longitudinal centre.

Secondly. I claim the use, application, and arrangement of an adjustable or sliding cheat or smut-board, *q, r*, as shown in diagrams, C and F; and the same, also, in combination with the top screen, No. 1, with side apertures or outlets, *o, o*, as shown in diagram, E, for the purpose as herein-before fully specified.

THOS. J. DOYLE.

No. 8885.—*Sash Stopper and Fastener.*

I claim my improvement of combining the rocking plate, F, and lever in one single piece, and extending it below the part which rocks on the part, *b*, of the notch of the catch plate, all essentially in the manner as described, whereby I greatly simplify the construction of the window catch, and render it not only cheaper in construction, but less liable to get out of order.

CHAS. C. FELTON.

No. 8886.—*Improvement in protecting Wheels and Axles of Cars, by encasing them.*

What I claim as new, and desire to secure by letters patent, is encasing the axles and wheels of rail cars within a metallic casing, D, E, F, substantially as and for the purposes herein specified.

A. L. FINCH.

No. 8887.—*Improvement in the Keys of Piano-Fortes, Organs, &c.*

I claim the improvement of the finger-keys of organs, piano-fortes, or any other musical instruments played in a similar manner, by constructing a part of every key in such manner that, when in position on the key-board, such part of every key shall be both level and in range with the similar parts of the other keys, so that the running of a finger over the keys of the whole chromatic scale, on the key board, may be capable of producing similar effects to those that can now be produced by a similar running of a finger over the lower range of keys of piano-fortes as now constructed, substantially in manner and form as set forth in the above specification.

W. F. FURGANG.

No. 8888.—*Improved Capping of Screws.*

I do not claim as my invention the adaptation simply of a cap of sheet metal to the particular configuration of any regular or irregular form by compression, or in whatever other manner the same may be produced. But what I do claim, and desire to obtain letters patent for, as my invention, is the attachment of a brass, copper, or other suitable metallic cap to, and its combination with, an iron wood screw, substantially in the manner and by the process described in the foregoing specification, (which I conceive to be the only practicable method in which the same can be usefully effected,) whereby, and by means of the successive operations of punching or stamping, the nick is first cut through the shell, and then, after being adjusted to the groove or slot in the head of the screw, the sides thereof are driven down into, and made to press closely against the sides of the slot, leaving the bottom of the groove or slot uncovered, so that the cap, when closed round the head of the screw, will preserve its hold without liability to be turned or displaced by the screw-driver which works upon the iron surface at the bottom of the slot, and against the covered sides thereof; thereby furnishing to the public, at a comparatively small cost, a wood screw, having all the beauty and finish of a brass, copper, or plated screw, in combination with the greatly superior strength of an iron one. The invention is equally applicable to steel screws, which may be capped in a similar way.

CHAS. T. GRILLEY.

No. 8889.—*Improvement in Machine for Drawing Spikes.*

Having thus explained and described my invention, what I claim, and desire to secure by letters patent, is the shackle, with the arrangement for clasping the head of a spike, for the purpose of drawing it from the cross-tie of a railroad track, in combination with the clevy, C, and the lever, A, substantially as hereinbefore described and set forth.

DANIEL HALE.

No. 8890.—*Improvement in Apparatus for Raising Water.*

What I claim as my invention, and desire to secure by letters patent, is constructing the wheel or turbine with exterior ribs, *e, e, e*, of any suit-

able number, size, or shape; the said ribs operating, in combination with a cover, D, or its equivalent, in the manner and for the purposes substantially as set forth.

N. H. LEBBY.

No. 8891.—*Improvement in Refrigerators.*

But what I claim therein as new, and desire to secure by letters patent, is the application, as herein described, to an ice safe or refrigerator of a crimped, convoluted, or corrugated form to the shelves, in order (in addition to combining strength with lightness of construction) to capacitate them for the collection, retention, and discharge of the water which results both from the ice and from the atmospheric moisture within the case.

ANDREW MAISH.

No. 8892.—*Improvement in Brick Machines.*

Having thus fully described my invention, and the manner of constructing the same, what I claim therein as new, and desire to secure by letters patent, is the manner of feeding the clay to the moulds by means of the cut-off (4) in the hopper case, with the scraper (5) for heaping the clay under the plunger, in connexion with the plunger, 8, operated as described, for partially condensing the clay into the moulds preparatory to pressing, substantially as described.

I also claim the "carrier" for clamping and removing the brick from the moulds, consisting of the clamp (36) and back plate, (32,) for clamping the brick, and the spring (38) and tumbler shaft and trigger, (37,) or their equivalents, arranged substantially as described, and operated upon by three stationary pins, 39, 40, and 48, substantially in the manner and for the purpose herein fully set forth.

JESSE SAMUELS.

No. 8893.—*Improvement in Rotary Pumps.*

Having thus described the nature and operation of our invention, what we claim as new, and desire to secure by letters patent, is the spiral flanch, D, working within a circular case, A, said flanch being constructed as described, in combination with the sliding valve, I; the spiral flanch and valve operating in the manner and for the purpose substantially as herein shown and specified.

HENRY C. SPALDING.
GAGE STICKNEY.

No. 8894.—*Improvement in Balance Gates.*

Having thus described the nature and operation of my invention, what I claim as new and desire to secure by letters patent, is the method of opening and closing the gate, A, substantially as herein shown and described, viz: by means of the ropes, or cords, d, d^1, passing over the semi or half pulley, C, and attached to the small upright, e, said pulley, C, being attached to one of the side pieces, a^1, of the gate; the gate being hung upon pivots, b, b, and balanced by the weight or counter poise, B; the several parts being operated as set forth.

WM. C. VAN HOESEN

No. 8895.—*Improvement in Tailors' Measures.*

What I claim as my invention, and desire to secure by letters patent, is the graduated straps, No. 1, No. 2, and No. 4, in connexion with the several centres about which they respectively turn, and with the graduated arcs, the said centres being arranged substantially as herein set forth and for the purposes specified, using for that purpose the aforesaid instrument, or any other substantially the same, and which will produce the intended effect; but I disclaim having invented the tape measure or the elastic square, designated as No. 3., underneath the main instrument.

WILLIAM T. WELLS.

No. 8896.—*Improvement in Hame Tugs.*

What I claim as my improvement, and desire to secure by letters patent, is the formation of the hame tug by means of the two metallic plates fitted together so as to embrace the buckle, loop, and cleft, substantially in the manner herein set forth.

R. B. WHIPPLE.

No. 8897.—*Improved Reflecting Spirit Level and Square.*

I would remark, however, that I deem the cubical block, with its two mirrors and two spirit levels, arranged as seen in the drawings, the most convenient form; and it is this instrument, or combination of block or frame, two mirrors, and two spirit levels, or what is equivalent to the two levels, viz. a spherical surface level, that I claim as my invention.

FRANCIS WILBAR.

No. 8898.—*Improved devices for Casting Plates, Roses, &c., with dove tailed Grooves.*

What I claim as my invention, and desire to secure by letters patent, is forming the dovetails, a, a, in circular plates by dovetail pieces, j, j, which are withdrawn lengthwise from the recesses; the said withdrawing being performed by attaching the dovetail pieces to levers, F, F, within the cylinder, E, or body of the mould; the said levers being moved by a rod, G, passing through the side of the cylinder or body of the mould, substantially as herein set forth.

NATHAN MATTHEWS

No. 8899.—*Improvement in Railroad Car Brakes.*

I do not claim the mere application of friction rollers, c, c, as such are not new; nor yet do I claim, independent of the means and manner shown, the employment of a stop to prevent the advance rubber from being raised by the wheel, or, exclusively of itself, the adoption of a

13—*m*

spring to reduce the shock. But what I do claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the sliding bar, E, made as described and represented in fig. 1, with the rollers, *e*, *f*, and suspended frame, B, attached to a hanger, C, by a centre pin. *i*, on which is adjusted the spiral spring, *d*; said frame being made, arranged, and operated in the manner and for the purpose herein set forth.

BENJAMIN KRAFT.

No. 8900.—*Improved Valves for Steam Engines.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement, in the valve-chest of a steam engine, of a duplex valve, one part of which is actuated in the usual manner, by valve-gear, to admit steam from the boiler to act directly on the other part, and force it to open and close the steam or exhaust passages, substantially as herein described.

MATTHIAS W. BALDWIN.

No. 8901.—*Improvement in File-Cutting Machines.*

Having thus described my invention for cutting files, I would state that I do not claim a pattern for regulating the depth of the cut of the chisels; but I do claim the combination of the pattern located between the cam and the chisel-carriage, in the manner herein described, with said cam and carriage, and the file carriage by which the pattern is moved; the whole arranged and operating substantially in the manner and for the purpose set forth.

JOHN CUST BLAIR.

No. 8902.—*Improvement in Shuttles for Weaving Hair-Cloth, &c.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the sliding bar, *c*, with the spring, *a* and *b*, when used in connexion with stops attached to the shuttle-boxes, (or other convenient fixtures,) so that the motion of the shuttle will slide the bar in such a manner that when one of the springs drops one piece of the woof or filling, the other spring will receive and confine another at the other end, so that the pieces may be carried through, alternately, from each side, and released or dropped in the right position to be beat up; when the whole is constructed, arranged, and combined substantially as herein described.

DANIEL S. DEWEY.

No. 8903.—*Improvement in Hold-Back for Sleds.*

I do not claim connecting the dogs with, and operating them by, the backward pressure of the tongue; but I claim as my invention, and desire to secure by letters patent, as being more simple than the ordinary means by which this is effected, attaching the dogs, C, C, to the roller, B, rigidly, instead of to the runners, as is usual, and connecting the tongue to the said roller, by hinges or analogous joints, in such a manner that the backward motion of the tongue, in relation to the body of the sled, turns the roller on its axis, and forces the points of the dogs so attached to it into the snow or ice of the road, substantially as and for the purpose herein set forth.

PERRY DICKSON.

No. 8904.—*Improvement in Smut Machines.*

Thus having fully described my machine, I wish it to be understood that I do not claim as new a "perforated case," the same having been heretofore in use; neither do I claim a spike rubber, nor a ventilator with spiral arms, nor scourers made of sheet or other metal; nor do I claim the oil-box at the top of the machine, nor the oil-pipe for the lower bearing of the shaft. But what I do claim as new, and desire to secure by letters patent, is—

First The projecting screen chambers, in combination with the arrangements for separating the rubbing chamber from the fan-chamber, whereby the grain is prevented from being affected by the blast from the fan chamber while it is passing through the rubbing-chamber, and is only brought in contact with the current of air where it ascends to take away the chaff and other impurities, substantially as herein set forth.

Second. I also claim, in combination with the scouring surfaces, the beating forks, for the purpose of beating the grain and breaking the hulls while falling from the rubber to the scourers, whereby the berries are more effectually cleaned from adhering impurities, as herein set forth.

JOHN M. EARLS.

No. 8905.—*Improvement in the Relief Steering Apparatus.*

Having thus described the nature of my invention, the way in which it is constructed, and its operation, I do not claim any particular part of the apparatus as new; but what I claim as my invention, and for which I desire letters patent, is the combination of the forked and unforked pawls with a single ratchet, and with rubbers, N and O, placed face to face, and on the same side of the wheel, A.

Second. I claim the combination of the spring, J, the arms, A[1], B[1], and the cap piece, C[1], with the relieving springs, H, I, whereby the pawls are supported with sufficient firmness, but, at the same time, permitted to have sufficient play to admit of the action of the said relieving springs, all as substantially set forth, represented, and described.

NATHANIEL T. EDSON.

No. 8906.—*Improvement in Railroad Switches.*

What I claim as my invention, and desire to secure by letters patent, is the bars or shifters, J, C, H. L, O, K, and N, P, M, constructed, arranged, and connected to the switches of a railroad in the manner and for the purpose substantially as described; so that if the train run in either direction, and the rudder be placed in either position, as described, and if the switch or switches are not in a proper position, the rudder will act upon the shifters and move them gradually as the train approaches, so as to

move and place the switches in such a position that the train may pass on unimpeded, without the risk of running off the track.

JOHN F. KLEIN.

No. 8907.—*Improvement in Gins for long staples of Cotton.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is regulating the feed of a cotton-gin for ginning Sea-island cotton by means of an endless apron, which may be set to or from the feed rollers to suit the quality of the staple, and the quantity to be fed in to be cleaned, and still be driven by the same mechanical movement, substantially as herein described.

I also claim, in combination with the covered feed-rollers which receive the material from the apron and carry it into the machine, the series of alternate brushes and elastic beaters on the same shaft, for combing out the fibre and knocking off the seed whilst it is still held by said rollers, as herein substantially set forth and described.

I also claim, in combination with the inclined chamber, *j*, through which the material is driven by the blast from the wings of the beaters, the inclined chamber, *p*, having a cross blast through it from the fan-blower, Z, to complete the entire separation of the fibre and the seed, both chambers being provided with screens, substantially in the manner and for the purpose herein fully set forth and described.

CALVIN WILLEY, Jr.

No. 8908.—*Improvement in Warm Air Furnaces.*

Having thus described the nature of my invention, and the manner in which it is constructed, what I claim as new, and desire to secure by letters patent, is the use of an equalizing flange, H, H, with the tubes, h, h^1, attached, by which the air on each side of the radiating cylinder is warmed to about the same temperature before entering the warm air conducting flues.

ALEXANDER KELSEY.

No. 8909.—*Improvements in Machines for Pressing Tobacco.*

Having thus fully described the nature, construction, and operation of my improved tobacco press, what I claim therein as new, and desire to secure by letters patent, is the use of the revolving mould disk, 3, combined with its revolving bed plate, 4, with the scraper, 5, and cloth roller, 6, or their equivalents, for keeping the moulds free from the licorice or juice of the tobacco, substantially as described.

I also claim the use of revolving sinkers, (9,) constructed substantially as described, combined with the pan, 10, and cushion, 11, or their equivalents, for keeping the same clean, and the combination therewith of mechanism for moving the sinkers a quarter of a revolution at every eight, more or less number of pressings, substantially as described.

I also claim the conductor formed of endless aprons or belts, or their equivalents, for confining and retaining the plugs under pressure until

they are thoroughly consolidated, in manner and for the purpose substantially set forth.

EPHRAIM PARKER.

No. 8910.—*Stud Brace for Flues of Sheet Water Space Boilers.*

What we claim as our invention, and desire to secure by letters patent, is the stud brace for bracing the flat surfaces of steam boilers, substantially as described in the foregoing.

ANDREW LAMB.
W. A. SUMMERS.

No. 8911.—*Improvement in Brushes.*

What I claim as my invention, and desire to secure by letters patent, is the double adjustability of the brush, by means of the combination of the ball and socket joint, and the sliding joint, or their equivalents, substantially as herein set forth.

FREEMAN MURROW.

No. 8912.—*Improved Float Gauge, Feed Regulator, &c., for Steam Boilers, &c.*

I do not, therefore, claim broadly the employment of a float to regulate the action of an independent mechanism, as a means of indicating the height of water and regulating the supply thereof, when such float acts upon such mechanism outside of the boiler. But what I do claim as my invention, and desire to secure by letters patent, is the employment, substantially as described, of an independent float within a steam or other boiler, or other vessel, which, as its position is varied by the change of level of the water, shall act as a check or stop to the motion of a mechanism combined therewith, and operated by an independent motive force outside of and passing through to the inside of the boiler, substantially as described, to determine the supply of water to be given, or to give the equired indication or alarm, as specified.

And I also claim the method herein described of preventing the action of the mechanism outside, which is actuated by an independent force, from reacting on and changing the position of the float, that it (the float) may be free to follow the varying level of the water, as specified.

THOS. J. SLOAN.

No. 8913.—*Improvement in Self loading and Dumping Carts.*

What I claim as my invention, and desire to secure by letters patent, is the manner of opening and closing the slatted bottom of the cart body, substantially as herein set forth, viz: by means of a bar, *f*, which is jointed to the near edge of the foremost slat, *e*, and which, when its rear end is unfastened, descends vertically, and allows the whole series of slats to be opened simultaneously by the action of the weight within the cart body pressing upon the same; and, when the rear end of the said bar is drawn rearwards and upwards, simultaneously actuates the whole series of slats, and thereby closes the bottom of the cart body.

B. T. STOWELL.

No. 8914.—*Improvement in Steering Apparatus.*

We are aware that the steering gear and rudder-head have been connected together, and the tiller made to rise and fall with them, and therefore we do not claim such an arrangement; but what we do claim as our invention, and desire to secure by letters patent, is the construction and arrangement of the tiller and rudder-head, as described, in combination with steering gear, entirely separate from the rudder-head; the tiller being connected with the latter, and attached to the former in such manner that, when the rudder is unshipped or raised unusually high by striking the bottom, the tiller will be disconnected therefrom, without danger of breaking either the steering gear or the rudder-head, or being itself broken.

NEHEMIAH HUNT.
ALFRED SWINGLE.

No. 8915.—*Improvement in Boxes for Journals.*

I claim making the cap box, in the manner described; that is to say, of alternate pieces of hard and soft metal, arranged in a helical position, by which, together with the circular end pieces, the soft metal is kept in place, and friction and injury to the axle prevented, substantially as described.

HENRY TURNER.

No. 8916.—*Improvement in Rock Drills.*

Having thus fully described the construction of my machine, what I claim therein as my invention, and desire to secure by letters patent, is, in combination with the cam-wheel, C, and guide, U, the hanging of the lever by which the drill is raised on a jointed arm, so as to give it two sets of motions, viz: up and down, to lower and raise the drill, and a backward and forward motion from and towards the cam-wheel, to operate the machine without noise or jar; the whole being arranged substantially in the manner and for the purpose specially set forth and described.

W. F. ASH.

No. 8917.—*Improvement in Leather Gauges.*

What I claim as my invention, and desire to secure by letters patent, is the wheel, E, with its inclined planes or wedges, arranged so as to act upon the roller frame, substantially in the manner herein set forth.

LEWIS W. BEECHER.

No. 8918.—*Improvement in Potato Washers.*

What I claim as my invention, and desire to secure by letters patent, is the screen and cylinder combined, the screen working within the cylinder, and its axis or shaft working within or through the tubular projections or bearings of the same, substantially in the manner and for the purposes set forth.

ALONZO BENTLEY.

No. 8919.—*Improvement in Lever Jacks.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the lever, H, the lip, *d*, and the cleat, *g*, constructed as herein set forth, with the dog, D, and the springs, *e*, so as to act together, in the manner and for the purposes herein stated.

LEVIS H. DAVIS.

No. 8920.—*Improvement in Electro-Magnetic Alarm Bells.*

I claim as my invention the combination, substantially as herein set forth, of the electro-magnet and armature (or its electro-magnetic equivalent) with the falling ball, or spring, and the detents, and the lifting cam, or its equivalents, so arranged that when the ball is supported by the armature, a slight force only of the electro-magnet is required to trip the ball, which ball in falling acquires sufficient momentum to produce much greater mechanical effects than the magnet alone, the velocity of the ball in falling being still further accelerated by the force of a spring, if desired. The power thus obtained I use in the manner and for the purpose herein described.

MOSES G. FARMER.

No. 8921.—*Improvement in Washing Machines.*

Having thus described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the application, substantially as described, to the process of washing of balls of wood, or other buoyant material, in connexion with a reciprocating frame, or equivalent device, by means of which a rolling, yielding, or evenly pressing surface is presented to the clothes or other articles to be washed

CHRISTOPHER HOLLINGSWORTH.

No. 8922.—*Improved Adjustable Wrench.*

What I claim as my invention, and desire to secure by letters patent, is constructing the collar or eye of the inner jaw with an aperture therein of greater section than the bar on which it slides, in combination with the spring thereon and the screw thereto attached; the whole constructed and operating substantially in the manner and for the purpose herein de cribed.

ANDREW HOTCHKISS.

No. 8923.—*Improvement in Differential Safety Valves.*

Having thus fully described my improved safety valve, I would state that I do not claim constructing a valve that shall act upon the differential principle, or one which will not admit of the application of external weight or pressure; but what I do claim as new, and desire to secure by letters patent, is the peculiar arrangement and combination of the hollow cylinder-box, D, sliding in case, A, with the conical valve and tubular valve-rod and escape pipe, B, constructed and operating substantially in the manner and for the purpose herein fully set forth.

JOHN McCLINTIC.

No. 8924.—*Improvement in Railroad Car Brakes.*

What I claim as my invention, and desire to secure by letters patent, is the employment of the radial bar, H, turning loosely on the brake lever shaft, F, of the tender or forward car, 1, and spring, I, for enabling the brakesman to operate the brake of the tender or forward car, on which he is stationed, without altering the position of the radial bar, H, after being set, as described.

THOMAS G. McLAUGHLIN.

No. 8925.—*Improved Anvil.*

What we claim as our invention, and desire to secure by letters patent, is a cavity in the body of anvils, for the purpose of cooling the same, by the introduction of water or other fluid into the said cavity, while the faces of said anvils are undergoing the process of tempering.

CHARLES PETERS,
WM. FETTER.

No. 8926.—*Improved machinery for Grinding Conical edged Knives.*

Having thus fully described the nature, construction, and operation of my invention, I will now state what I claim as new therein, and desire to secure by letters patent.

I claim—First. The combination of the curved way, H, and table, I, thereon, provided with appropriate automatic contrivances for traversing the latter along the former, with the carriage, F, on which they are both supported, and which is provided with axis and screws, or their equivalents, to adjust said carriage, F, to any required angle with the horizon, for the purpose herein fully described.

I claim—Second. Operating the feed motion, or the motion for carrying the edge of the knife across the periphery of the stone, by means of a roller, Y, bearing on the periphery of the stone, in the manner and for the purpose herein fully set forth.

I claim—Third. Connecting the carriage, F, and the table, I, which carry the knife, with the roller, Y, receiving motion from the stone by means of the combination of mechanism, substantially as herein described, by which the motion of the roller towards the axis of the stone, consequent upon the wear of the stone, will cause the knife or knives being ground to follow the periphery of the stone, and thereby compensate for its wear and preserve the required form of the edge or edges of the knives, viz: that of an arc of a circle, as herein fully set forth.

JAMES L. PLIMPTON.

No. 8927.—*Improvement in Churning Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the arrangement of dogs, or pawls, J, J[1], and pen, *h*, with wedges, K, L, for the purpose of tripping each other.

GELSTON SANFORD.

No. 8928.—*Improvement in Funnels.*

What I claim as my invention, and desire to secure by letters patent, is the measuring funnel, constructed substantially as herein set forth, with an interior ventilating tube to admit air beneath the valve.

CHRISTIAN SCHNEIDER.

No. 8929.—*Improvement in Machinery for Grinding or Polishing Saw Blades, &c.*

Claim first. The combination of two grindstones, or their equivalents, revolving in the direction herein made known, for the purpose of grinding or polishing two sides of a saw, or other article, simultaneously, with a reciprocating frame, or its equivalent, for the purpose of holding the article being ground or polished, whereby the tendency of either stone to move the article is counteracted by the action of the other stone, and the same force is thereby required to reciprocate the article in either direction, as described.

Second. The combination of the right and left hand screws, carriers and nuts for said screws, movable pedestals, or boxes, together with the cross shaft, worms, worm-wheels, and handles, substantially as set forth, for the purpose of moving two grindstones, or their equivalents, simultaneously, against opposite sides of an article being ground or polished, as described.

Third. I do not claim giving an automatic traverse motion to grindstones. But what I do claim, is the arrangement of screws, mitres, wheels, handles, eccentrics, eccentric boxes, and movable frame, substantially as herein described, whereby I am enabled, at any time, to move the grindstones, or their equivalents, entirely across the machine, for the purposes set forth, without interfering with the automatic traversing motion which is given to the said stones, irrespective of their precise position with reference to either saw frame, or either saw, or other article fixed in said frame.

Fourth. The arrangement in the same machine of two sets of reciprocating frames, either of which can be stopped without affecting the other, and a carriage, whereby the grindstones can be caused to move from one frame to the other, by which arrangement one saw can be ground or polished while another is being adjusted into place.

WILLIAM SOUTHWELL.

No. 8930.—*Improvement in Lightning Rods.*

Having thus fully described the nature of my improvement, what I claim therein as new, and desire to secure by letters patent, is the formation of the point of a lightning rod of three or more metals, encased one within another—the most fusible to the outside, in order to prevent the destruction of the entire point by melting from an overcharge of the electric fluid.

JAMES SPRATT.

No. 8931.—*Improvement in Window Blind Machinery.*

Having thus described the nature, construction, and operation of my invention, I will proceed to state what I claim, and desire to secure by letters patent.

I claim—first. Hanging the auger shafts in swinging arms, or gates, S, S, of different lengths, hung on centres, *m*, *m*, said centres being in line, so that by moving the said swinging arms or gates nearer to or further from a position at right angles to the line in which the centres are placed, the distance between the said auger shafts taken in lines parallel to the line of centres, *m*, *m*, will be increased or decreased, and thereby be adjusted to different widths of slats lying upon each other, as herein substantially set forth.

I claim—second. The combination of the sliding bar, or carriage, O, carrying the stiles and rods, with the reciprocating carriage, R, carrying the mortising augers and wire-hole prickers, in the manner substantially as described, for the purpose of boring the mortises in the slats and pricking the wire holes in the rods, and insuring the distances between the mortises and points of attachment of the slats being precisely the same throughout.

I claim—third. The reciprocating slat table, or bed, made in three parts, X, Y, Y^5, the two end parts of which are adjustable to the middle part, in combination substantially in the manner described with the adjustable cutter heads, Z, Z, to wit: the end parts, Y, Y^5, of the table, or bed, and the cutter heads, being adjustable relatively to each other, for the purpose of tenoning or turning down the pivots on both ends of slats of various lengths.

I claim—fourth. Pricking the wire-holes in the slats and feeding them at proper intervals, from the box in which they are contained, to the bed or table upon which they are tenoned, by means of a vibrating feeder, 23, deriving its motion from the bed or table carrying the slats—the said feeder being provided with suitable horns, 24, 24, or their equivalents, and prickers, 29, 29, for the purpose of entering the box and pricking and pushing out the slats, one after the other, in succession.

DANIEL H. THOMPSON.

No. 8932.—*Improvement in Speaking Tubes.*

What we claim as our invention, and desire to secure by letters patent, is the combination of an alarm valve with a speaking tube or pipe, in the manner and for the purpose substantially as herein set forth.

THOS. J. WOOLCOCKS.
WILLIAM OSTRANDER.

No. 8933.—*Blind and Shutter Fastener.*

What I claim as new, and desire to secure by letters patent, is the method of securing or fastening window shutters by having the upper portion of the pintle, B, of the hinge of a square or other many sided form, and the upper portion of the socket, C, of a corresponding shape; a space being between the socket and pintle to receive the cap, E, which corresponds in shape to the upper portion of the pintle and socket, and fits on the pintle and in the socket, securing or fastening the shutter as herein specified.

SAMUEL BARKER.

No. 8934.—*Improvement in Portable Cot Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The elevation in the side-rails as a substitute for the pillow, as described.

Second. I also claim the dovetails as used for attaching and detaching the legs to and from the side rails—that is to say, the dovetails entering their mortises from opposite ends of the cot frame, so that they cannot readily loosen by use.

Third. I also claim the arrangement of the right and left hand screws which unite the opposite legs at their crossings, in such manner that the screws shall tend to tighten the joint as the legs separate from eac other, or loosen the same as they approximate.

Fourth. I claim the combination of the tense bars, F—having right and left screws—with the side-rails, Q, Q, of a cot-bed, for the purpose of keeping the sacking bottom tense.

WILLIAM C. BETTS.

No. 8935.—*Improvement in Railroad Car Seats.*

What I claim as my invention, and desire to secure by letters patent, is constructing the backs of railroad car seats with outer sliding backs, A, A, fitting in slides, *a*, *a*, *a*, and held by springs, for the purpose of elevation above the ordinary back, or depression below it, as herein shown and set forth.

ABEL B. BUELL.

No. 8936.—*Improvement in Meat Cutters.*

What I claim as new, and desire to secure by letters patent, is arranging in separate concaves—maintaining vertical positions, and uniting with each other—two cylinders, the one above the other,—the upper one operating to partially mince the meat and deliver it upon the lower cylinder, revolving at a greater speed, for reducing it to the required fineness, as described.

WILLIAM BURNS.

No. 8937.—*Improvement in Measuring Faucets.*

Having thus fully described our invention, what we claim therein as new, and desire to secure by letters patent, is the so constructing of a faucet, for measuring and drawing molasses, honey, oil, tar, or other liquids, that it shall always stand charged with a measured quantity of the liquid, which may be forced out of the faucet instantaneously, however thick or sluggish it may be, when the same is accomplished by means substantially the same as herein described and represented.

JACOB R. BYLER,
G. W. SENSENICH.

No. 8938.—*Improvement in the Manufacture of Brushes.*

I claim as my invention the above-described improvement in filling the holes of a brush block with bristles; the same consisting in the employment of a frame to contain said bristles in mass, and hold them in the brush blocks, and in the direction of their respective holes in the block, in *combination* with giving to such block and frame such movements, rappings, jarrings, or blows as to cause the bristles, by the force of gravity, or concussion, to pass into and fill the holes in the block, as hereinbefore stated.

ABBOT R. DAVIS.

No. 8939.—*Improvement in Cooking Boilers.*

What I claim as my invention, and desire to secure by letters patent, is the application of the small cup to the cooking pot, as herein described.

L. S. De BIBORY.

No. 8940.—*Improvement in Apparatus for Soldering in a vacuum.*

Having thus described the nature of our invention, what we claim therein as new, and desire to secure by letters patent, is the application to the purposes of soldering in a vacuum of a hollow bent tube, (*f, g, h*,) for the reception of a heater; the said tube being closed at the lower end, and provided with a screw thread (*f*) at its upper end, fitting tightly within a screw neck or collar, (*e*,) upon the glass receiver of an ordinary air pump, or other suitable instrument for producing a vacuum; the bent form of the tube bringing it to bear, during its rotation, upon the perimeter of the cylinder disk which closes the aperture.

J. B. HORNE.
J. R. HORNE.

No. 8941.—*Improvement in Blocks for Printing Oil-Cloths.*

Having thus described the nature and operation of my invention, I do not claim the construction of the stock, H, or gauges thereon. But what I do claim as new, and desire to secure by letters patent, is the movable gauge, E, in combination with the adjustable point, F, or its equivalent, to compensate for the contraction and expansion of the pattern block, in the manner and for the purpose substantially as shown and described.

JAMES JENKINS.

No. 8942.—*Improvement in Platform Scales.*

What I claim as new, and desire to secure by letters patent in the above-described scale or balance, is the rod, V, and the rod and socket, W, and section, Z, or their equivalents, in combination with the revolving head and face, (or graduated plate,) and hand or index, to show at once, and in any required direction, the weight of the article weighed.

ROBERT NEWELL.

No. 8943.—*Improvement in Lead-Pipe Machinery.*

What I claim as my invention, and desire to secure by letters patent, is connecting the core with the ram by means of a universal joint, or its equivalent, substantially as specified, so that the core shall be retracted with the ram, in combination with the cylinder and die of a machine for making pipe, by pressure, from lead or other soft metal run into the cylinder and on to the said core in the molten state, substantially as specified, whereby the core is retracted with the ram, and held in position while the charge is poured in, and, during the operation of forming the pipe, the vibrations of the ram do not practically affect the central position of the core in the dies, as herein specified.

BENJAMIN TATHAM.

No. 8944.—*Improvement in Tables.*

Having thus fully described my invention, I will now proceed to state what I claim as new, and desire to secure by letters patent. I claim—

First. The employment of "flies," G, G, levers, H, H, or their equivalents, in combination with the spiral springs, E, or their equivalents; the whole being constructed and arranged, and operating, in the manner and for the purposes substantially as herein set forth.

Second. The employment, in the manner substantially as herein described, of the levers, H, H, or their equivalents, in combination with the flies, G, G, for the purpose of lowering the table leaves when desired.

TIMOTHY H. TAYLOR.

No. 8945.—*Improvement in Gold-beating Machinery.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the double action, adjustable, differential cams, or their equivalent, combined with the sliding rod and pivoted cylinder, in connexion with other parts of gold-beating machinery, substantially in the manner and for the purpose as herein set forth and described.

WM. VINE.

No. 8946.—*Improvement in Mash Tuns.*

What we claim as our invention, and desire to secure by letters patent, is the completely enveloping the mash tun with water, or sufficiently so to produce the desired rapidity in cooling the mash.

ROBERT WICKS.
JAMES FAULKNER, Jr.

No. 8947.—*Improved Implement for Cutting Butter from Firkins.*

What I claim as new, and desire to secure by letters patent, is the knife, C, operated by means of the levers, D, D, or their equivalents, in combination with the piston, B, and the box; the knife, levers, and piston being constructed, arranged, and operated in the manner and for the purpose substantially as herein shown and described.

NATHANIEL WOODBURY.

No. 8948.—*Improvement in Carding, by which variegated Slivers are produced.*

What we claim as our invention and improvement, and desire to secure by letters patent, is traversing the doffer or doffers of a card, or setting the teeth upon them serpentine or zig zag, or serpentine and zig-zag, or in such other curves, points, or angles as may suit the taste or fancy of the operator; also, to traverse them, when so set, if desirable, so as to take the wool or other materials from such parts of the main or other cylinder of the card, and deliver it to the condensing rollers, or other apparatus, so as to make roving variegated, either in colors or materials, or both, when said colors or materials are fed upon the card, substantially as described.

JONAS HOLMES.
EPHRAIM FRENCH.

No. 8949.—*Improvement in Stoves.*

It is, therefore, that my invention, and what I claim, consists in a combination of the following particulars or elements, viz:

First. A close drum or chamber made with one or more air-inlets, and their closing slides or doors in its lower part, and a fuel opening and door at or near its upper part.

Second. A fire pot, or chamber of combustion, placed within the said drum, and having a grate in its lower part, and a smoke discharge pipe leading out of it at or near its upper part.

Third. An air space under the fire-pot grate.

Fourth. A space between the external sides of the fire pot and the internal sides of the drum, and made to freely communicate with the space under the grate.

Fifth. A space above the fire-pot or place for the fuel, and made to freely communicate with the space around the fire-pot.

Sixth. A fuel supply opening and door, and an air register in the top of the fire-pot; the whole being arranged and made to operate together substantially as above described.

G. W. KENNISON.

No. 8950.—*Improved Ships' Blocks.*

What I claim as new, and desire to secure by letters patent, is the employment or use of the metal bands or hoops, B; said hoops or bands encompassing the cheeks, A, and fitting in grooves (*a*) in the peripheries of the cheeks; the hoops or bands having eyes, C, C, formed in them at the upper end of the block, through which the bolt, D, passes, securing the cheeks the proper distance apart at the upper end of the block, as set forth.

CHAS. H. PLATT.

No. 8951.—*Improvement in Umbrellas.*

What I claim as my improvement, and desire to secure by letters patent, is—

Distending or opening the umbrella by the rods, F, which have heretofore simply served as stays to the covering, and been permanently attached thereto, the covering being secured to the apex of the central rod, D, and the lower ends of the distending rods, F; and this I claim, whether the inner ends of the distending rods be made to descend, or the central rod to ascend with the apex of the covering in distending the umbrella.

I also claim the manner of securing the cover, I, to the frame, viz: by means of swivels, G, G, attached to the cover, and screwed on to the ends of the rods, F, as herein described.

I also claim the application of the springs, *h*, *h*, of the rods, F, to the slide, E, operating in the manner and for the purpose described.

J. V. TIBBETS.

No. 8952.—*Improvement in Iron Safes.*

What we claim as our discovery, invention, and improvement, and desire to secure by letters patent, is the application of chalk, or whiting, which has been subjected to the action of acids, and has been partially deprived of its carbonic acid,—the material which we use being in fact the waste or residual matter left from the manufacture of what is called mineral water, after chalk or whiting has been subjected to the action of acids, for the purpose of expelling a portion of its carbonic acid, this residual matter consisting substantially of the substances named in the analysis before referred to,—in the construction of double iron chests or safes, in the manner above described, or in any other manner substantially the same.

WILLIAM ALFORD.
JOHN D. SPEAR.

No. 8953.—*Improvement in Saw-Sets.*

What I claim as my invention, and desire to secure by letters patent, is the dog, or set, J, so constructed and arranged as to traverse or slide upon a rod or bar, in a direction parallel to the toothed edge of the saw, for the purpose of setting the same, substantially as described.

A. G. BACHELDER.

No. 8954.—*Improvement in Straining Saws in Saw Mills.*

I will now state what I claim as new, and desire to secure by letters patent.

I claim the employment of the lever, H, *b*, *l*, or its equivalent, the spring, M, connected to the lever, H, by a rod or link, L, which is secured or attached to the lever near its fulcrum, *a;* both operating together, and in combination with a reciprocating saw, connected to the lever, H; and the whole being constructed and arranged, and operating, substantially as herein described.

E. BOOTH.

No. 8955.—*Improvement in Steam Boilers.*

What I claim as my invention, and desire to secure by letters patent, is isolating the lower portion of the water space surrounding the furnace from the upper portion, and connecting it by a free and constantly open communication with the tank of feed water, in such manner that the

feed water of the tank will circulate without being forced by a pump in contact with the fire-plates, to cool them, and to be itself heated preparatory to being pumped into the boiler, substantially as herein set forth.

JAS. W. FARRELL.

No. 8956.—*Improvements in Cartridges for Breech-loading Guns.*

We do not claim to have invented any of the separate parts described herein; but we do claim as new, and of our own invention, the application of the leather breech-piece, *a*, to cartridges used with breech loading guns; such leather breech-piece serving the purposes of a foundation for its own cartridge, a protection to the breech-pin, a wad for the next cartridge in succession, and of a swab, to clean out the soilage caused in the barrel by the antecedent explosion, producing a safe cartridge for pieces that load at the back of the breech, and in which explosion is also caused in the line of the axis of the barrel, substantially as described and shown, but without regard to the sizes of arms used with these cartridges, and irrespective of the machinery, or mechanical means, by which the cartridge itself is made.

WM. W. MARSTON.
FREDERICK GOODELL.

No. 8957.—*Improvement in Swings.*

Having thus fully described my invention, what I claim as my invention, and desire to secure by letters patent, is the combination of the wire frames, constructed as set forth, with the net work and swing cords.

EDWARD MAYNARD.

No. 8958.—*Improvement in Cotton Batting.*

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is uniting two or more layers of cotton batting together by means of any glazing material, thereby producing a new article of manufacture, which I term cotton felt, to be used for upholstery and all other purposes to which it is applicable, as herein set forth.

E. P. RIDER.

No. 8959.—*Improvement in Churns.*

What I claim as my improvement, and desire to secure by letters patent, is hanging the series of beaters or dashers, 4, 4, 4, 4, by rods, 2, 2, extending from the shaft, 1, 1, the lower ends of which rods support the fulcrum, *f*, on which the beaters or dashers move, (not confining myself to the number or form of the dashers,) the said dashers being operated by the rods, 3, 3, 3, 3, and bell cranks, 5, 5, substantially as herein set forth.

CLARKSON RHODES.

No. 8960.—*Improvement in Ovens.*

Having thus fully described my improved oven, with cooking apparatus attached, what I claim therein as my invention, and desire to secure by

letters patent, is the construction of said oven, with recesses on the side or sides for fuel, substantially as set forth above; and in combination therewith the cooking chambers as herein described.

THOMAS N. REID.

No. 8961.—*Improvement in Hay Rakes.*

What I claim as my invention, and desire to secure by letters patent, is in so constructing revolving spring tooth-rakes as to bring the centre of revolution nearer the lower ends of the teeth than can be done by having them revolve on the head around which the teeth are coiled (which is the usual mode.) By which means I cause them to revolve much quicker, and in going a much shorter distance than otherwise can be done; while at the same time they revolve much easier and more readily, in consequence of having the second head, coil, &c., to balance, or nearly so, the remaining heft of the teeth, &c., which will be on the other side of the centre of revolution, or nearly so; thereby giving the required length and elasticity to the teeth with a quick and easy revolution, which I accomplish as herein set forth, or by means analogous thereto.

CHARLES R. SOULE.

No. 8962.—*Improvement in Cements.*

Having thus described my invention, I claim the primary cement herein described, formed of the hydrate of lime in a finely subdivided state, and resin in a finely subdivided state, mixed together with water in a cold state, for the purpose set forth.

B. S. WELCH.

No. 8963.—*Improvement in Machines for making Fuses.*

What I claim as my invention, and desire to secure by letters patent, is passing the hollow mandrel through the winding spools in combination with the fliers, E, which direct the winding thread from the different spools to the interior of said mandrel, for the purpose of winding the fuse as it passes from the forming machine, when combined substantially as herein described.

ALBERT F. ANDREWS.

No. 8964.—*Improvements in the Tumblers of Locks.*

What I claim as my own invention, and desire to secure by letters patent of the United States, is—

Firstly. The employment of tumblers in such combination with the bolt of the lock, that each and every tumbler independent of the others shall have freedom to move laterally as well as vertically, whereby a great number of positions may be assumed by their unattached ends, as described.

Secondly. I claim the guide pieces upon the key, for the purpose of controlling the lateral motion of the tumblers as described; the whole being constructed and operating substantially in the manner and for the purpose herein set forth and described.

HENRY BLAKELY.

No. 8965.—*Improvement in Watch Chain Swivels.*

What I claim as my invention, and desire to secure by letters patent, is making the joint of the opening piece, *i*, oblique to the eye, so that it will open obliquely to the hook piece, *a* or *b*, in the manner and for the purpose herein set forth.

WM. B. CARPENTER.

No. 8966.—*Improvement in Mortising Machines.*

Having thus fully described my several improvements, and sufficiently so for the better illustration of the former, the parts (not new) connected therewith, and constituting in combination the machine, I desire it to be understood that the main principle of action, involving reciprocating chisels, and by a ratchet wheel feeding on the timber, is not by any means new; nor do I claim such, these being well known and common to other mortising machines; nor yet do I claim reversing the chisels; neither do I claim, separately of themselves, the devices by which I effect my improvements. But what I do claim as my invention, and desire to secure by letters patent, is—

First. The employment of a stop catch or hook, O, operated on by the reach arm or pawl, *n*, to prevent the momentum given to the ratchet wheel, T, from throwing the pawl, *n*, out from between the teeth after having performed its pull, and so making irregular the feed, one (*r*) of the ratchet wheel teeth being bevelled or reduced in order to admit of the pawl, *n*, entering sufficiently deep to arrest the motion of the feed, in the manner and for the purpose set forth.

Second. The combination and arrangement of the stud, *a*, clutch-arm, G, lever, H, cam, J, and stop, *b*, so that when the lever, H, is thrown in, the cam, J, will unclutch the machine, when the chisel crank, C, is on the full centre, and the chisels are out of the work, and retain them in that position by the clutch, G, coming in contact with the stop, *b*; the several parts being made, arranged, and operated in the manner herein fully set forth.

JOHN B. CHAMBERS.

No. 8967.—*Improvement in Stone-dressing Machines.*

What we claim as our invention, and desire to secure by letters patent, is hanging the arm, J, carrying the pick upon a shaft, F, which receives a vibratory motion through a cam, G, driven by a mill spindle or other spindle provided for the purpose, and giving the said arm a motion lengthwise along the said shaft, substantially as and for the purpose herein described.

SIMON W. DRAPER.
REUBEN M. DRAPER.

No. 8968.—*Improvement in Swivel hooks.*

We do not claim to have invented any one of the parts described and shown, as these, in themselves separately, are not new. But we do claim the combination of the spring, 7, and its enclosing slide, 8, with a swivel hook, for the purposes and as described and shown.

A. FAULKENAU.
MORRIS FAULKENAU.
MORRIS POLLAK.

No. 8969.—*Improvement in Worm Tubs of Stills.*

What I claim as my invention, and desire to secure by letters patent, is the division of the worm-tub into an upper and lower compartment, F and G, and connecting them to each other by a valve, *u*, so arranged that it will be operated by the influence of the temperature of the water in the upper compartment, F, for the purpose of enabling the distiller to keep the water in the said upper compartment, at any elevated temperature that may be required for use in preparing the distiller's beer, or fermented wash, or for other purposes in the distillery.

GEORGE JOHNSTON.

No. 8970.—*Improvement in Flour Bolts.*

I do not claim to be the first to use a flat sieve or bolter to separate substances of different sizes; but what I do claim as new, and of my own invention, and desire to secure by letters patent of the United States, is the construction, arrangement, and combination of the shafts and cranks, 3 and 6, to receive and move the bolter, *c*, with the cranks, 7 and 8, and connecting bar, *a*, or their equivalents, as described, to regulate and equalize the movement, the coarser particles being carried off from the bolter, *c*, by the flexible tube, *f*, or other convenient means; the whole being substantially as described and shown.

And I claim the application of the breakers or spreaders, *d*, in the bolting box, *c*, to prevent the material working off too fast, and spread it evenly over the sieve or bolter, *e*, as described and shown.

DAVID MARSH.

No. 8971.—*Improvement in Lubricating Oils.*

Having described the character of my invention, I will state that I am aware that spirits of turpentine and carbonate of potash have been used before my invention in lubricating compounds; and I do not, therefore, claim them, except as specific agents, to accomplish a definite and specific purpose stated in the specification.

What I claim as my invention, and desire to secure by letters patent, is the combination of a mixture of camphene and benzole, carbonate of potash and glycerine, with whale or other cheap oil having similar properties, in the manner and for the purposes set forth.

WM. H. MASON.

No. 8972.—*Improvement in Hominy Machines.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the beaters, *c*, *c*, with the beaters, D, D, each set

moving in opposite directions, as set forth in the foregoing specification, substantially and for the purposes therein noticed.

SAMUEL NULL.

No. 8973.—*Improvement in Railroad Car Trucks and Brakes.*

I do not claim the winding of the chain around the axle for the purpose of pressing the shoes against the wheels; neither do I claim the clutch nor the collar separately, for they have each been previously used. But what I do claim, and desire to secure by letters patent, is—

First. The method of operating the toggle joint by means of the rod, B, having the cam, C, upon it, which works in a slot in the bar, D, by which the clutch is thrown in and out of gear, or the cap, O, made to bear against the hub of the wheel, (*b*,) in combination with the compensating joints, P, constructed in the manner and for the purpose as shown and described.

Second. I claim the employment of the guards, (*p*,) (*p*,) (p^1,) (p^1,) vertical studs, (*v*,) and rods, (*w*,) (*w*,) arranged as described, for the purpose of enclosing the wheels and preventing them getting off the track in case of the breakage of a wheel or axle, in combination with the arms, (*t*,) and bolts, (*s*,) by which the trucks are suspended to the car-bed, in the manner and for the purpose as herein specified.

E. G. OTIS.

No. 8974.—*Improvement in Cooking Apparatus.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The peculiar arrangement of the smoke-flues, as shown in figs. 13 and 14, by which they are made to envelop the centre on all sides, and thus concentrate them in the smallest possible space.

Second. The combination with this machine of the key and valves, A, B, C, for ventilation and supply of air to the furnace from the room, as above described.

J. SMOLINSKI.

No. 8975.—*Improvement in Cast-iron Car Wheels.*

What I claim as my invention, and desire to secure by letters patent, is connecting the hub, A, and rim, B, of a solid cast-iron railroad wheel by a single plate, having two series of radical corrugations, G, G, and H, H, united by a hollow band, or single circular corrugation, I, J, substantially as herein described.

STEPHEN THURSTON.

No. 8976.—*Improvement in Machines for Jointing Staves.*

What I claim as my invention, and desire to secure by letters patent, is jointing the staves by means of cutters, M^1, M^2, set at an inclined position, and converging towards one another in the front, the said cutters having a motion given them perpendicular to the stave, for formation of the bilge or varying width of the stave, by means of the cam, *n*, framing,

Q, Q, and their accompanying parts, or devices equivalent thereto, operating substantially as specified.

DENNISON WOODCOCK.

No. 8977.—*Improvement in Fountain Pen-holders.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the valves in a fountain pen for the admission of air and regulating the flow of ink, with the slide or button, and with the spring and slide, in the manner above described, or in any other substantially the same.

CHARLES CLEVELAND.

No. 8978.—*Improvement in Corn Shellers.*

What I claim as new and my improvement, and desire to secure by letters patent, is the combination of the conical concave wedge, H, and the guard, G, with the concave wheel, E, for shelling corn, as herein described.

DAVID ELDRIDGE.

No. 8979.—*Improvement in Railroad Car Wheels.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is, in the construction of car wheels, the combination of the segmental ring and keys, constructed substantially as described, or their equivalents, for the purpose of facilitating the insertion of the ring or band of India rubber or other elastic material, between the central portion and the rim of the wheel, and as a means of fastening or holding the whole together, as herein set forth and shown.

NEHAMIAH HODGE.

No. 8980.—*Improvements in Copying Manuscript.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is—

First. The employment or use of the circular rack, D, which serves as a guide to the index, C, said rack having a rim, F, attached to its under surface and projecting outwards, with the necessary letters and characters stamped or placed upon it corresponding to the type placed on the periphery of the horizontal wheel, as specified.

Second. I claim placing or securing the type vertically to the periphery of a horizontal wheel having a rotating motion, and also a motion in the direction of its axis, by which, with the aid of the rack, D, and index, the required letters may be printed upon the paper, in combination with the roller, U, levers, V, X, and the shaft, W, or other equivalent device, for the purpose of operating upon the cylinder and adjusting it to allow for the different thickness of type on the wheel, as herein described.

Third. I claim the employment of the cylinder, G, upon which the paper is secured, said cylinder having a motion in the direction of its

axis, and also a rotating motion; said motions being communicated to it by the devices as shown and described, or in any other equivalent manner.

JOHN JONES.

No. 8981.—*Improvements in Violins.*

That which I claim as my improvement, and desire to secure by letters patent, is the construction of that portion of stringed musical instruments which receives the strain of the strings, when tightened in tuning, in such form or forms as will cause the line of that portion of the instrument to be lengthened instead of shortened, if the same be altered at all by the strain.

I also claim the hollow backed violin, or other stringed musical instrument of similar character, constructed substantially in the manner herein set forth.

WM. S. MOUNT.

No. 8982.—*Improvement in Revolving-Breech Fire-Arms.*

What we claim as our invention, and desire to secure by letters patent, is the construction of the sliding crotch, substantially as described, to enable it to perform the double purpose of revolving the breech and wedging it up against the barrel, and the combination of the sliding-crotch and guard lever, constructed and arranged as specified, by which the breech is rotated, wedged forward, and the gun cocked by one motion, back and forward, of the trigger-guard, or its equivalent, substantially as above described.

HENRY S. NORTH.
CHAUNCEY D. SKINNER.

No. 8983.—*Improvements in Smut Machines.*

What I claim, and desire to secure as my invention in the above described machine, is the arrangement in which the grain is fed in at or near the bottom of the cylinder, A, through which it is elevated by means of spirally inclined beaters, and discharged through the passage, or spout, K, in combination with the ascending blast from the fan, or blower, C; the same being arranged and operated essentially as above set forth and described.

G. S. PECK.

No. 8984.—*Improvements in Power Looms.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Connecting the rocker of each picker-staff, made and operated substantially as specified, with the bed on which it rocks by means of an interposed strap of leather, or other flexible substanse, attached at the inner end to the bed, and at the outer end to the rocker, substantially as and for the purpose specified.

Second. Forcing the shuttle binders inwards against the shuttle while boxing, by a gradually increasing force, by means of arms on a rocker provided with a spring, which is acted upon by a pin on the connecting rod of the lay, substantially as described.

Third. Securing the raw hide pickers to the inner face of the staffs by means of a leather strap, or the equivalent thereof, embracing and binding the two together, substantially as described, to insure the firm union to resist the rapid blows, and to prevent pieces of raw hide from breaking and flying, as set forth.

RENSSELAER REYNOLDS.

No. 8985.—*Improvement in Cast Iron Car Wheels.*

Having thus fully described my invention, I will proceed to state what I claim, and desire to secure by letters patent. I do not claim the concave plates, or sides, C, C, of the wheel, nor do I intend to limit myself to the precise form of such plates connecting the hub with the rim or tread of the wheel.

But I claim the partitions, or braces, D, D, connecting the rim, or tread, A, with the two plates, or sides, C, C, of the wheel; the said partitions, or braces, extending from the inside of the rim, or tread, radially, or nearly so, part of the distance towards, but not connecting with, the hub, as herein fully set forth.

D. R. RALL.

No. 8986.—Cancelled.

No. 8987.—*Improvement in Fire-Escape Ladders.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is forming or constructing a ladder with each successive step from the end or ends longer than the one preceding it, and connecting said steps with each other by links, B, made fast at one end to each step and the other end sliding through eyes, *a*, *a*, in the step above or below, so that the steps can all fold closely together, in the manner substantially as described.

JOHN C. FR. SALOMON.

No. 8988.—*Looms for Weaving Piled Fabrics without the Figuring Wire.*

Having now described the particular feature of my improvements in looms for weaving, and the mode or method of producing plain or figured goods or fabrics, I desire it to be understood that I claim as my invention—

Firstly. The novel mode or method of producing plain or figured goods or fabrics, having terry or looped surfaces of the kinds above described, by partially beating up certain picks of the shoot or weft threads, and afterwards further beating up or driving home those picks or shoots in order to cause certain portions of the terry warp to pucker up in loops. But I do not confine myself to any particular number of picks or shoots of weft, but have described a method by which my improvements, in

producing plain or figured goods or fabrics having a terry or looped figure, may be accomplished as the number of picks or shoots of weft may be varied to produce a different appearance in the face of the fabrics woven under my patent, according to the desire of the weaver.

Secondly. I claim varying the forward stroke of the batten to produce the open or close beating up of the weft, substantially as described, in combination with the apparatus for holding the surface threads or yarns, and carrying them forward in the manner described, or any other, substantially similar, for the purpose of aiding in forming, in the loom, the loops of terry fabrics.

R. W. SIEVIER.

No. 8989.—*Improvement in Vertical Trip Hammers.*

We are aware that vertical trip hammers, elevated by friction rollers, are not new; neither are cams for regulating the elevation to which such hammers shall be lifted; and therefore we do not claim them. But what we do claim as our invention, and desire to secure by letters patent, is—

First. The recessed rollers, D, D, in combination with the plain rollers, D^1, D^1, and springs, H, or their equivalents, for controlling the operation of the lifting rollers; the projections on the said recessed rollers causing the shaft, B^1, lifting roller, C^1, and plain rollers, D^1, D^1, to recede or move from the rollers on the shaft, B, and thereby allow of the hammer fall; the whole being constructed and arranged, and operating substantially as herein described.

Second. The manner herein described of regulating the blow of the hammer by making the recesses, *b, c, d,* in the periphery of the rollers, D, D, of unequal lengths, and making the said rollers movable on their shaft, so that either projection can be brought opposite to, and made to act in combination with, the plain rollers, D^1, D^1, in the manner herein set forth.

his
PETER × STEBBINS.
mark.
JOHN HOLMES.

No. 8990.—*Improvement in Machines for Turning and Polishing.*

Having thus described my improvement in machines for turning cylindrical rods, what I claim therein as new, and desire to secure by letters patent, is the arrangement of a polishing belt for polishing circular surfaces in such manner that a bight of it shall pass round the article to be polished, and move concentrically, or nearly so, to the surface thereof, so as to finish the same rapidly, and without the danger of making flat places in its periphery, which is always so imminent when a round article is polished, by bringing it in contact with a polishing surface moving in a straight line.

I likewise claim the combination of the rotating tubular cutter for turning the rod with the polishing belts, which, while polishing one end of the rod, grasp it firmly and hold it from turning while its other end is under the action of the cutters, as herein set forth.

BENJAMIN J. TAYMAN.

No. 8991.—*Improvement in Engraving Surfaces.*

What I claim as my invention, and desire to secure by letters patent, is—

In the *first place.* The connecting of rhomboidal frames, or pentagraphs, in series, so that the one which first receives a movement from the hand, or other moving power, conveys its movement to a second, and this again, if required, to a third, and so on as far as the nature of the work to be done may need a high diminution to be carried.

In the *second place.* I claim as my invention, the placing rhomboidal frames, or pentagraphs, in pairs, so connecting each pair by a rod or bar at the working joints of each that a true geometric point of movement is presented upon every point or spot of such rod or bar, whether the said rod or bar be made to communicate motion to the cutting or other tools which act upon a fixed surface, or whether it be made to communicate motion to the surface itself, either plane or cylindrical, while the tools are fixed. These tools, which may be of any number convenient to apply, or required by the work, may be diamond or steel points, gravers, punches, drills, pencils, pens, or tubes for conveying colors.

In the *third place.* I claim as my invention, the conveying the movement of the above mentioned rod or bar, connecting two pentagraphs to a cylinder, or roller, in such manner that, when points or tools of any required kind are applied to the surface of the same, and in whatsoever direction, whether vertically, or on the sides horizontally, or beneath, each point or tool brought into contact with the cylinder produces thereupon the same figure or mark, of whatever kind, which it would produce if operating upon a plane surface.

In the *fourth place.* I claim as my invention, the construction of a frame called, in my specification, a ruling board, which, by transferring the weight of a loaded cylinder alternately from the sides or bearers of an external and internal frame, allows each frame in its turn to move backward or forward a distance regulated by screws or other similar means. In this manner, and by the application of a carriage or traversing point to one of these frames, lines may be ruled or engraved with perfect accuracy as to their distance one from the other.

ISAAC TAYLOR.

No. 8992.—*Improvement in process of Manufacturing Gutta Percha.*

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is the preparing of gutta percha for vulcanizing, by a preliminary separate heating of it to such a degree as to expel its volatile ingredients herein specified, which I find can generally be effected at the high temperatures from 285 to 430 degrees, Fahrenheit, substantially as herein set forth.

I also claim the process herein described of vulcanizing gutta percha by first heating it to a sufficiently high temperature to expel from it the volatile ingredients herein specified, which, it is believed, can be accomplished between 285 and 430 degrees, Fahrenheit, and then incorporating with it, substantially as herein specified, a hypo-sulphite, either alone or in combination with metallic sulphurets, or whiting, or magnesia, or with all of them together, and then subjecting the mixture to a temperature of

from 285 to 320 degrees, Fahrenheit; all the steps of the said process being performed substantially in the manner herein set forth; at the same time, desiring it to be understood that I disclaim the vulcanizing of gutta percha in all cases save when it has been prepared for the vulcanizing operation by the aforesaid preliminary heating.

JOHN RIDER.

No. 8993.—*Improvement in the construction of Retorts for Chemical Furnaces.*

I disclaim all *processes* to which these retorts are applicable, and all chemical compounds, and mode of working the same, which are herein described; and I disclaim all the apparatus shown herein except as follows: What I desire to secure by letters patent, is—I claim the retorts, H, formed by the arch, 7, and bed, 6, with the sides, 5, 5, and perforated with the cross flues, 10, 12, or 13, below the bed and above the arch of each retort; said retorts being formed and operating as herein set forth, and being used for any purpose for which they may be available.

JOHN AKRILL.

No. 8994.—*Improvements in the Manufacture of Plate and Window Glass.*

Having thus described my improved mode of making window or plate glass by machinery, what I claim as my invention, and desire to secure by letters patent, is—

First. The use of hollow chilled iron rollers in the manufacture of window and plate glass in connexion with the mode of heating them with charcoal or other combustible, placed inside.

Second. The combination of the grooves, o, o^1, with the strips and guides, i, i, and the set screws, s, for the purpose of regulating the width and thickness of the sheet of glass.

Third. The use of trucks for carrying off the sheets of glass as they pass from the rollers, as aforesaid.

Fourth. The combination and arrangement herein before described o the gates, flues, and furnace, in the construction of the polishing oven.

TER. CLARK.

No. 8995.—*Improvement in Processes for preparing Oakum.*

Having thus described our invention, we claim the treatment of "junk" by steeping or rinsing it in acidulous liquor, as described, for the purpose herein set forth.

JOHN A. CORMACK.
GEORGE CORMACK.

No. 8996.—*Improvement in Cow-Catchers.*

What I claim as my invention, and desire to secure by letters patent, is the wheel, A, and the guard, B, C, connected and arranged substantially as herein described, and for the purposes described.

COOK DARLING.

No. 8997.—*Improvements in Cop Spinning Frames.*

What I claim is as follows: I claim the toothed quadrant, y, the pinion, x, and its shaft, w, in combination with the two scroll cams, t, v, their chain, u, tubular shaft, f, and the clutch contrivance made with the spring-click, g, and one single detent or opening, d; the whole being applied to the scroll shaft, L, and spur-gear, M, and made to operate substantially in the manner and for the purpose as herein before stated

I also claim the ratchet wheel, w^2, the arm, b^3, and retaining pawl or click, c^3, or any mechanical equivalent therefor, in combination with the balance-wheel apparatus, (viz: the arm, x^2, the fly-wheel, y^2, its shaft and pinion, a^3,) and the spur-gear, s^2, having a positive motion, as described; the whole being for the purpose as specified.

And, in combination with the scroll shaft and its mechanism for effecting the upward and downward movement of the ring rail, I claim the mechanism for effecting the change of the downward to the upward motion of the said rail in an easy manner, and so as to prevent injurious strain when the spring-click, g, strikes into the recess, d, of the clutch flanch, c, the said mechanism consisting of the arm, f^3, roll, g^3, spring, h^3, tube, i^3, rod, k^3, cam, l^3, curved lever, m^3, and spring, o^3, (or their mechanical equivalents,) combined and operating together, substantially as herein-before described.

I also claim the improvement of so applying or combining the thread guide, G, or the guide bar or rail, U^3, to or with the ring rail and the frame, that the said guide, or guide-bar, shall be movable, or made to move upwards and downwards while the ring rail so moves, and this with a movement either equal to, or in accordance with, that of the ring-rail or a variable one, as circumstances may require; the same being for the purpose as specified.

And, in combination with the scroll, z, its chain and connexions with the ring rail, I claim a compensature mechanism or apparatus for regulating the action of the copping rail or rails on the said scroll, according to the leverage, or, in other words, for providing a compensation for the difference of leverage produced by the swell, as described; the mechanism employed by me, and the combination of which I also claim, consisting of the two cams, d^4, e^4, the pulleys, i^4, k^4, the chains, l^4, m^4, n^4, and weights, o^4, as applied together and to the frame, and operating substantially as specified.

And I claim the bent arm, l, and its projection, k, or other equivalent contrivance, in combination with the driving belt, shifting lever, or contrivance; the same being for the purpose as herein before set forth.

And I also claim my improvement in the construction of the thread guide, G; the same consisting in making the opening of it straight on its rear side, substantially as seen at q^4, r^4; the same being for the purpose as herein before explained.

And I also claim my improved or new combination of mechanism, by which a sudden or very quick rise of the copping-rail is effected in order to finish each upward movement, and this so as to wind as little yarn as possible at the nose or upper end of each conic layer composing the cop; the said combination consisting of the arm, l^2, upon the scroll-shaft, L,

the levers, k^2, m^2, the arm, c^1, and the rollers, b^1, p^2, as applied and operated together, essentially as herein before specified.

GEORGE HENRY DODGE.

No. 8998.—*Smoke and Spark Deflector.*

What I claim as my invention, and desire to secure by letters patent, is the method of directing the discharge of smoke and sparks, or either, from the chimney of a locomotive, by combining therewith deflectors, substantially such as herein described; the apertures thereof being governed by a valve or shutter, substantially as specified.

ALBERT EAMES.

No. 8999.—*Improvements in Machinery for making Spoons, Forks, &c.*

What I claim is the employment, for trimming the edges and giving the ornaments to the blanks, of a pair of rollers, each of which is furnished with a cutting edge, and a device engraved within the same, and a space outside of said cutters, for the reception of the waste; said rollers being so worked and applied to each other, that the cutting edges of the one come in contact with and cut against the cutting edges of the other.

I do not claim simply a movable die; but what I do claim, is a movable die located within the pattern dies, so that spoons or forks, having various crests, names, or initials thereon, may be made by the same contour or device and edge pattern.

ALFRED KRUPP.

No. 9000.—*Improved process for making Axes.*

I claim the method of manufacturing axe poles by a process of which the following are its successive steps, in combination with others, as they are applied to the metal bar when heated, and prepared for manufacture, viz:

I. Spreading the iron bar at four points on its edges by strokes of a peculiar tool made for the purpose.

II. Forming half eyes across the bar at spaces equidistant from its centre, by strokes of a narrow and round-edged hammer.

III. Finishing the half eyes and making them equal and similar on a swaging tool.

IV. Cutting the bar partly through across its centre, and doubling together the halves of the bar so that the half eyes shall unite in correspondence with each other, and form the eye of the axe, completing the whole ready for welding the two halves of the pole together, substantially as the process is set forth in the above specification.

JOHN ORELUP.

No. 9001.—*Improvement in Reflector Lamps.*

What I claim as my invention, and desire to secure by letters patent, is a reflector lamp, constructed substantially as herein set forth, with a

case to contain a cooling liquid for the protection of the reflector from injury, as herein described.

JAMES H. PEASE.

No. 9002.—Cancelled.

No. 9003.—*Improvement in Wheel Cultivators.*

Having thus explained my improvements in wheeled cultivators, I will here state that I am fully aware that there are other modes of raising and lowering the frame containing the teeth of cultivators in use, particularly that patented to David B. Rogers, January 16, 1849, which consists mainly of a combination of a crank axletree extending across the centre of the frame, on the ends or cranks whereof are mounted the sustaining wheels. While I acknowledge the similarity of the lifting action of the cranks of the axletree to that of the pivoted segment levers used by me, and which I disclaim, yet I am not aware that Mr. Rogers is entitled to claim all means for effecting the same result, and I conceive that my improvements differ in material points from his, and which form the subject of my claims, as follows:

First. Mounting the carrying wheels upon axles, F, only when said axles, F, are made to project from pivoted segment-shaped levers at each side of the frame, in the manner and for the purposes specified.

F. P. ROOT.

No. 9004.—*Improvement in Seed Planters.*

Having thus fully described my improvements, what I claim therein as new, and for which I desire to secure letters patent, is, first, the seeding apparatus, constructed substantially in the manner and for the purposes set forth, consisting of the cup (i) and receivers, the plate, (d,) gate, (e,) and their attachments.

I also claim the mode of putting the cups into motion, and stopping them, by shifting the pitman, (k^1,) as described, on, to, or from the eccentric, (l,) by the windlass, in the manner set forth.

I also claim raising and holding the teeth by the employment of the apparatus for turning and holding the windlass, consisting of a crank and bevel-wheels, as described; so that one man can easily raise the teeth to any desired height, and to a much greater range than can be done conveniently by levers, or similar devices, and attach it in that position by the revolving clutch. which meets, when at the proper height, with the crank which it fastens.

J. P. ROSS.

No. 9005.—*Improvement in Harvesters.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the curved fingers, O, in combination with the rivets, n, projections below the sickle,

N. by which means the sickle is prevented from being clogged or bound, substantially as described.

G. H. RUGG.

No. 9006.—*Improvement in Seed Planters.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the construction of the serpentine driving cam, E; the cam being formed of two parts, *f*, *g*, and placed on the axle, F; the part, *f*, of the cam being fixed firmly to the axle, and the part, *g*, moving freely thereon, and secured, at the desired point, to the axle by the set screw, *h*, each part of the cam being formed of a collar having a zig-zag or serpentine thread, or projection, upon it; the friction roller or bulb, G, at the lower end of the lever, D, fitting between the threads or projections, which act against it as the cam revolves, and give a reciprocating motion to the shove-rod, C, substantially as shown and described.

B. D. SANDERS.

No. 9007.—*Improvement in Hay Rakes.*

What I claim as my invention, and desire to secure by letters patent, is the construction of the axle and rake head with hinges connecting it with the platform, in combination with the draught strap, to raise and depress the rake teeth, in the manner and for the purpose set forth.

ZENAS SANDERS.

No. 9008.—*Improvement in the construction of Soap Boilers.*

Having thus described the construction and operation of my apparatus for heating, boiling, and mixing by steam, I desire it to be understood that I do not claim to be the original inventor of the application of steam to heating, boiling, and mixing But what I do claim as my invention, and desire to secure by letters patent, is the combination of the steam-jacket, *c*, *c*, tubes, *p*, *p*, and agitating rods, *f*, *f*, for transmitting and equably diffusing heat through soaps and other similar substances, where it is difficult to keep up a uniform heat throughout the mass, substantially in the manner set forth and shown.

JNO. R. ST. JOHN.

No. 9009.—*Improvement in Rat Traps.*

What I claim as my invention, and desire to secure by letters patent, is the employment of the pulley, G, *f*, cords, H, I, hook, *g*, and inclined tilting passage, F; the whole being arranged as described, and operating in combination with the tub, K, having a tilting door, *m*, arranged on the top of the same, and a guard, M, placed round the door, *m*, in the manner and for the purpose herein specified.

JOHN J. VEDDER.

No. 9010.—*Improvement in Grease Cocks.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is the inclined discharge passage, *h*, of varying area, constructed, arranged, and operating with respect to, and in connexion with, the hollow cylinder and its aperture, *a*, in the manner and for the purpose herein set forth.

ROB. M. WADE.

No. 9011.—*Improvement in Fastenings for Garments.*

I claim the combination of the catch-plate with the plates above and below it, as shown and described.

I claim the perforated bar for preventing the instrument from turning; the whole being arranged and acting substantially as set forth.

ELBRIDGE G. BELKNAP.

No. 9012.—*Improved valves, or gates, for Oblique Float Paddle Wheels.*

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is the series of radial winged and pivoted gates, F, for preventing the water acted on by the paddles being moved laterally as they move through the water, and opening to deliver the water freely at the proper time, arranged and operating substantially as described.

J. C. CARNCROSS.

No. 9013.—*Improvement in Mill for Crushing Quartz.*

Having described the manner in which I construct my machines, what I claim as my invention, and desire to secure by letters patent, is—

I claim giving motion to the balls between the two plates or disks, in the manner and for the purpose substantially as above specified.

J. W. COCHRAN.

No. 9014.—*Improvement in Piano-Fortes.*

I do not claim as new metallic frames, nor bridges; neither the up-bearing of the strings, nor bringing the strings to an equal length, other than in connexion with my arrangement. What I claim is making the perforated bridge for the up-bearing of the strings a part of the solid arched frame or plate, as described.

WM. COMPTON.

No. 9015.—*Manufacture of Granular Fuel from brush wood and twigs.*

I claim the granular fuel produced from brush-wood and twigs, by cutting the same into lengths about equal to its average diameter, as herein described, as a new manufacture.

REUBEN DANIELS.

No. 9016.—*Improvement in Machines for making Cigars.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the manner herein described of making cigars, viz: by combining with the cutters and followers which cut off and feed in the requisite quantity of tobacco for each cigar, the rollers for rolling up the fillers and putting on the wrappers, said rollers having the requisite arrangement of parts, so as to open to receive the material, and close to form the cigar, and again open to deliver the finished article, in the manner substantially as herein described.

I also claim the making of the roller which feeds in the wrapper of less diameter than the rollers which form the filler, so that the filler may move at an increased velocity over that of the wrapper, for the purpose of more evenly spreading out the wrapper, and winding it more tightly upon said fillers, substantially as herein described.

WILLIAM DAWSON.

No. 9017.—*Improvement in Cast-iron Car Wheels.*

What I desire to secure by letters patent, is the double reversed corrugations, *d* and *e*, connecting the rim and hub, formed and acting as described and shown, and the combinations of these corrugated parts with the annular cylinder, *c*, between them and the hub, as described and shown.

PETER DORSCH.

No. 9018.—*Machine for polishing Daguerreotype Plates.*

I do not claim the platform, L, nor frame, K; neither do I claim the reciprocating bed, B, separately. But what I claim as new, and desire to secure by letters patent, is the horizontal reciprocating bed, B, operated in the manner as described, or in any other equivalent way, in combination with the frame, K, for the purpose as herein specified.

TOWNSEND DURYEA.

No. 9019.—*Improvement in Alarm Locks.*

Having thus described the nature of my inventions, their construction and operation, that which I claim as new, and desire to secure by letters patent, is the combination of the slide and button, constructed for the purpose of making and breaking the connexion of the bell and hammer with the bolt, catch, latch, or fastening of the lock, substantially in the manner I have described.

I also claim the combination of the lever, H, with the bolt and catch or latch, of the lock, by means of which the movement of the catch is prevented, when the bolt is projected, and the catch is drawn by the same key which has drawn the bolt; constructed and operating substantially in the manner I have described.

CHARLES FLEISCHEL.

No. 9020.—*Improved Machine for making Sheet Metal Tubes.*

What I claim as my invention, and desire to secure by letters patent, is such an arrangement and combination of the mandrel, and the enclosing compressing rollers and their operating accessories, as will, after a tube has been formed upon the mandrel, enable me to depress the lower rollers clear of the mandrel, and by the same movement depress the mandrel, and retain it in a horizontal position between and clear of the four compressing rollers, with one of its ends left free and unconfined, to facilitate the removal of the said tube from the mandrel, substantially as herein set forth.

I also claim the placing of the movable collars, O, O, upon the compressing rollers, and the movable collar, *l*, upon the mandrel, for the purpose of producing an enlargement at the end of the tube, without causing straining or friction, substantially as herein set forth.

JEHIAL T. FARRAND.

No. 9021.—*Improvement in preparing Cotton Yarn for the Manufacture of Duck and other Coarse Fabrics.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the process herein described of preparing yarn for coarse cotton goods, but more particularly for cotton duck, by passing them through between moistening rollers, or otherwise wetting them, and then passing them over or around grooved or plain heated steam pipes or rollers, for removing their elasticity, smoothing and condensing them, whilst in a state of proper tension, substantially as herein described.

HORATIO N. GAMBRILL.

No. 9022.—*Improvement in Organs.*

What we claim as our invention, and desire to secure by letters patent, is the use of a separate air chamber, for supplying wind to all the pipes of a single stop, as herein described, and as opposed to the old method of having a single air chamber supply all pipes of the same note or letter in the different stops.

And, finally, we claim the combination of air chambers, such as are herein described, with valves communicating with the several pipes, and operated by mechanical agencies, such as are shown in the foregoing description, explanations, and the accompanying drawings, substantially as herein described.

ALBERT GEMUNDER.
GEORGE GEMUNDER.

No. 9023.—*Improvement in Carriage Axles.*

What I claim as my invention, and desire to secure by letters patent, is making the box in two or more parts, with a recess to embrace a collar on the journal part of the axle, or the equivalent thereof, substantially as described, when this is combined with the mode of securing together the sections of the said box, by fitting it within the hub or pipe-box, and

securing it therein by a nut, which embraces the several sections, and which secures them within the hub or pipe-box, substantially as specified.

KINGSTON GODDARD.

No. 9024.—*Improvement in the motion of the Lay in Looms.*

What I claim as my invention, and desire to secure by letters patent, is giving the lay of a loom one or more long beats for the shuttle to pass, or to insert a wire into the web, and as many short beats as may be necessary or desirable to strike up each thread of weft and wire with a toggle joint, operated by a sweep, or some other device, connected to or operated by a crank, cam, or otherwise.

JOHN GOULDING.

No. 9025.—*Improvement in Derricks.*

What we claim as our invention, and desire to secure by letters patent, is placing the axis upon which the jib, F, swings in a position deviating from the vertical, so as to cause the jib to have a tendency to swing in one direction, and applying the hoisting tackle, or part of the hoisting tackle, in any manner, substantially as described, to the side opposite to the direction in which the jib tends to swing, so as to make the hauling on the said tackle, or part of the tackle, swing the jib in the opposite direction to that in which is its tendency to swing when left free.

SELAH HILL.
CHARLES M. DUPUY, JR.

No. 9026.—*Improvement in Imitation Stone.*

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that I do not confine myself to the details, as herein described, so long as the peculiar character of either part of my invention be retained; but what I claim is the production of ornamental surfaces on picture frames, inkstands, and other articles, and on walls and other places, and on different matters, by applying thereto colored silk waste, or other colored fibrous substances, combined with cement, in such manner that the colored silk waste, or other colored fibrous matters used, shall produce a veined or marbled character.

CHAS. ILES.

No. 9027.—*Improvement in Preparations of Archil.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is mixing and treating lichen rocellus with a volatile alkali, urine, and clear and fully saturated lime-water, in the proportions and after the manner herein substantially set forth, for the purpose of producing a coloring matter known as archil.

LEON JAROSSON.

No. 9028.—*Improvements in Machines for Jointing Staves.*

We claim as our invention as follows: In combination with each carriage or frame, S, T, we claim the clamping contrivance or mechanism by which such carriage is held firmly in position, after being moved outwards by a stave, and while such stave is being reduced on its edges, or has the bilge formed on it, such contrivance or mechanism consisting of the movable bar, w, the rocker-bar, x, the lever, z, connecting-rod, b^1, and the clamping lever, c^1; the whole being applied to each carriage, and made to act on it as specified.

And in combination with the lever, v^1, as applied and operated in the manner above set forth, we claim the mechanism by which the fulcrum of the lever is caused to move longitudinally, or towards the cam, for the purpose of producing the effect equivalent to shortening the rear arm of the lever, and lengthening the front arm thereof, whereby the cutter-head is made to depart further from the middle of the machine, so as to increase the curve of the bilge, or make it, as it were, with a diminished radius, such mechanism being the stationary slotted plate underneath the carriage or frame, S or T, as arranged and made to operate essentially as described.

And in combination with the cutters which produce the bilge curve, we claim the self adapting planes or plane irons, arranged in front of such cutters, and for the purpose of jointing or smoothing the edge of the bilge, as explained.

DAVID ROOD.

No. 9029.—*Improvement in Saddles.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is the employment of woven ratan, cane, whalebone, or other similar elastic substance, in the construction of the seats of riding saddles, said seats so constructed being attached to and combined with the saddle-tree, in the manner and for the purposes above set forth.

WM. S. KENNEDY.

No. 9030.—*Improvement in manufacturing Wooden Type.*

Having thus fully described my invention, I do not claim any of the parts separately; but what I do claim as new, and desire to secure by letters patent of the United States, is the combination and arrangement of the lever or crank, D, with an inclined plane on its side, the screw, C, connected to the square bar, the band with its screws on the end of the bar, to hold the dies in place, the feeding lever, spring, dog, and tube, or grooved piece on the side of the press, to move and guide the type wood to the place for receiving the impression, in a press for forming wooden type, as herein described and shown in the drawings hereto annexed.

JOHN McCREARY.

No. 9031.—*Improvement in Harvesters.*

I do not claim as new the application of a rake having a reciprocating movement, for the purpose of gathering the grain into gavels, nor yet do

I claim causing teeth, *m*, *m*, to travel between the slats forming the receiving table, neither vibrating the said teeth in the manner specified, as such has been before done. But what I do claim as my invention, and desire to secure by letters patent, is the application of a rake cleaner, W, constructed similarly to the gate, V, but not acted upon by springs, it being loosely suspended, and so operated by the back motion of the rake, that its teeth work upwards between the teeth of the rake, throwing the grain cleared therefrom towards the delivery end or gate V.

WILLIAM McLAGAN.

No. 9032.—*Machine for Wiring Blind-Rods.*

Having thus fully, clearly, and exactly described my invention, what I claim as new, and desire to secure by letters patent, is—

First. The combining of clenching mechanism, substantially such as herein described, with devices for feeding the rod and the wire, and piercing the former, and severing, forming, and inserting the latter; whereby I make and firmly attach blind staples in their proper positions, substantially as herein described.

Second. I also claim the pivoted clencher, arranged and actuated substantially in the manner herein specified.

FREDERICK H. MOORE.

No. 9033.—*Improvement in Hanging Mill-Spindles.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the bail or balance rine, *a*, (of the usual shape,) with the cock-eye, *d*, of the spindle, by means of the inverted bearing cup, *b*, whose shank presses up through and is made fast in the centre of the said bail, and whose head is enclosed in the inverted socket, *e*, which rises above and is made fast to the top of the spindle, substantially as herein set forth.

W. H. NARACON.

No. 9034.—*Improvement in Bedstead Fastenings.*

What I claim as my invention, and desire to secure by letters patent, is securing the rail to the post by means of pin, C, key, D, and plate, E in the manner substantially herein set forth.

A. S. NEWHOUSE.

No. 9035.—*Improvement in Meat Cutters.*

Having thus fully described my improvements in meat cutters, what I claim therein as new, and for which I desire to secure letters patent, is the mode of attaching the knives herein described, by which they can be taken out and replaced expeditiously.

JOSEPH POTTS.

No. 9036.—*Improvement in Ore Stampers.*

Having thus fully described my improved stamper, and its mode of peration, what I claim therein as new, and for which I desire to secure

letters patent, is the employment of weights upon the stamper, substantially as described, to keep up a uniformity of weight as the stamper wears, as herein set forth.

THOMAS REANEY.

No. 9037.—*Improvement in Hand Seed Planters.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the method of conveying seed from the seed box, A, and depositing it in the furrow or hill, substantially as herein shown and described, viz: by having the rods, D, attached in any proper manner to a staff, C, said staff and rods passing vertically through the bottom of the seed-box, the upper part of the rods having cups (*b*) attached to them by elastic joints, the cups having spurs, *d*, projecting from them, which cant or turn over the cups when the staff and rods are raised, and throw the seed into the tops of the tubes, when they catch under the projections, (*e*,) the lower ends of the rods forcing out the seed from the tubes when the staff is depressed, and the spring (*c*) retaining it when the staff is raised.

GELSTON SANFORD.

No. 9038.—*Improvement in Harvesters.*

First. We claim as our invention the arrangement of the bridges beneath the platform, in combination with chain-bands, having accommodating knee-formed fingers or rakers working on pivots, and attached thereto, substantially as described.

Second. We also claim working the vibrating cutter between an under and an upper open guard or finger, as described and represented.

WM. SCHNEBLY.
THOS. SCHNEBLY.

No. 9039.—*Improvement in Label Cards.*

I claim the manufacture of label cards, or tickets of cloth and paper stuck and pressed together, substantially as above described.

JAMES SHARP.

No. 9040.—*Improvement in Machines for Making Cordage.*

Having thus described my improved rope and cordage-making machine, what I claim therein as new, and desire to secure by letters patent, is—

First. The arrangement and combination of the parts by which the machine is enabled to stop itself when the sliver becomes exhausted, or nearly so, in any one of the cans, viz: by means of the movable bottoms, *c*, within the cans, connected to the rods, *d*, which pass through the tubular journals of the can-frames, and descend below the disk, H; the arm, *q*, fixed near the centre of the spring-shaft, P, and the arm, *r*, fixed near the projecting end of the said shaft; and the arm, S, projecting from the side of the machine; or the respective equivalents of the said parts, when arranged, combined, and operating with each other, and with the

fixed pulley, Q, and the loose pulley, R, on the shaft, E, substantially in the manner herein set forth.

Second. I also claim the corrugating of the sides of the cans to prevent the sliver from rising therein, when it is pressed into the same, by which a much larger quantity of sliver can be placed in them than can be placed in cans of the usual form.

Third. In combination with the said corrugations in the sides of the cans, I also claim the perforating of the sides of the same for the purpose of allowing the air to escape therefrom, when the sliver is compactly pressed into the cans.

Fourth. I also claim the inserting of a wing (or wings) into each of the cans, for the purpose of preventing the combined annular and rotary motion which is imparted to the cans from twisting and kinking the slivers as they rise to the upper tubular journals of the can-frames, substantially as herein set forth.

DAVID PERRY.

No. 9041.—*Improvement in Sewing Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combination of the bobbin, F, for carrying one thread, with a rotating hook, which is of such form, or forms part of a disk, or its equivalent of such form, as to extend to the loop on the other thread, and pass it completely over the said bobbin, whereby the two threads are interlaced together; the parts being arranged and operating in any way substantially as herein set forth.

ALLEN B. WILSON.

No. 9042.—*Improvement in Machine for stamping Ores.*

I do not claim as my invention the combination of the drum or pulley, K, the strap, I, the frame, H, its catch-lever, and the cam at the top of the gins, as employed to elevate the ram, or weight, and disengage it so as to enable it to fall down on the bed, or mortar; nor do I claim the arc, g^1, of cogs, and the two gears, N, N^1, (applied to their two shafts,) for the purpose of alternately imparting a rotary motion to each shaft, as I am aware that such are old contrivances; but what I do claim as my invention is the combination and arrangement of the said arc of cogs and its wheel, the two spur wheels, N, N^1, the shafts thereof, the drums, K, K^1, straps, I, I^1, frames, H, H^1, their catch levers, and disengaging cams; the whole being applied to the two weights, or rams, and made to operate or alternately raise them, disengage them, allow them to fall, and afterwards re-engage them all, as specified.

And in combination with the *two* spur gears, N, N^1, and the arc gear, g^1, P, I claim the cam, *k*, on the wheel P, the two spring catches, *i*, *i*, and the two pins, or studs, *h*, h^1; all arranged, applied, and made to operate substantially in manner and for the purpose as herein-before specified.

VIRGIL WOODCOCK.

No. 9043.—*Improvement in Friction Clutch.*

I do not claim as my invention making a loose pulley fast with its shaft by means of the friction of internal segments; but what I do claim as my invention, and desire to secure by letters patent, is operating the segments for producing friction on the inner surface of a loose pulley by means of a thimble on the shaft of the pulley, connected with the segments by diagonal rods or braces, substantially as described.

WENDELL WRIGHT.

No. 9044.—*Improvement in detaching harness from Horses.*

What I claim as my invention, and desire to secure by letters patent, is the manner of constructing the hames, the saddle-tree guard, and stop, as herein-above described, so as to enable the driver at any time to detach the horse or horses from the harness and buggy, carriage, or other vehicle, by a single pull or jerk of a cord.

GEORGE YELLOTT.

No. 9045.—*Machine for washing and amalgamating Gold, etc.*

What I claim as my invention, and desire to secure by letters patent, is the manner herein described of constructing the hollow revolving cylinder, B, to wit: with brackets, D, along its periphery, and an inner partition, E, near its discharge end, C^1, for separating, washing, and causing gold to amalgamate, in the manner herein described.

ALEX. BARCLAY.

No. 9046.—*Improvement in Valves for Pumps.*

What I claim as new, and desire to secure by letters patent of the United States, is the device consisting of a cylindrical box-valve, *f*, with its induction openings, *h*, h^1, and its side or water-way openings, *g*, g^1, and its eduction openings, *i*, i^1, and of a valve-chest adapted thereto, with its induction, and side or water-way, and eduction openings corresponding to the openings in the valve-box; the whole, in connexion with the usual water-ways and barrel of a double-acting pump, furnishing the parts necessary to the operation of such a pump, thus obtaining from a single valve, deriving its motion from the outflowing and in-flowing currents, the result for which several separate valves have hitherto been needed, substantially in the manner described.

J. R. BASSETT.

No. 9047.—*Improvement in Bomb-Lance for killing Whales.*

What I claim as my invention is as follows: I claim the mode of sustaining the fuse-rope in the fuse-tube, and preventing the fire of the charge of the gun from passing by the fuse-rope and into the bomb, viz: by the two metallic tubular plugs, *h*, *i*, cast around the ends of the fuse-rope and into the fuse-tube, and arranged substantially as specified.

I do not claim the application of wings or feathers to a shaft or rod, to direct its passage through the air; but what I do claim is my improved

mode of making them, viz: of vulcanized India rubber, or other equivalent, so that they may not only resist the destructive powers of the explosion, but be folded down on the shank, when put into a gun-barrel, and have the property of elasticity, such as will enable them to unfold themselves after being discharged from the gun.

CHRISTOPHER C. BRAND.

No. 9048.—*Improvement in Heat Radiators.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the flue, I, I, the cylindrical flue, the flue, H, the receiver, G, the pipes, L, L, and the open space, P; all operating in the manner and for the purpose substantially as herein described and set forth.

MERRILL COLVIN.

No. 9049.—*Improvement in Horse Powers.*

What I claim, and desire to secure by letters patent, is—

First. The method of combining and arranging the two pallets, as connected by a joint with the levers, in such a manner that, by the action of the teeth of the main wheel against the end of these pallets, an oscillating motion is given to the levers; and by such motion, and the aid of the connecting rods and cranks, a rotary motion is produced. But I do not claim the application of connecting rods and cranks for producing such rotary motion.

Second. I also claim the method of combining and arranging with the parts above claimed the three eccentric wheels running together, in such a manner that, while the motion of the middle one is uniform, that of the other two, on which the cranks act, are irregular, alternately; that irregularity being required for the purpose of giving to the middle eccentric wheel a direct motion, not subject to being reversed, as it would be by using common wheels; all as herein-before described, for the purposes set forth.

Third. I do not intend, by the foregoing claim, to limit myself to the application of this invention to horse powers, but to apply it, as I may think proper, to other purposes for driving machinery when speed is required.

AARON D. CRANE.

No. 9050.—*Improvement in Dumping Wagon.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the adjustable bar, or incline, K, and screw, O, in combination with the rollers, I^1 and I, I, all operating in the manner substantially as shown and set forth in the foregoing specification and accompanying drawings.

J. V. CROSS.

No. 9051.—*Improved Wrought Nail Machinery.*

Having thus described the nature of my invention, what I claim as new, and desire to secure by letters patent, is as follows:

First. I claim the combination of a series of hammer faces with gripers, having both a rotary and progressive motion, and so arranged as to convey the blank between the several pairs of faces successively, at the same time revolving it so as to present different sides successively to the action of the hammers.

Second. I claim such an arrangement of the several hammer faces which act successively upon the blank, with regard to the distance of the lines in which they respectively move from the line in which the gripers move, that when the gripers move forward in said line, thereby conveying the blank from one pair of faces to another, the successive strokes which it receives will fall on different points, thereby reducing different parts of it successively to the required size.

Third. I claim, in combination with such an arrangement of the faces, with respect to the gripers, such a graduation in the nearness with which the several pairs respectively approach when they strike, that the several parts of the blank upon which they respectively act will be reduced to different sizes, and that the combined effect of the whole will be to reduce the nail to the proper form.

Fourth. I claim the combination of the two kinds of faces, broad and narrow, with gripers so arranged as to present the blank to the action of the narrow ones until it is suitably elongated, and subsequently to that of the broad ones, to receive a finish.

Fifth. I claim the arrangement of a set of gripers upon the interior of a circular hub or frame, in combination with the hammers placed in or near the centre of the circle in which they are arranged.

Sixth. I claim adjusting the gripers by means of a spring, or its equivalent, so arranged as to press them towards the hammers to their proper place, allowing them to recede as far as the lengthening of the nail requires while the hammers are acting, and causing them to return again when the hammers are withdrawn.

Seventh. I claim such a combination of stops for limiting the approach of the hammers to each other with cams, or their equivalents, for forcing them together, as do diminish the inequality, which unequal resistance between the faces has a tendency to cause the springing of the parts which produce the stroke; thereby rendering the effect of the strokes more uniform.

DANIEL DODGE.

No. 9052.—*Improvement in method of ascending Inclined Planes.*

I do not claim the placing of a third rail in the centre of the track, against the sides of which wheels are made to press or grip, for the purpose of enabling a locomotive to ascend inclined planes. But what I do claim, and desire to secure by letters patent, is the rail constructed with the projecting flange, forming a clear space for friction wheels to revolve as described, in combination with the friction wheels, *g*, *g*, arranged and operating in manner substantially as set forth, giving to the engineer the power of increasing the adhesion of the engine at his pleasure, and thereby insuring that it will, at all times, work up to its steam capacity.

JAMES S. FRENCH.

No. 9053.—*Improvement in Sewing Machines.*

Having thus described our improved sewing machine, we shall state our claim as follows: What we claim as our invention, and desire to have secured to us by letters patent, is the arrangement above described in a sewing-machine, for feeding the cloth along, consisting of a notched bar, which has a vertical or up-and-down motion, for fastening the cloth upon, and releasing it from, the notches of said bar, by striking it against a yielding plate, and a lateral motion, or motion forward and back, for feeding the cloth along after each stitch, substantially as above set forth.

We also claim a circular instead of a straight horizontal needle, for spreading the loops of the thread of the vertical needle, substantially as above described.

WM. O. GROVER.
WM. E. BAKER.

No. 9054.—*Improvement in Foot Cars.*

Having thus fully described my invention, what I claim in the construction of foot-cars as new, and desire to secure by letters patent, is suspending each of the treadles upon which the passenger operates from the same side of the axle, the treadles being so arranged as to rotate the axle, whether they be applied both together or one at a time alternately, and through said axle give motion to the driving wheels, substantially as herein described.

I also claim combining with the axle and driving wheels the fixed ratchets and spring pawls, for the purpose of giving the driving wheels a continuous motion in one direction, whilst the axle may have an intermittent motion in the same direction, as herein represented and described.

NEHAMIAH HODGE.

No. 9055.—*Improvement in Clover Harvesters.*

What I claim as my invention, and desire to secure by letters patent, is the hinged board, A, in combination with the movable cutter frame and the platform, C, as herein set forth.

Second. I claim the shield, F, the same being constructed, applied, and operated in the manner and for the purposes herein set forth and described.

Third. I claim the combination of the lever, *f*, and lever, *n*, the latter being constructed at its posterior end with slot and pivot pin, to admit of antero-posterior movement, and at its anterior end with supports for cogged gearing; so that while the levers raise and depress the cutters, they also contribute to connect and sustain the gearing for driving the cutting reel.

JOHN KRAUSER.

No. 9056.—*Improvement in divided Railroad Car Axles.*

I do not claim surrounding a divided axle with a tube; neither do I claim making semi-axles of a conical form; but what I do claim as my invention, and desire to secure by letters patent, is the conical semi-axle, *a*, in combination with the tube, A, constructed as described, for the double purpose of giving the greatest strength to the axle itself, with a given weight of metal, and of increasing the strength of the tube in the centre, without a corresponding increase of the external diameter thereof.

Again, I do not claim a hollow divided tube, attached rigidly to the wheels, and revolving upon an undivided axle, to which it is secured by flanges, rings and bolts.

But what I do claim is the peculiar manner of coupling the wheels and semi-axles to the hollow tube surrounding said axle, by the use of the groove in the hub of the wheel, into which the flange of the tube enters, in combination with the ring, *n*, secured to the wheel by bolts as described, for the three-fold purpose, first, of enabling the wheel and its semi-axle to revolve independent of the tube, and of strengthening the axle at its weakest point, where it enters the wheel, and, lastly, to prevent the end of the tube from splitting out, by thus removing half the strain from the lower to the upper side, in the manner above set forth.

WM. S. LOUGHBOROUGH.

No. 9057.—*Improvement in steps and bearings of Mill Spindles.*

Having thus fully described my invention, I would observe that I do not claim upbearing or sustaining the gudgeons of shafts, or other revolving bodies, by liquids when packing and force pumps are used for giving the desired pressure to sustain the weight of said shaft or other body and to prevent the lubricating liquid from overflowing.

But what I do claim as new, and desire to secure by letters patent, is lessening the friction of mill spindles and other heavy revolving bodies by upbearing and sustaining the gudgeon of the same upon any lubricating liquid, by the use of the hollow lighter or case, (*b*,) with the case, (*a*,) for containing said liquid, upon which said lighter revolves, or their equivalents, said lighter being proportioned to the weight it is designed to sustain, and arranged and connected with the shaft as described, or in any other manner substantially the same in principle, operation, and effect.

THEODORE S. MINNISS.

No. 9058.—*Improvement in Planing Machines.*

I do not claim as my invention the combination of one or more stationary planes so arranged that, while one or more remove the rough surface of a board, the rest or last shall finish or produce on it a smooth plane surface; but I claim, when placed so as to operate on one side of a board, a cylindrical rotary cutter, for roughing and reducing, which cuts from the unplaned to the planed surface, in combination with a stationary cutter placed behind, and as near thereto as may be, for finishing, without pressure rollers, or pressure bars of any kind; whereby I am enabled to operate with greatly diminished power, and the rotary cutter will cut up and throw off the shavings from the stationary cutter, and the boards will be reduced to an equal thickness and a smooth surface.

N. G. NORCROSS.

No. 9059.—*Improvement in Machines for preparing Flocks, &c.*

What I claim as my invention, and desire to secure by letters patent, is—

Firstly. The construction and arrangement of the fan-wheel, and its combination with the elastic grinding bed or grater, constructed as described, or in any other manner substantially the same, for effecting the feeding, separating, and discharging of the flocks and other matters mixed therewith, in the manner described.

Secondly. I claim supporting or attaching the concave grater, or grinding bed, to the frame by springs or other elastic material, for the purpose set forth.

Thirdly. I claim the reflectors, and their arrangement in the machine, in the manner and for the purpose set forth; the whole being combined d operating substantially as described herein.

JOHN R. PETERS, Jr.

No. 9060.—*Improvement in Fluid Metres, &c.*

What I claim as my invention, and desire to secure by letters patent, is in combination with a force-pump and a piston or plunger, actuated by water or other fluid forced from the same, the air-vessel and the drop-valve, arranged and actuated substantially as described, whereby the measuring piston or plunger is caused to pause at the end of each stroke in either direction, substantially in the manner and for the purposes described.

I also claim supplying the pump-chamber, A, and the metre-chamber, K, through valves, arranged and operating as described, and loaded in proper relative proportion, or supplied from heads of proper proportional height, for the purpose herein described; height of head of supply, or amount of load on the valves, being equivalents, producing the same results.

I also claim actuating the counter through the agency of a rack and a segment cog, arranged substantially as described, whereby any movement of the metre, piston, or plunger less than a whole stroke, is counted up in proper proportion by the counter.

WILLIAM HENRY LINDSAY.

No. 9061.—*Improvement in Ploughs.*

Having thus fully described and represented my improved plough, what I claim therein as new, and desire to secure by letters patent, is combining a plough and harrow in one implement—that is to say, attaching a comb or rake, or its equivalent, to the rear and upper end of the mould board, to comb out and pulverize the soil on the bottom of the furrow as it is turned up, substantially as set forth.

DAVID SWARTZ.

No. 9062.—*Improvement in Time Pieces.*

What I claim as my invention, and desire to secure by letters patent, is insulating or separating the clock-frame from all contact with the case, by intermediate packings of India-rubber, or other non-conductor of sound, substantially as shown and set forth.

S. R. WILMOT.

No. 9063.—*Improvement in Mill-Stone Dress.*

Having thus fully described the nature of my invention, I wish it to be understood that I do not claim the polishing of one stone by rubbing it with another of the same material; neither do I claim polishing the face of mill-stones by rubbing it with another stone, as both these have been essayed. But what I do claim as my invention, and desire to secure by letters patent, is, first, the rounding off of what is usually termed the feathered-edge of mill stones for grinding buckwheat, so as to present a round, smooth surface, instead of a cutting edge, as herein set forth; and this I claim whether said furrows are polished, sharpened, or straightened by rubbing the same with a burr-block after said furrows have been roughed out with a pick or other tool, or by any other means substantially the same.

WILSON AGER.

No. 9064.—*Improvement in Hulling Buckwheat.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the method herein described of scouring or hulling buckweat by passing it through between horizontal stones, the runner having furrows on its face, draughted substantially as herein represented, and cut in the direction of the motion of the stone, with the design of keeping the grains from leaving the stones too fast, and for rotating them both on their short and long diameters; and the bed-stone left without furrows, in the manner and for the purpose herein set forth.

WILSON AGER.

No. 9065.—*Improved Sail Hank.*

Having described the nature of my invention, what I claim, and desire to secure by letters patent, is the construction of a *divided hank*, so formed that one part, A, may embrace the stay, and the other part, D, enter the eyelet of the sail, and the parts be connected together by the socket, B, or one receiving the shank of the other, and be confined by the bolt, E, for the purpose of securing sails to the stay, substantially in the manner set forth and shown.

SAM'L BARKER.

No. 9066.—*Apparatus for Propelling Vessels.*

What I claim as of my own invention, and desire to secure by letters patent, is the combination of the radius bars, upright levers, cranks, horizontal levers, carrying paddles, and curved slots, arranged with respect to each other, and connected and operating substantially in the manner set forth herein.

MATHEW AUGUSTUS CROOKER.

No. 9067.—*Improved Revolving Last-holder.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The revolving stock, H, B, K, L, constructed and arranged, and operating in the manner substantially as and for the purpose herein set forth.

Second. The revolving last holder, M, N, O, attached to the revolving stock, H, B, K, L, and having an adjustable rest, or arm, P; the whole being constructed, arranged, and operating in the manner substantially as and for the purpose herein specified.

HENRY G. DE WITT.

No. 9068.—*Improvement in Railroad Car Trucks.*

Having described the nature of my improved safety truck for railroads, what I claim, and desire to secure by letters patent, is the construction of a truck with independent wheel frames, A, A, A, strengthened by braces, D, D, and connected to the opposite side wheel frame by the bar, E, extending across the truck upon which said wheel frames may vibrate, substantially in the manner and for the purposes set forth and shown.

CALEB R. DISBROW.

No. 9069.—*Improvement in Potato Diggers and Stone Gatherers.*

Having now set forth the nature of my invention, I will proceed to state what I claim, and desire to secure by letters patent. What I claim, therefore, is the use of the roller, having a series of rows of pins in its periphery, and secured on an axletree of a cart or other moving apparatus, in combination with an adjustable apron having teeth in it, and a discharging plate having teeth in it, substantially for the purpose of gathering stone, potatoes, fruit, or other substances or articles, and depositing them in a box, as herein-before set forth.

J. T. FOSTER.

No. 9070.—*Improved Lock.*

Having now described my invention, I will proceed to state what I claim and desire to secure by letters patent of the United States. What I claim, is the arrangement of the lever, g^2, and its accessories, for latching and unlatching bolt, relative to the lever, W, for locking the revolving key plate, whereby the auxiliary key acts upon the former by being lifted endwise, and upon the latter by its bit when revolving in the usual manner, substantially as set forth.

F. GARACHON.

No. 9071.—*Improvement in Cast Iron Car Wheels.*

Having now fully described my improvement in the railroad cast-iron car wheel, and shown the difference thereof from other wheels in use, what I claim as new, and desire to secure by letters patent, is so combining the outer concentric disk, C, with the arched inner disk, E, that the union of the latter with the rim, D, shall form alternate curved radial arches, F, to the corrugated disk, C, at its connexion with the rim; and also that the union of the two disks, C, E, shall form intermediate solids, G, curving centre-ward from the rim for about two inches, (more or less,) in the manner and for the purposes specified.

ALFRED HEBBARD.

No. 9072.—*Improvement in Hanging Steps of Mill Spindles.*

Having thus fully described my tramblock and bridgetree, what I claim as my invention, and desire to secure by letters patent, is the manner of connecting the tramblock foundation with the stone-bearers by means of stanchions and screwbolts, as specified, in combination with the method of suspending the lighter lever from the shell which guides and sustains the pot containing the step of the spindle, by means of the shell, *j*, the sway bar, *p*, and the knife edges of the sway bar and pot, or their equivalents, in manner and for the purposes substantially as described.

GIDEON HOTCHKISS.

No. 9073.—*Improvement in Bedstead Fastenings.*

Having described the nature and use of my improvement, I do not claim a bedstead fastening composed of a stub bolt drawn tight on an inclined plane, as that is well known. But what I do claim, and desire to secure by letters patent, is the combination of the fastening, composed of the stub bolt, C, and the inclined plane, *h*, or their equivalents, drawn tight by the cording of the bedstead, with the endless screw, *f*, acting upon the inclined plane, *h*, by means of cogs, *d*, or other equivalent device, in order, by turning the inclined plane under the bolt, *c*, to loosen, separate, or tighten again the fastening without the necessity of slacking the cording.

JASPER JOHNSON.

No. 9074.—*Improvement in Moulding Hollow-Ware, &c.*

What I claim as new, and desire to secure by letters patent, is the method of moulding hollow-ware, or other similar castings, with a flaring rim, or its equivalent, (such as the lip on cannon stove or other tubular castings,) by using third patterns attached to suitable match-plates or follow boards, and so devised that, in connexion with the first and second patterns which form the exterior, I mould therefrom the top edge, a portion of the interior of the desired casting, and a true seat for the core; thus, with the core, forming the entire mould, substantially as described and represented.

JAMES J. JOHNSTON.

No. 9075.—*Improved method of Heating Sheet Iron while in the process of manufacture.*

Having thus described my improvement in the manufacture of sheet iron, by which it is made to resemble the imported Russia sheet iron, and

possess that beautiful mottled gloss and smooth hard surface, what I claim as new, and of my invention, and desire to secure by letters patent, is heating the sheets of iron in a bath of hot lead, instead of heating them in an oven, by which the surfaces of the sheets are protected from the oxygen in the atmosphere during the heating process preparatory to the rolling operation.

HENRY McCARTY.

No. 9076.—*Improvement in Compound Anchor.*

What I claim as my invention, and desire to secure by letters patent, is the above described anchor for holding ships.

SAM'L NYE MILLER.

No. 9077.—*Improvement in Mixing Mortar.*

What I claim as my invention, and desire to secure by letters patent, is the mixing of the lime and sand together before straining, substantially in the manner and for the purpose herein set forth.

JESSE PECK.

No. 9078.—*Improvement in Locomotive Engines.*

What we claim as our invention, and desire to secure by letters patent, is the combination in a locomotive engine of three cylinders, whose cranks are at angles of about 120° to each other, with valves, valve-chests, escape pipes, and steam pipes, provided with throttle valves, substantially such as are herein described, whereby the steam acts only on one side of the piston when the locomotive is advancing, and upon the other when it is backing, and the reversal is accomplished by such change in the operation of the steam without recourse to any of the ordinary means of reversal.

H. R. REMSEN.
P. M. HUTTON.

No. 9079.—*Improvement in Skates.*

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is making the runner, C, out of a plate of steel, G, and of the form substantially as shown and specified; the plate, G, being turned or struck the desired form by means of disks, or in any other desirable way.

NATHANIEL C. SANFORD.

No. 9080.—*Improvement in Belt Clasp.*

What I claim as my invention, and desire to secure by letters patent, is the making clasps to fasten belts or bands together, to run on machinery or around pulleys, by using jaws or plates of metal, constructing or adapting them to that purpose, and then confining them together with screws, so as to hold the belts solid, and thereby introducing a new and useful manner of fastening machine belts together.

ALBERT M. SMITH.

No. 9081.—*Improvement in method of Ringing Bells.*

I am aware that bells have been rung in various ways before my invention, and that the devices which I use have been separately employed for various purposes. But what I do claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the levers, C, C, and D, D, and the compound levers, E, E, so connected and attached to the axle, I, as to give motion to the bell-clapper, in the manner and for the purposes herein shown and set forth.

THOMAS V. STRAN.

No. 9082.—*Improvement in Brick Machines.*

I do not claim the plunger or follower, operated by a connecting rod and crank, as that is well known. But what I claim as new, and desire to secure by letters patent, is—

First. The employment or use of the lever, H, having step projections, (b^1,) (b^2,) on one of its sides, attached to the connecting rod, *c*, and arranged as shown and described, by which a greater or less pressure of the plunger or follower upon the clay in the moulds is obtained as desired.

Second. I claim the arrangement of the levers, I, J, N, rods, K, L, vertical lever, M, and the rod, O, with the levers, P, S, and upright shaft, R, for the purpose of operating the feeder, T, and vibrating bar, U, substantially as set forth.

Third. I claim the employment or use of the spring, Y, attached to the vertical lever, M, and operated upon by the rods, *r*, *r*, attached to the lever, whereby the working of the machine is prevented by any obstruction, as described.

Fourth. I claim the attaching together of the feeder, T, and vibrating bar, U, the vibrating-bar having a guide rod, (*m*,) working in suitable bearings, (*n*,) or arranged in any other suitable way.

R. A. VER VALEN.

No. 9083.—*Improvement in Sofa Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the manner of guiding the seat, when it is raised and lowered, and of connecting the seat and bed when extended, by means of the metallic bearings, D, and the grooves, E, which they traverse when the seat is raised and lowered.

ALFRED WALKER.

No. 9084.—*Improvement in Railroad Cars.*

What I claim as my invention, and wish to secure by letters patent is an enclosed passage or communication from one car to the other, as herein described, for the purpose of ventilating the train, through the

ends of the cars, from the forward part of the train, and for the safety of passengers while passing from one car to the other, and for the purpose of keeping dust out of the cars when the train is in motion.

CHARLES WATERBURY.

No. 9085.—*Improvement in connecting Cocks with Pipes.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the manner herein described of making a tight joint, viz: by boring the hole in the pipe as nearly cylindrical as may be, and making that part of the cock which is to be inserted, near the end and near the shoulder, of equal diameter with the holes, and the central part slightly larger, and then driving the cock into its place, the edges of the hole shaving the cock to its proper size and form.

DANIEL A. WEBSTER.

No. 9086.—*Improvement in Sugar Boiling Apparatus.*

What I claim as my own invention and discovery, and desire to secure by letters patent, is the construction of the transverse canal, A, in combination with the hinged cover, B, for the double purpose of returning the froth to the receiving pans and for preventing the sirup from falling into the canal while being laded from one pan to the other.

I also claim the construction of the lower longitudinal canal, G, with its hinged board, H, for the purpose of more effectually removing the feculencies as described.

I also claim the use of the movable plank, P, in the coolers, which when removed leaves a vacancy or channel for the molasses to flow away to the discharge aperture through the bottom of the cooler.

JUAN RAMOS.

No. 9087.—*Improvement in processes for the manufacture of Sugar.*

What I claim as my own invention and discovery, and desire to secure by letters patent, is the use of the juice of the plantain stalk and quick-lime, combined substantially in the manner and for the purpose described, for defecating the cane-juice.

I also claim the application of a fresh strike of concentrated sirup from the battery to the molasses first drained off, for the purpose of crystallizing the sugar yet remaining in the molasses.

JUAN RAMOS.

No. 9088.—*Improvement in Revolving Boot-Heels.*

What I claim as of my invention is as follows: that is to say, I claim the combination of the four separate pieces, *a*, *b*, *c*, *d*—that is to say, the metallic ring, *a*, the leather or flexible disk, *b*, the leather annulus or ring, *c*, and the leather disk, *d*, the said combination being represented in figure 1, and constructed, arranged, and made to operate together, substantially as herein-before described.

THOS. WALKER.

No. 9089.—*Improved Centre Square for finding the Centre of a Circle.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The application to an instrument, substantially in the manner herein set forth, of a geometrical fact, viz: that any circle, touching the sides of a right angle, will be divided into two equal parts by the line which divides the right-angle into two equal parts.

Second. The union of the above with the common "trying square," by means of the bar, B, C, as described.

NATHAN AMES

No. 9090.—*Improvement in the construction of Bridges.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the string pieces with the posts, F, F, the cross-joists, E, E, the saddles, A, A, the diagonal braces, *b*, *b*, and the ties, *a*, *a*, of a bridge frame, in such manner that the said string pieces are enabled to move longitudinally under the influence of variations of temperature, or other cause, without injury to themselves or to the parts with which they are combined, substantially as herein set forth.

ABEL BRADWAY.
ELIJAH VALENTINE.

No. 9091.—*Improvement in Car Seats.*

What I claim as my invention, and desire to secure by letters patent, is a car-seat, constructed with a double back, which can be folded up or unfolded by means of the hinged arms, *k*, *k*, *l*, *l*, operating as above set forth, the two pieces which constitute the back being held together, when open or raised up, by the spring lips, *o*, *o*, substantially as above described.

JOHN BRIGGS.

No. 9092.—*Improvement in Turning Engines.*

What I claim, and desire to secure by letters patent, is the clasp, *b*, in combination with the slide, C, and saddle, B, for the purpose of arresting the combined operation of the slide, C, and pattern, I, when required.

And I also claim the cylindrical nut, E, in combination with the standard and tool-holder, F^1, of the slide rest, as described, by which the edge of the tool is brought to the proper position to co-operate with the pattern-bar and slide-rest, substantially as is herein set forth.

JAMES S. BROWN.

No. 9093.—*Improvement in the construction of Bridges.*

I am aware that diagonal or inclined counter-braces, differently arranged, have before been used: such, therefore, irrespective of their disposition and combination as specified, I do not claim. But what I do claim as my invention, and desire to secure by letters patent, is the upper

and lower counter braces, F, G, inclining in reverse directions to one another for either half of the span, as shown and described, and connecting the double diagonal main brace, E, with the upper and lower cords, A, B, united by tie timbers, D, as specified, producing the important results herein set forth.

J. B. GRIDLEY.

No. 9094.—*Improvement in Hand Planes.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The loop, *f*, on the cap, F, in combination with the plane-iron, E, and the stem, B, of the stock, in the manner substantially as described, to wit: the said loop fitting over or embracing the plane-iron and stem, and allowing the iron to be secured between the cap and the stem by means of a wedge, G, placed either between the back of the iron and front of the stem, between the front of the iron and the cap, or between the back side of the stem and the back part of the loop, the three positions of the wedge forming three different widths of throat as herein explained.

Second. Providing the cap, F, with shoulders, *g*, *g*, which, when the cap is placed in the stock of the plane, will fall on suitable resting pieces, provided in or upon the stock, substantially as described.

BIRDSILL HOLLY.

No. 9095.—*Improvement in Patterns for Metal Hubs, &c.*

Having described my improvement, what I claim as my invention, and desire to secure by letters patent, is furnishing the usual pattern with a shield, as herein described, whereby I am enabled more easily to draw the core, and prevent chipping and breaking down thereof.

JASPER JOHNSON.

No. 9096.—*Improvement in Portable Grain Mills.*

What I claim as my invention, and desire to secure by letters patent, is forming the inner stationary cone with a cavity, (square or otherwise,) as described, for the purpose of readily securing the mill on the top of a post, or stump, without the use of bolts or wedges, &c., as set forth.

CHARLES LEAVITT.

No. 9097.—*Improvement in Churns.*

Having thus fully described the nature of my improvement in churns what I claim therein as new, and desire to secure by letters patent, is the racks, (*b*,) grooves, (*c*,) and pinions, (*d*,) by which the shaft (*e*) and beaters (*f*) are caused to traverse the milk or cream with a compound vertical revolving and reciprocating motion, after the manner and for the purposes described.

NORMAN B. LIVINGSTON.

No. 9098.—*Improvement in Railroad Car Brakes.*

I do not claim the mere combination of two plates or surfaces, one of which shall be made to rub against the other, and constitute a friction brake; but what I do claim as my invention, is my improved brake, composed of three or any greater number of plates or disks, arranged side by side, and on a shaft, and having some one or more of them connected with the shaft, so as to be revolved by it, and the others held stationary, so as not to be revolved, and the whole, except one of the outer ones, made to slide endwise on the shaft, and combined with an apparatus or means of pressing them towards and against one another, substantially as specified.

I also claim the combination of the cross-rods, D, D, with their friction plates and axle, for the purpose of sustaining the axle in case of fracture of it, as specified.

W. MONTGOMERY.

No. 9099.—*Improvement in Processes for Defecating Sugar.*

Having thus described the nature of our improvements, and the manner of performing the same, we would have it understood that we do not confine ourselves to the details as herein given, nor to the phosphates mentioned, as others may be substituted. What we claim is the use of aluminate of lime, in combination with the super-phosphate of alumina, or of lime, or with the phosphoric acid, for clarifying cane juice or sirups, as set forth. But we disclaim the use of phosphoric acid, except in combination with the above-named basis.

JOHN OXLAND,
ROBERT OXLAND.

No. 9100.—*Improvements in Cutter Heads for Planing.*

What we claim as our invention, and desire to secure by letters patent, is our improved elliptical reducing and planing instrument, composed of obliquely acting cutters, secured to an elliptical plate in such a manner that the periphery of the said plate will gauge the depth of the action of the cutters, and also serve to hold down the material operated upon, substantially as herein set forth.

JAS. M. PATTON.
WM. F. FERGUS.

No. 9101.—*Improvement in Cordage Machines.*

Having thus described the construction and operation of my machine, what I claim, and desire to secure by letters patent, is the use of grooved scrolls, (G, G, G,) and their combination with pinions, (*c*, *c*,) and grooved rollers, (*d*, *d*,) and friction rollers (*h*, *h*,) or equivalents for such friction rollers, to create a regular feed motion and equality of strain whilst laying or forming in a rope, twine, or cordage machine; the whole being constructed in the manner and for the purpose substantially the same as described.

JOHN W. PEER.

No. 9102.—*Improvement in Double Acting Doors.*

What I claim as my invention, and desire to secure by letters patent, is the manner, substantially as herein described, of arranging vertical and horizontal adjustable slats, C, C, C^1, C^1, and J, J, along the front, top, and back edges, *a*, *b*, *c*, of the door, B, for the purpose of allowing the door being opened in either direction, in or out; said slats being made to operate in the manner herein specified by means of the door, B, levers, D, D, or their equivalents, I, *h*, j^1, and springs, G, G, G^1, G^1, and *j*; the whole being constructed and arranged in the manner herein set forth.

WILLIAM RIPPON.

No. 9103.—*Improved mode of Grinding Puppet Valves whilst the Engine is in motion.*

What I claim as my invention, and desire to secure by letters patent, is the valve provided with spindles, free to turn on their lifters, in combination with mechanical devices, substantially such as are herein described, which rotate said valves when down on their seats, but do not act on said valves when rising or falling; the whole acting substantially in the manner and for the purposes described.

ENOS ROGERS.

No. 9104.—*Improvement in Machines for Rubbing Stone.*

We are aware that stationary or fixed wheels have been placed in the centre of stone-rubbing machines, with cranked pinions revolving on their own axis, and around the said fixed wheels, as a common centre; therefore we do not wish or intend to claim the arrangement of stationary or fixed wheels, around which pinions revolve, to give motion to the arms and rubbers. But what we do claim as our invention, and desire to secure by letters patent, is the arrangement of a revolving centre driving wheel, with a series of stationary crank shaft pinions, revolving on their own axes, whether in combination with the cranks, *f*, or stationary pins, so constructed and arranged upon a radial line as to give the arms and rubbers a rotary or compound elliptic rotary motion, for the purposes herein shown and set forth.

PLEASANT E. ROYSE.
IRA REYNOLDS.

No. 9105.—*Improved Combination of Cutters for Threading Wood Screws, &c.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein specified, of cutting away the mass of the metal to form the thread, by means of a burr-cutter, in combination with the method, substantially as specified, of finishing and smoothing the threads by means of the chaser, as set forth.

THOS. J. SLOAN.

No. 9106.—*Improvement in the Thermostat for Regulating Heat.*

What I claim as my invention, and desire to secure by letters patent is the application of the physical principle of the expansion and contraction of substances by varying degrees of heat, to regulate and control a mechanism applied to operate a damper, register, valve, ventilator, or other equivalent device, which mechanism is actuated or propelled by some independent motor, substantially in the manner and for the purpose specified.

THOS. J. SLOAN.

No. 9107.—*Improvement in Pneumatic Spring.*

Having thus described my improvements, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, in an air car spring, in which the piston operates upon the disk of rubber, or other elastic substance, which forms one side of the air chamber, is the combination of the movable diaphragm, constructed of the pieces, *f*, *f*, &c., operating substantially as herein-above described, with the rings, *h*, placed loosely on the same, for the purpose herein-above set forth.

ELIJAH WARE.

No. 9108.—*Improvement in Planing Machines.*

Having thus described my improvements, what I specifically claim therein as new, and desire to secure by letters patent, is a reducing plane, composed of a series of oblique irons, arranged substantially as herein set forth.

I also claim the combination of the before-claimed reducing cutters with smoothing cutters, arranged substantially as herein set forth.

WM. WATSON.

No. 9109.—*Improvement in Railroad Car Brakes.*

What is claimed by us is to so combine the brakes of the two trucks with the operative windlasses, or their equivalents, at both ends of the car, by means of the vibrating lever, A^1, or its equivalent or mechanism, essentially as specified, as to enable the brakeman, by operating either of the windlasses, to simultaneously apply the brakes of both trucks, or bring or force them against their respective wheels, and whether he be at the forward or rear end of the car.

A. G. BACHELDER.
LAFAYETTE F. THOMPSON.

No. 9110.—*Improved Screw Threading Machine.*

What I claim as my invention, and desire to secure by letters patent, is a fusee threading cutter for threading screw blanks, substantially as herein set forth.

I also claim the arrangement of the cutter and blank in such manner that the adjacent portions of their peripheries shall move in opposite directions during the operation of threading, so that the metal may be cut from the grooves in the blank from the bottom outwards to allow the chip to be freely discharged, substantially as herein set forth.

I also claim the combination of the vibrating feeding trough and screw-driver, arranged in such manner that when the driver is pushed forward to turn a blank while being threaded, an unthreaded blank may lie in the trough upon the driver, ready to drop into place before it the instant it is drawn back to allow the previous blank to be withdrawn from the cutter.

I also claim the combination of the vibrating arm, or its equivalent, to detach the head of a threaded blank from the bit of the screw-driver, with a discharging punch, or its equivalent, to eject the threaded blank from the rest; the two thus operating insuring the discharge of one blank before another is presented.

Lastly, I claim a spring, or the equivalent thereof, in the mandrel of the screw-driver, substantially as herein set forth, to impart to the bit of the screw-driver a slight yielding pressure against the head of the blank until it finds and enters the neck thereof, in combination with the lever and cam, which afterwards apply to the driver a positive motion to keep it engaged with the blank while the latter is turned to be threaded, substantially as described.

CULLEN WHIPPLE.

No. 9111.—*Improvements in Machines for Tonguing Boards.*

Having thus fully described my invention in tonguing, what I claim therein as new, and desire to secure by letters patent, is, in combination with flaring stock, substantially as described, the arranging of a series of cutters therein, so formed as to take the shavings from the sides and shoulders of the rebate, substantially as described; and this I claim whether said cutters have a double or single graduation, so that I attain the result herein set forth, by substantially the arrangement and combination herein described.

SAMUEL ALBRO.

No. 9112.—*Improved Instrument for driving Nails in different places.*

What I claim as my invention is the instrument as constructed of a combination of a tube, A, two or more springs, B, B, one or more holding points, C, C, and ramrod, D, and made to operate substantially as herein-before specified.

SETH P. CARPENTER.

No. 9113.—*Improvements in Cast-iron Caissons.*

Having thus described my invention, what I claim as new, and desire to secure by letters patent, is the method of bracing rectangular or other shaped metallic boxes by means of the diagonal braces, B, and rods, E; the braces and rods being arranged in the manner substantially as set forth.

JAS. P. DUFFEY.

No. 9114.—*Improvement in Threshing Machines.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the manner

herein described of constructing skeleton threshing cylinders, viz: by bolting or welding to the arms, *a*, which are attached to the shaft, *d*, any suitable number of branches, *b*, which, together with the arms, present their edges to the line of motion, and are provided with serrated ends, substantially in the manner and for the purpose set forth.

JOSEPH G. GILBERT.

No. 9115.—*Improvement in Shingle Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is so combining and arranging the riving knife and the shaving knives in their ways, that after the shingle has been separated, or nearly so, from the bolt, it will be carried forward by the carriage to the shaving knives, where it is finished, and so that the riving knife shall remain stationary until the shaving knives have taken firm hold of the rived shingle; the whole being operated by the means substantially as herein described.

I also claim, in combination, the double carriage—one moving on top or over the other, and so arranged that one shall feed up the riven shingle to the knives, and the other shall carry back the bolt, at each operation of the machine, sufficiently far to cut off one shingle therefrom; the whole being operated substantially in the manner described.

FURMAN HAND, Jr.

No. 9116.—*Improvement in Railroad Car Brakes.*

What I claim as new, and desire to secure by letters patent, is the method of raising the forked or cam hook-end of the jointed bar, B, to a horizontal position immediately in advance of the pin, C, at the upper end of the rubber levers, D, so that it will act upon the same when forced back, and enable it to detach itself and descend to an inclined position when it is desired to back the train by means of the friction wheels, I, whose shaft, G, moves in slots, and whose peripheries rest on the car-wheel shaft or axle, and chain, E, attached to the shaft of the friction wheels, and passing over the roller, F, above the jointed bar to which it is attached, arranged and operated as herein described, whether said jointed bar, B, be attached to the sliding bar represented or to the ordinary bumper of the car.

JOS. P. MARTIN.

No. 9117.—*Improvement in Churns.*

I am aware that the oscillating churns have been used before; therefore, this I do not claim; but what I do claim as my improvement, and desire to secure by letters patent, is mounting the churn-tub or barrel composed of two sections, I, I, and containing a grate, J, at their juncture, within a clasp band, united to pivoted pendant bars, C, C, whereby (through means of a lever) the barrel is so operated as to present its ends uppermost, the one after the other, by which the milk or cream is carried up by one section and allowed to descend through the grate, as described.

JOHN McLAUGHLIN.

No. 9118.—*Improvement in Shingle Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is making the double racks in segments—one of which is stationary, and the other adjustable, for the purpose of cutting shingles of various thicknesses at butt and point with the same racks, substantially as described.

ROBERT L. NOBLET.

No. 9119.—*Improvement in Benzole Lights.*

I do not lay claim to any particular apparatus; but what I do claim as my invention or discovery is the mixture of alcohol, benzole, and such proportions of water as shall render the mixture milky in appearance, and passing air through the same, substantially as herein set forth. I do not confine myself to the exact proportion of water named in the specification, but design to cover the results herein named.

HENRY M. PAINE.

No. 9120.—*Improvement in Corn Shellers.*

Having thus fully described my improved corn sheller, what I claim therein as new, and desire to secure by letters patent, is the within described combination of a toothed or flanged cylinder with an enclosing cylindrical casing of such proportions respectively, and so arranged the one within the other, as to leave an amount of space between the two, which will cause the cobs and ears to clog and accumulate therein during their passage through the same, and form an elastic self-adjusting bed for the spirally arranged teeth or flanches of the shelling cylinder to act in concert with, in place of the stationary bar or rest which is employed in all other cylindrical corn shellers.

WILLIAM READING.

No. 9121.—*Improvement in Cast-iron Car Wheels.*

Having thus described my improved car-wheel, what I claim as new therein, and desire to secure by letters patent, is the double curved arms interlacing one another, and uniting the opposite edges of the rim and hub, substantially as specified.

HIRAM H. SCOVILLE.

No. 9122.—*Improvement in Bedstead Fastenings.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is forming the tenon portion of a bedstead joint by catch studs or pens, (*f*,) having heads, (*g*,) projecting rectangularly from tangs, (*h*,) so tapered and notched that, by being slipped forcibly past each other, they can be made to interlock within a socket drilled for them, across the radial or bastard grain of the rail tenon, and be made by their thus interlocking to resist any tendency to be drawn out from the rail, and by the compressure of their heads to prevent the rending apart of the fibre of the tenon, and

can be made of such dimensions that a pin of adequate strength can be inserted within the limits of an ordinary bedstead tenon.

J. A. SARGEANT.

No. 9123.—*Improvement in Alarm Clocks.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the double notched cam, I, with the locking apparatus, K and L, with their appendages, *f*, *m*, *r*, *n*, *i*, *j*, and *q*, when used in any kind of time-pieces, for giving alarms at the time desired, and giving *more than one* alarm with *once winding*; when the whole is constructed, arranged, and combined substantially as herein described.

JONATHAN S. TURNER.

No. 9124.—*Improvement in Cotton Presses.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is the arrangement and combination of the screws, J, J¹, and E, with the top and bottom cross-beams of the frame and the cross-head of the follower, by which the follower and the bed-plate are made to press the bale from top and bottom, and the distance travelled by the follower towards the bed-plate is three times that of the frame (to which the power is applied) over the screw.

Secondly. I claim making the weight of the press an auxiliary power, by resting it entirely on the lower screw, E, so that in pressing the bale the frame is travelling down the screw as on an inclined plane.

J. G. WINGER.

No. 9125.—*Improvement in Seed Planters.*

Having thus fully described my improved seeding apparatus, and the various modes I contemplate modifying it, as required by law, what I claim therein as new, and for which I desire to secure letters patent, is the hooked rod, (*n*¹,) constructed and arranged substantially in the manner and for the purpose set forth.

JOSHUA WOODWARD.

No. 9126.—*Improvement in Door Locks.*

I therefore claim the combination of the cover plate and its arbor with the slide for carrying the bit plate, and a contrivance applied to the said arbor, and made to actuate the said slide and bit plate, all constructed and made to operate together substantially as herein-before described.

And I also claim the improvement termed the circular arc lip in its combination with the cover plate and the tumblers, and the key, which does not revolve with the cover plate, and made to project down between the bit plate recess and the tumblers, when the bit plate hole, or entrance of the cover plate, uncovers the bitt plate recess either in whole or in part, all substantially as herein-before explained.

MARCUS R. STEPHENSON.

No. 9127.—*Improvement in Fire Engines.*

What I claim as my invention, and desire to secure by letters patent, is the mode herein described of drawing the resistance towards the fulcrum of the lever, to which the power is applied through its entire descent; thereby lengthening the long arm and shortening the short arm of the lever, substantially as described.

ORVILLE G. ADKINS.

No. 9128.—*Improvement in Car Seats.*

Having thus described my improvements, I shall state my claim as follows: what I claim as my invention, and desire to secure by letters patent, is a car seat, to the bottom of which are jointed a back and leg support, the said back and leg support being placed and held at any desired angle by arms, *i, i,* fastened to the side arms, *m, m,* in any desirable way, as above set forth.

WM. L. BASS.

No. 9129.—*Improvement in Ploughs.*

What I claim as my invention, and desire to secure by letters patent is the arrangement of the beam of a plough with respect to the irons, and the bending of the standard towards the land, and having its line of direction parallel with that of the land side, in the manner and for the purposes herein set forth.

N. BLATCHLEY.

No. 9130.—*Improvements in Machines for shaving Shingles.*

Having thus fully described my improved machine for dressing riven shingles, what I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the yielding knives, *e, e,* the sliding shingle patterns, *c, c,* the roller, *b,* the elastic bed, F, the plate, *c,* and the box, E, substantially in the manner and for the purpose as herein set forth.

ABEL BRADWAY.

No 9131.—*Improvement in method of converting Reciprocating Rotary into Reciprocating Rectilinear Motion.*

I do not claim the use of pulleys, chains, and guides, for the purpose of converting rotary reciprocating into rectilinear reciprocating motion; but what I do claim as my invention, and desire to secure by letters patent, is slotting or forking the rods, *c, c,* and letting their two sides, *a, a,* into grooves, *b, b,* in the periphery of the pulley, and connecting the rods and pulley by three (3) chains, two (2), D, D, of which connect with each rod on opposite sides, and pass in one direction round the pulley, and the other, D[1], connects with each rod within the slot or fork, and passes in the opposite direction round the pulley, for the purpose of guiding and directing the rods, and dispensing with the ways and cross heads ordinarily made use of for this purpose; the several parts operating substantially as and for the purpose set forth.

ALFRED CARSON.

No. 9132.—*Improvement in Machines for dressing Stone.*

What I claim as new, and desire to secure by letters patent, in the within-described machine for dressing stone, and for facing, reeding, fluting, and cutting mouldings upon stone, is the operating of one or more chisels or tools by a crank or cranks, or their equivalents, which, by their continued action upon said tools, thrust or force them against the stone or other material to be worked, substantially as described.

ROBERT EASTMAN.

No. 9133.—*Improvement in Cruppers for Harness.*

What I claim as my invention, and desire to secure by letters patent, is the construction of a crupper as herein described, by means of which, in taming or subduing horses, the tail of the horse may be kept in a desired position without the necessity of resorting to the painful and injurious operation of nicking, or pricking, and the pulleys, and to be used for the same purpose when riding or driving the horse.

JOHN J. FLACK.

No. 9134.—*Improvement in Grain and Grass Harvesters.*

I claim as my invention, and desire to secure by letters patent—

First. An open spaced guard-finger, with an inside surface or middle finger, for the cutting tooth to cut against, substantially as herein described.

Second. I claim the construction of a clamp, of two parts, which will hold the finger-bar where desired, without bolts passing through the finger-bar, arranged as herein set forth.

Third. I claim the construction of a mould-board, with two upright posts, which posts pass through proper apertures in the frame of the machine, and are free to move up or down, according to the varying surface of the ground, and sustain the mould board forward of the cutter-bar on an angle sufficient to move the mown grass which may be forward of the finger-bar to the inside of the clamp, substantially as herein described.

Fourth. I claim the arrangement and combination of a right-angled stanchion, made of wood or metal, with a pivotal motion on the frame-work of the machine, and supporting upon its upright part a crooked lever, made of wood or metal, with a pivotal motion on the said stanchion, to which lever is attached a rake. By the combination and operation of these two pivotal motions of the stanchion and lever as set forth, a direct line motion may be given to the rake where needed, as also a circular motion, so that a person may remove the grain from the platform in bundles, and sit or stand on the machine near the driving-wheel, as herein described.

ELIAKIM B. FORBUSH.

No. 9135.—*Improvement in Railroad Car Brakes.*

What I claim as of my invention is the combination of the sliding detached lever, R, with the main lever, O, and the connecting rods, P, Q, so as to operate essentially in manner and for the purpose as hereinbefore specified.

WILLIAM HALL.

No. 9136.—*Improvement in Rice Hullers.*

I do not claim the use of India-rubber surfaces for hulling the rice, such having been used before. But what I do claim as my invention, and desire to secure by letters patent, is the use of a vulcanized gum-elastic or rubber, or its equivalent, in combination with a stone or other equivalent non-elastic rubbing surface, for hulling rice, substantially in the manner herein set forth.

I also claim the manner of constructing the rubber, C, of three substances of different qualities, viz: the metallic disk, *d*, leather disk, *e*, and gum-elastic or gutta-percha disk, *f*, by which firmness, elasticity, and durability are combined, substantially as herein described.

CLARK JACOBS.

No. 9137.—*Improvement in Grass Harvesters.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The clearer, as above described.

And, lastly, we claim the coupling the wheel (E) to the shaft (I) with universal joint, constructed with toggle joint arms, (L, L,) to admit of a vertical motion, and with gimble-ring to allow of a rolling or wabbling movement, without affecting its rotary motion, when combined and arranged for the purpose and in manner above described.

JESSE S. LAKE.
DAVID LAKE.

No. 9138.—*Improvement in Grass Harvesters.*

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is suspending the cutting-head and front part of the machine, whereby I dispense with front wheels by constructing the frame as described, and attaching the cutting-head to the hames of the harness, in the manner and for the purpose herein fully set forth.

WILLIAM MANNING.

No. 9139.—*Improvement in Sewing Machines.*

Having fully described my invention, what I claim as new, and desire to secure by letters patent, is—

First. The stopping or prevention of the operation of the feed, substantially as herein described, when the thread breaks, or is otherwise prevented from forming a loop, by attaching the stud, *q*, or its equivalent,

through which the feed-lever, U, is operated upon by the feeding cam to a lever, V, the said lever, V, being subject to be operated upon in such a manner as to withdraw the said stud, or equivalent, from the operation of the cam by a sliding piece, W, attached to the picker, *f*, which drives the shuttle forward for filling the said sliding piece, requiring to be caught and moved by every loop to prevent its operation on the said lever, V.

Second. Sewing or making the back stitch by folding or bending the cloth or material over the edge of a guide-plate, 6, or any other suitable edge, and passing each loop through the cloth or material on each side of the said bend, and each succeeding loop through in advance of the preceding one, and half-way between the two preceding perforations, substantially as herein set forth.

CHARLES MILLER.

No. 9140.—*Improvement in Grain Separators.*

Having thus described my improvements in grain separators and cleaners, what I claim therein as new, and desire to secure by letters patent, is the combination of the adjustable crank for vibrating the separating trough with the adjustable tracks on which the jumping roller runs, which shakes the trough up and down, whereby the conveyance of the straw may be accelerated or retarded without affecting the vertical shaking of the straw.

I also claim the adjustable angular rails, constructed and arranged in the separating trough, in the manner and for the purposes herein set forth.

I likewise claim the method herein described of relieving the winnowing apparatus of a portion of the work by separating, by means of a screen, S, arranged substantially as herein set forth, such impurities as will pass through it before the grain is delivered to the winnowing apparatus.

CYRUS ROBERTS.

No. 9141.—*Improvement in Railroad Car Brakes.*

What we claim as our invention, and desire to secure by letters patent, is the arrangement, substantially as set forth, of the levers, K and Q, rods, R, and vertical shaft, I, applied to each truck of a railroad car, in combination with the method of connecting the levers, K, by means of the links, L, so that if one or more of the links or bars should break, so as to render part of the brakes useless, the remainder are still serviceable for the purposes intended.

EBENEZER ROSS.
JOHN HOUSTON.

No. 9142.—*Improvement in Machines for Rubbing Stone.*

I do not claim the separate employment of a rotary rubber, L, and blocking tables, M, M, as such are in common use; nor do I claim, of itself, giving the rubbers, G, G, a separate motion, in addition to their revolving one, by means of pinions, H, H, gearing into a fixed wheel, D, and through cranks and connecting rods, serving to operate the rubbers,

as such has before been done. But what I do claim as my invention, and desire to secure by letters patent, is the combination of parts herein specified for rubbing and polishing marble or other stone, consisting of rubbers, G, G, having, in addition to their revolving travel on the faces of the stones being rubbed or polished, a motion in and out from the centre shaft, E, not in a radial, but in a winding, twisting, or curvilinear direction, produced by the cranks, I, I, and rods, J, J, and F, F, as shown and set forth; the said rubbers, G, G, being held in clamps, C, C, so hung or connected that the rubbers, by their weight, will adjust themselves to the stone, without rendering it necessary to pack up the latter, and for the further advantages specified.

PLEASANT E. ROYSE.

No. 9143.—*Improvement in Water Pipes of Tuyeres.*

What I claim, and desire to secure by letters patent, is the combination of the pipe, H, with the circulating pipe, P, V, Q, so connected that H may be removed from or form a water-tight joint with P, V, Q, whereby I am enabled to blow all the water out of the latter, and at the same time to shut off its communication with the cistern, in the manner and for the purposes described.

PETER SWEENEY.

No. 9144.—*Improvement in Railroad Car Coupling.*

What I claim as my invention, and desire to secure by letters patent, is the transverse incline bar, F, in combination with the coupling-pin, E, and link, D, the pin resting on the incline bar, and being raised clear of the link by passing up the inclines on the said bar as it (the pin) moves sideways, substantially as herein described.

JAMES TURNER.

No. 9145.—*Improvement in preparing Zinc from the Ores.*

Having thus fully described the nature of my invention or discovery, and shown the method in which it may be accomplished, what I claim therein as new, and desire to secure by letters patent, is the process of manufacturing metallic zinc, in a state of impalpable powder, by the cooling agency of steam, substantially in the manner herein set forth.

HENRY W. ADAMS.

No. 9146.—*Improvement in Machines for forming Button Backs.*

What I claim as my invention, and desire to secure by letters patent, is the jointed clamps, *(i, i,* fig. 2,) and the tongue, *(n,* figs. 1 and 3,) to form the eye, when combined with the slide, (L,) with its stationary and movable jaws, *(a* and *b,)* when the movable jaw and slide are worked by a jointed lever, (as *c, c*^{1}*,)* to feed the wire, when they are constructed and made to operate substantially as herein described.

I also claim the die for punching and forming the button back, composed of the punch, (S,) and bed, (Q,) when combined with the slide, *(p, p,)* and feeding cylinder, (P,) when constructed and operated substantially as herein described.

I also claim the jointed fingers, *(u* and *u,)* for receiving the formed and punched back, and conveying it to, and placing it on, the eye, when combined with the setting or riveting punch, (U,) when they are constructed, combined, and arranged and made to operate substantially as herein described.

JAMES C. COOKE.

No. 9147.—*Improvement in Saws for Sawing Stone.*

What I claim as my invention, and desire to secure by letters patent, in the making of blades for cutting stones, is the employment of lead, or its equivalent, between and in combination with the hard metal sides, substantially as specified.

ALBERT EAMES.

No. 9148.—*Improved Churn and Butter Worker.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combination, in a cylindrical or tub churn, of floats, or paddles, attached to a revolving axis, with stationary posts standing near the axis of the churn, combined and operating in the manner and for the purpose above specified.

Second. The combination of dashers, or paddles, broad at their ends, with posts small at each end and large in their middle portions, combined and operating in the manner and for the purpose above specified.

ORSAMUS R. FYLER.

No. 9149.—*Improvement in Fastenings for Harness.*

Having thus fully described my invention or improvement, I wish it to be understood that I do not claim, in general terms, the use of a crooked lever and ring, for these have been applied before to this purpose; but I do claim as new, and desire to secure by letters patent, the use of this peculiar kind of crooked lever, or hook, described above, in which the fulcrum and centre of motion are at the short end, and the point of resistance at the curve and in a straight line with the fulcrum and other end, thereby effecting the desired object within itself, and without the combined aid of plate, spring, rivet, or other fixture, whether the same be applied to the fastening of hames, as described above, or to connecting the ends of chains, as in the case of the chains usually fastened across the middle of wagon bodies, or to any similar purpose.

THOMAS HENDERSON.

No. 9150.—*Improvement in Duplex Escapements.*

I do not claim any of the parts herein described or shown, nor do I claim the duplex escapement shown in fig. 5. But what I do claim as new, and of my own invention, and desire to secure by letters patent of the United States, is the construction and arrangement of the escapement

wheel, 3, with three points, 4, and pins, 5, to take the arm, 7, on the balance axis; the whole being constructed and operating substantially as described and shown.

CHAS. E. JACOT.

No. 9151.—*Improvement in Seed Planters.*

What I claim as my invention, and desire to secure by letters patent, is the combination of a series of stationary combs, secured to the bottom of the hopper near the orifices through which the grain is discharged, with a corresponding series of rotating teeth secured to a cylinder, or roller, that revolves within the hopper, in the manner and for the purposes herein set forth.

I also claim the combination of the cross bar, Y, and its links and levers, with the draught bars of the shares, whereby the whole series of shares can, at will, be raised and depressed while the machine is in motion, and the weight of the whole machine is brought to bear upon any tooth that may tend to run out in consequence of meeting with hard soil, while, at the same time, an even depth of furrow is maintained by the wheels, and the weight of the frame taken off the shares, except when some one of them tends to run out, as herein set forth. But I make no claim to any arrangement of mechanism for holding the teeth or shares in the ground when the pressing bar acts upon the teeth through the medium of springs.

ADAM KRABER.

No. 9152.—*Improvement in Soaps.*

What I therefore claim, and desire to secure by patent, is the combination of ammonia, or carbonate of ammonia, with kaolin, or other equivalent aluminous minerals, in the composition of a soap, substantially as herein set forth.

WM. McCORD.

No. 9153.—*Improvement in Railroad Track Clearer.*

I do not claim the grapples, C, C, which are attached to the engine car, or carriage, and embrace the top flange of the rail; but what I do claim, and desire to secure by letters patent, is keeping the said grapples, C, C, closed upon the flange of the rail by the collar, G, which drops over their joints, and opening the same by chains, or their equivalents, attached to the said collar and to the grapples, under the control of a person on the engine car, or carriage; said chains, or equivalents lifting the collar so as to leave the grapples free, and then opening them, substantially as herein set forth.

SIMEON MINKLER.

No. 9154.—*Improved Block for Stretching Coats.*

Having now described my invention, I will proceed to state what I claim, and desire to secure by letters patent:

What I claim is the use of the seamless coat stretcher, made in two halves, and jointed together by hinges at their back edges, and having permanent or adjustable arms attached thereto, and hooks for holding the edges of the cloth while stretching, spring hook or ketch and pin for holding the halves of the machine together, and steadying pins in the face of the two halves, in combination therewith, substantially as set forth.

SAMUEL M. PERKINS.

No. 9155.—*Improvement in Railroad Car Seats.*

What I claim as my invention is to so combine the back, D, with the two end frames, B, C, by means of bars, E, F, jointed to it, one or two studs, *a*, and one or two series of notches, *d*, *d*, or equivalents therefor, that the said back (when not a reversible one) may be raised and inclined in various positions, so as to not only support the back but the head of a person at the same time.

And I claim making the back reversible by means of two series of notches, *d*, *d*, and *e*, *e*, &c., and two sets of studs, *b*, or equivalents, the same being arranged on opposite sides of the chair, and made to operate as specified.

And in *combination* with the back, made to raise and be inclined by contrivances, substantially as specified, I claim the improvement of making each bar, E, F, with a rack or racks of teeth, or succession of notches, to be set on the pin, G or H, in manner and for the purpose as specified.

SAMUEL M. PERRY.

No. 9156.—*Improvement in Mortising Machines.*

What I claim as my invention, and desire to have secured to me by letters patent, is the method I employ of turning the mandrel (6) that contains the mortising chisel, by means of the collar, (*s*,) on the mandrel springs, (14, 14,) ketches, (11, 11,) shifting piece, (12,) friction rings, (R, R,) and pinion, (13,) all in combination for the purpose heretofore mentioned and set forth in the foregoing specifications.

WILLIAM C. SHAW.

No. 9157.—*Improvement in Lamps.*

What I claim as my improvement is the open slide tube, E, as combined with the supply reservoir of a lamp, constructed and made to operate substantially as described, the object of such tube being not only to maintain the oil at a constant level around the wick, but to enable a person to regulate the height of such level at pleasure.

CHARLES SIEDHOF.

No. 9158.—*Improvement in Graduated Cutters for Cloth and other Substances.*

What I claim as my invention, and desire to secure by letters patent, is the employment of a cutter and bed, or their equivalents, made adjust-

able in relation to each other in the direction of the cutting edge, for the purpose of varying the length of the cut, substantially in the manner herein described.

HALSEY D. WALCOTT.

No. 9159.—*Improvement in Compounds for Uniting Steel and Iron.*

I wish it understood that I do not claim the use of crude borax, either pulverized or not, for the union of metals, as this has been used for the purpose by others; but it does not insure a perfect union, and cannot be relied upon with any degree of certainty, and great loss of time and material often occurs, as well as a ready separation of the two, even after a seeming union, and the particular work seems complete and ready for the use intended. But what I do claim as my invention or discovery, and desire to secure by letters patent, is the mode and manner of calcining and preparing the crude borax, and compounding the same afterwards with the carbonate of ammonia, and in the proportions above set forth and described, and the mode of applying or using it, or any other substantially the same and which will produce the intended effect.

B. C. LEAVITT.

No. 9160.—*Improvement in Brooms.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Securing the material of the broom by means of a clasp, having its jaws hinged at the extremities, E, and fastened together at the socket, B, or some equivalent device, substantially as herein set forth.

Second. A spring, or springs, whether placed, as herein described, inside of the brush or material composing the broom, or otherwise, so as to operate in substantially the same manner.

Third. The cross fastened to the spring with spurs, or otherwise, in combination with the hoop, to hold the brush or other material in its proper place, as described.

CYRUS T. MOORE.

No. 9161.—*Improvement in Railroad Car Seats.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is, in combination with a permanent seat or seats, a divided back, which is so constructed that one part thereof shall swing around one end of the seat and the other part around the other end thereof, the back retaining always its upright position; by which arrangement the two parts of the back may be entirely reversed, or they may be left *tête à tête,* substantially as herein described.

CHARLES P. BAILEY.

No. 9162.—*Improvement in Looms for Weaving Figurea Fabrics.*

I do not claim the application of the above-named levers to the trap or knot boards of the jacquard loom; but what I do claim therein as new, and desire to secure by letters patent, is—

First. The opening, or raising and depressing the harness, by means of levers or bars, oscillating about a fixed point or points, in connexion with hooks, or their equivalents, which catch upon these levers or bars, and which constitute a part of the connexions between the top and bottom jack-levers, cords, or other devices, for raising and drawing down the harness, thus raising or depressing the heddles in a greater or less degree, according as they are more or less distant from the *fell*, or cloth-making point; the motions of the harness all commencing and ending at the same time, as herein substantially described.

I also claim the method, as described, of arranging and combining the parts for moving the figuring chain, or cylinder, with the other parts of the machine, so as to carry the said chain, or cylinder, back as well as forward, as the machine is made to move backward and forward.

C. W. BLANCHARD.

No. 9163.—*Improvement in Pressure Gauges.*

Having now described my invention, I wish it to be understood that I claim the application of curved or twisted tubes, whose transverse section differs from a circular form, for the construction of instruments for measuring, indicating, and regulating the pressure and temperature of fluids, substantially as above described.

EUGENE BOURDON.

No. 9164.—*Improvement in Dumping Wagons.*

Having thus described my improved dumping wagon, what I claim therein as new, and desire to secure by letters patent, is the arrangement of the body on a fixed roller fulcrum, on the frame of the running gear, in such manner that by a slight amount of force the body can be turned to give its under side, which rests on the roller, either a forward or backward inclination, to cause the weight of its load to tend to hold it forward or back, as it is required to carry or to dump the same, substantially as herein set forth.

THOMAS CASTOR.

No. 9165.—*Improved Tally Board.*

What I claim as new, and desire to secure by letters patent, is the manner of tallying or keeping an account of articles as they are delivered or moved, by means of screw rods, B, having nuts, E, upon them, said nuts being placed over graduated spaces, F, which indicate the distance the nuts have moved, or give the number of turns or half turns of the rods; the rods, nuts, and spaces being arranged as shown and described, or in any other manner substantially the same.

FRANCIS N. CLARKE.

No. 9166.—*Improvement in Casting Stereotype Plates.*

What I claim as my invention, and desire to secure by letters patent, is the manner of casting stereotype plates by the application of pressure

upon the surface of the melted metal in the inner kettle, which pressure forces the metal, while fluid, through a tube and upon the mould—the face of the mould being turned down to receive the metal making the casting; the whole acting substantially in the manner and upon the principles set forth and described in the above specification.

HOBART P. COOK.

No. 9167.—*Improvement in Compositions for Preserving Butter.*

What I claim as my invention, and desire to secure by letters patent, is the preservation of fresh butter for any length of time, as herein described, using for that purpose the aforesaid chemical compound, or its equivalent, substantially in the manner and for the purpose set forth.

LS. DE CORN.

No. 9168.—*Improvement in Looms for Weaving Figured Fabrics.*

What we claim as constituting our inventions, and which we desire to secure by letters patent, is the following, viz:

First. The star-movers, whether they be arranged to slide instead of the star-wheel, or otherwise, and neutral surface, in combination with the star-wheel, (sliding or otherwise,) arranged substantially in the manner and for the purpose herein specified.

Second. We claim the pins or pattern plates, or their equivalents, in combination with the diamond-shaped projection or four-sided inclined plane, lever, and star-wheel, arranged substantially as described, for the purposes herein specified.

Third. We claim the guide, N, in combination with star-movers and star-wheel, as described.

Fourth. We claim the combination formed by the mechanism herein described, for giving a positive and correct motion to the jacquard card cylinder—that is to say, the star-mover, star-wheel, and connecting arms, H^2, with mitre wheels, or their equivalents, as herein fully made known; and the above mechanism is also intended to be applied to other description of looms, where lags and other similar devices are used, instead of the cards, as on barrel and other similar looms; therefore the claim is not limited to the turning of a jacquard card cylinder.

SAMUEL ECCLES.
JAMES ECCLES.

No. 9169.—*Improvement in adjusting the Chasers in Screw-Cutting Stocks.*

Having thus fully described my invention, I do not claim the index. But what I do claim is the adjustable band, "*d*," figure 4, and *d*, *d*, figure 5, on which the index is lettered, for adjusting the index to the chasers, the same being adjustable to the wear of the chasers or chasers of different lengths, and in combination with suitable apparatus for causing said chasers to approach and recede from a common centre for the purposes stated.

And I also claim the shaft, "*f*," as shown in figures 2 and 4, and pinion, "H," figure 2, in combination with pinions, G, G, G, G, figure 2, and the bevel gear-wheel, E, figure 3, at the outer end of which shaft is attached a crank to drive the bevel gear-wheel, E, figure 3, as herein before set forth and described, and for the purposes stated.

M. C. GARDNER.

No. 9170.—*Improvement in Scales for Weighing.*

What we claim as our invention, and desire to secure by letters patent, is the making of the weighing beam of platform or other balances or scales with two graduated arms, extending in opposite directions from the fulcrum of said beam, and applying one or more movable weights or peas to each of them; the divisions on one arm indicating the larger divisions of weight, and those on the other any subdivisions or fractions of the larger that may be desired, substantially as herein set forth and described.

WM. P. GOOLMAN.
WILLIAM HOLTSECLAW, JR.

No. 9171.—*Improvement in Jacquard Looms.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Connecting the knot and trap boards with, and operating them by, levers arranged substantially as herein described, so that the second row of heddles or harness shall fall and rise so much farther than the first, and the third than the second, and so on through the entire series of heddles or harness, that as the warp is sprung, the threads in the same shed from each row of heddles, whether front, middle, or back, and whether sprung in the top or bottom shed, all lie substantially in the same plane.

Second. The apparatus which inserts and draws the wires to form the pile, constructed and operated substantially as described.

Third. The devices for locking and unlocking the beam or beams containing the warp, substantially as described.

JOHN GOULDING.

No. 9172.—*Improvement in Ox Yokes.*

I do not claim the slides, independently of their connexion, as they have been previously used. But having thus described the nature of my invention, what I claim as new, and desire to secure by letters patent, is the connecting of the slides, B, B, in which the bows are secured by means of the chains, E, E, and rods, G, G, the chains passing over the pulleys, F, F, by which neither of the slides nor bows can be moved laterally without communicating a corresponding opposite motion to the other, thus keeping the oxen at all times at equal distances from the centre of the yoke; the chains, rods, and pulley being arranged as shown and described, or in any other manner substantially the same.

EZRA HOUGH.

No. 9173.—*Improvement in Elastic Horse Shoes.*

What I claim, and desire to secure by letters patent, is the shoe formed with two plates, between which a sheet of vulcanized rubber, or other elastic substance, is interposed, in the manner and for the purpose herein set forth.

JOHN O. JONES.

No. 9174.—*Improvement in Scythe Fastenings.*

Now I would remark, that I do not claim the invention of confining the shank to the snath by fastening contrivances, applied both to the heel and toe of the scythe, particularly when the fastening contrivance of the toe is made to press against the toe in a direction *towards* the heel of the scythe, as under such circumstances the variation of the angle of the blade and snath is generally limited to certain fixed positions. But what I do claim as my improvement is to make the fastening bolt of the toe act against the side of the toe, or *laterally* against the shank in combination with making it, or the bolt and shank with the peculiar curved projection, *d*, and recess, *c*, and the flattened faced stirrup, G, or confining contrivance of the heel of the shank, so as to allow of the lateral position of the heel being changed or varied as specified, whereby the angle of the shank part of the snath and of the blade may not only be varied to any extent within certain limits, but the toe of the shank as usually made, confined down by other means than that which operates to secure the shank (at its heel) to the snath.

ALPHEUS KIMBALL.

No. 9175.—*Improvement in Processes for making Illuminating Gas.*

What I claim as my invention, and desire to secure by letters patent, is the process of manufacturing illuminating gas, substantially as herein set forth, viz: the process of feeding into heated retorts, charged with bituminous coal, either oil, coal, tar, resin, asphaltum, or any other bituminous or carbonaceous substances, separately or mixed, and reduced to a fluid state, and decomposing the same in the same retort, and by the use of the same heat, in conjunction with the distillation of the coal, in the manner and for the purposes substantially as herein described.

HENRY W. ADAMS.

No. 9176.—*Improvement in Double Gates.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the forked rods, *h*, *h*, or their equivalents, in combination with the inclined track, *e*, and roller, *f*, for the purpose of causing the gate always to swing in the direction *from* the rider, substantially as herein set forth.

I also claim the combination of the latch, *q*, catch, *t*, and pin, *r*, or their equivalents, substantially in the manner and for the purpose herein set forth.

J. S. BROWN.

No. 9177.—*Improvement in Casting Type.*

What I claim as my invention, and desire to secure by letters patent, is the employment in type casting machines of an adjustable valve, substantially in the manner described.

WM. P. BARR.

No. 9178.—*Improvement in Cider Mills.*

Having thus described the nature and operation of my invention, I will now state what I claim as new, and desire to secure by letters patent: I claim the employment of the revolving crushing cylinder or roller, F, with grooves cut in its periphery, the movable feeding slats or radial cogs, J, the eccentric rings or plates, L, M, and the scrapers, R, R, the whole being constructed, arranged, and operating in the manner substantially as and for the purpose herein set forth.

JARVIS CASE.

No. 9179.—*Improvement in Machines for Dressing Stone.*

In behalf of the within-named Alexander Catlin, I claim the revolving arms or wheel, having a cavity near its centre to receive the core of the stone, in combination with the revolving cutters, in the manner and for the purpose herein described.

H. W. CATLIN, (*Administrator.*)

No. 9180.—*Improvement in the method of securing movable points of Railroad Frogs.*

What we claim as new in our invention, and desire to secure by letters patent, is the combination of the peculiarly formed shank of the frog point and its corresponding channel and socket, said points secured to its seat by spike and bolts, or their equivalents, substantially as described.

M. S. CURTIS.
E. ST. JOHN.

No. 9181.—*Improvement in Tanning.*

Having thus described my process of tanning leather, what I claim as my invention, and desire to secure by letters patent, is the combination of the sulphate of potash with the tanning liquor, substantially in the manner and for the purpose herein set forth.

A. K. EATON.

No. 9182.—*Improvement in Grain and Grass Harvesters.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The construction of the floor in the centre, upon which a man may stand to gather the grain.

Second. The construction of the rim, K, to which the knives are attached, for the purpose of giving the butts of the grain a bed to stand upon while being carrried through the channel to the centre.

Third. The constructing a spiral channel within the guards, for the purpose of gathering the grain within the central space.

DANIEL FITZGERALD.
JOHN H. SMITH.

No. 9183.—*Improvement in Carriages.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Making the hubs of wheels of two disks of wood, with angular scores cut in them, to which the spokes are fitted, so that as the disks are drawn together they bind the sides as well as the edges of the spokes, said disks of wood being fitted to, and confined between, two plates of metal, substantially as described.

Second. The sliding perch, H, in combination with the levers, *c*, *c*, and *g*, *h*, ratchet-wheel, I, and pawls, *l* and *k*, or such analogous devices equivalent to these as will raise the hind end of the body of the carriage and load when the hind axle stops, while the fore one moves forward; the weight of the hind end of the body and load aiding, as it descends, in propelling the hind axle forward; the body being made to slide upon the rocker of the forward axle, as described, or otherwise.

Third. The sliding perch, H, in combination with the levers, *c*, *c*, and *g*, *h*, or such analogous devices equivalent thereto as will raise the load, or a part of it, when the team or moving power starts, so as to partially relieve the team and carriage from the sudden jerk and shock to which it is subject when the connexion is firm and unyielding.

JONATHAN FOX.

No. 9184.—*Improvement in manufacture of Glass Lenses.*

What I claim as my invention, and desire to secure by letters patent, is the manufacture of dioptric lenses of glass in steps or rings, by pressure in metallic moulds, substantially as specified.

JOHN L. GILLILAND.

No. 9185.—*Improved method of converting Reciprocating into Rotary Motion.*

What I claim as my invention, and desire to secure by letters patent, is an apparatus, substantially such as is herein described, for converting a reciprocating motion into a rotary one, or converting a rotary into a reciprocating motion, consisting of the wheel, B, levers, E, D, G, H, and connecting rods, M and N, or their equivalents, for the purposes specified.

CHAS. HOWARD.

No. 9186.—*Improved mode of drying Sized Paper.*

Having thus fully described our invention, what we claim therein as new, and desire to secure by letters patent, is the process of drying sized paper by passing it between a series of trunks perforated on two sides, and so arranged that the hot air passing through these perforations will come in contact with both sides of the paper and then escape, and not run or be confined with the sheets.

JOSEPH KINGSLAND, Jr.
NORMAN WHITE.

No. 9187.—*Improvement in reducing Gold Minerals.*

I do not claim the use of lime when forming fluxes; but what I claim is the use of iron, substantially as described, to extract portions of gold when the same are not readily precipitated by their density.

WILLIAM LONGMAID.

No. 9188.—*Improvement in Looms for weaving Pile Fabrics.*

What I claim as my invention, and desire to secure by letters patent, is the spring flaps, *v*, *v*, or their equivalents, which open and close the pincers upon the wires, and support the wires after they are drawn from the loops and carried to a proper position to be inserted between the sheds of warp, and guiding them into the same, substantially as described.

SAMUEL RICHARDSON.

No. 9189.—*Improvement in Railroad Car Brakes.*

Having thus fully described and represented the nature and operation of my improved mode of rendering railroad car brakes inoperative at the pleasure of the engineer or man in the locomotive tender, and thus dispensing with a corps of brakemen, what I claim therein as new, and desire to secure by letters patent of the United States, is the method of arranging and operating the parts which render the brakes inoperative at the pleasure of the engineer or other hand, viz: Hanging the drops, (*a*,) from arms, (*v*,) on arbors, (*t*,) with arms, (*s*,) projecting in a contrary direction to the arms, (*v*,) the arms, (*s*,) being connected by links, (*q*) and (*r*), midway to a lever, (*k*,) the end (*l*) of which is the fulcrum; the power being applied to the other end, through the eye, (*m*,) by means of the rope, (*n*,) which passes through loops (*o*) along the entire train, to the rear end of which it is made fast; the same devices being repeated and capable of instantaneous action on each car—this arrangement thus having nothing in itself antagonistic to the end in view; the rope (*n*) being always slack, and by its own weight and motion, when the train is under way, keeping the drops (*a*) up and out of the way of the brakes, so that the brakes are always operative, unless the engineer, by winding up the rope, (*n*,) throws down the drops, (*a*,) and renders the brakes inoperative for the time being; the whole being substantially as described and represented; by no means intending to claim, however, the interruption of the operation of the brakes, actuated by the crowding of the cars upon the locomotive, by the interposition of drops, when these are interposed by mechanism, the weight and motion of which, when the train is under way, is antagonistic to the counter-balance intended to keep the drops up and out of the way of the brakes.

JOHN SCHOENHERR.

No. 9190.—*Improvement in Hats.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The attaching to a hat a ring, or part or parts of a ring, inside, to fit upon the head, and leave a space around it, for the purpose of producing ventilation, in the manner substantially as above described.

Second. I claim constructing a band, for the purpose of fitting easily to the head, of thin metal, made flexible by cutting out part of the substance, in the manner substantially as above described in the strip, fig. 4.

BENJAMIN SHERWOOD.

No. 9191.—*Improvement in Machinery for Threading Wood Screws.*

What I claim as my invention, and desire to secure by letters patent, is—

First An annular concave burr-cutter, for threading screws, having a helical or conical serrated thread, substantially as described.

Second. The combination of two moving rests on opposite sides of a revolving screw-cutter, with the mechanism herein described, or the equivalent thereof, for operating the same in such manner as to move them simultaneously towards and from the cutter to press the blanks against the latter to be threaded, and so that the pressure of one blank in one direction may be counteracted by the pressure of another blank in the opposite direction, as set forth.

Third. The combination of the vibrating rests with the vibrating, rotating turn screws, substantially in the manner herein described, so that the blank may be rotated steadily and with regularity, while the rest is carrying it towards the cutter to sink a screw thread on it.

CULLEN WHIPPLE.

No. 9192.—*Improvement in Mill Dress.*

I do not claim a circular mill stone dress in which the furrows are arcs of circles swept from a single centre; but what I do claim, and desire to secure by letters patent, is the particular mill dress represented in fig. 1, and laid down by the pattern shown in fig. 2, constructed and arranged as described, or in any manner substantially the same.

JOHN W. KANE.

No. 9193.—*Improvement in Ventilators.*

I do not claim the upper cylinder, *a, a*, the flanges, *b, b*, attached thereto, the lower cylinder, *f, f*, nor either set of the wings upon a vertical shaft therein. But what I do claim as new, and desire to secure by letters patent, is the two cones, *d, d*, and *e, e*, arranged and combined with a ventilator composed of revolving vanes, and flanges, and cylinders, operating as above described and set forth.

MORTIMER M. CAMP.

No. 9194.—*Improvement in File Cutting Machinery.*

Having described our improvements in machinery for cutting files, what we claim as our invention, and desire to have secured to us by letters patent, is, as herein constructed and combined, the racks, *r*, pinions, *s*, cams or eccentrics, K, rods, L, and springs, *q*, in connexion with the vibrating hammer, F, as described, for the graduation of the blow at the commencement of the operation.

JOHN W. CONKLIN.
HENRY L. SIDMAN.
EUGENE WHRITNER.

No 9195.—*Improvement in Machine for making Wrought Iron Railroad Chairs.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is—

First. The arrangement and combination of the feathered wedge and dies, as described, for filling the cavity between and fitting around the knuckle end of the shears and benders, forming an adjustable, solid, and level bed for the centre of the plate whilst being cut and bent, and preventing the fulcra of the shears and benders from moving towards the centre away from the set screws.

Secondly. I claim furnishing the caps of the pedestals with adjustable cutters, the cutting edges of which are nearer to each other at the outer than at the inner end, and which shear the plate in conjunction with the cutters on the face of the shears, which are narrower at their outer than at their inner end, in order to cut the clip of the chair narrowest at the point, and thereby leave it perfectly free and clear of the cutters in the cap, so that the cap will lift free from the plate.

ROBERT GRIFFITHS.

No. 9196.—*Improvement in Spark Arresters.*

Having thus fully described our invention, what we claim therein as new, and desire to secure by letters patent, is combining with a stack or chimney provided with chambers and openings, for separating and passing out the smoke and gases, and retaining the sparks, substantially such as herein described, the draught flue around the stack, which takes in air at the bottom, and furnishes at the top of the chimney additional draught, to supply that impeded by the separation of the sparks; the whole being arranged substantially as herein set forth.

JOSEPH LEEDS.
GEORGE H. OAT, Jr.
ALFRED A. OAT.

No. 9197.—*Improvement in Cotton Presses.*

Having thus fully described the nature and operation of my press, what I claim therein as of my invention, and desire to secure by letters patent, is the arrangement of the press herein-above described in such manner that it may be conveniently charged in an upper story of the

building in which it is placed, and actuated and discharged in a lower story of the same, substantially as herein set forth—reference being had in my claims for letters patent to the drawings and specifications as filed and herein-before set forth.

LEWIS LEWIS.

No. 9198.—*Improvement in Hernia Truss.*

What I claim as my invention, and desire to secure by letters patent, is the peculiar shape of the two balls, F, F, and their arrangement upon the slides, L, L, so that they may be moved upward and downward, and right and left, to any part of the metallic plate, Y, Y, on the pubic brace, and thus be fitted to any rupture in the abdominal rings, or on any sized person, and their combination with the pubic brace, as above described.

A. J. LOUNSBERRY.

No. 9199.—(Suspended.)

No. 9200.—*Improvement in Artificial Legs.*

I am aware that the *tendo Achillis* has been extended upward and attached to the thigh piece, for the purpose of drawing upward the heel, and depressing the forward part of the foot, when the leg is straightened; and, therefore, I do not claim that arrangement as my invention; but what I do claim as new, and desire to secure by letters patent, is attaching the upper end of the *tendo Achillis* to a lever, or to its equivalent mover; which is united to an auxiliary tendon, that descends from its connexion with the thigh piece; and, also, the so arranging of the said lever and tendons that, when the weight of the person is thrown upon the ball of the foot, in walking, the powerful downward strain which will thereby be exerted upon the *tendo Achillis* will exert little or no influence upon the said auxiliary tendon, (which descends from the thigh-piece,) or, at any rate, no influence that will have an appreciable tendency to bend the knee or give instability thereto, substantially as herein set forth.

I also claim the vibratory brace, *p*, and elastic cord, *m*, operating in combination, substantially in the manner and for the purposes herein set forth.

B. FRANK PALMER.

No. 9201.—*Improvement in Neck-Yoke of Horses.*

What I claim as my improvement, and desire to secure by letters patent, is the spiral springs, operated by the rods, giving extension and contraction to the yoke, in the manner and for the purpose herein set forth.

CALVIN L. RAWDON.

No. 9202.—*Improvement in Artificial Legs.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is so operating the lever, *f*,

through the spring, L, by means of the cords, *i*, *j*, which are respectively attached to, and operated by, the toe and heel part of the foot, that, when the leg is bent forward or back on the ankle joint, the knee joint shall be locked by said lever, substantially as described.

JONATHAN RUSSELL.

No. 9203.—*Improvement in Bedstead Fastenings.*

What I claim as my invention, and desire to secure by letters patent, is the plug, as above described, in combination with the clamp, or clamps, for fastening bedsteads.

WILLIAM SHAW.

No. 9204.—*Improvement in Hot Air Furnaces.*

Now I do not claim a descending draught as such, or an alternately descending and ascending draught; nor do I claim a draught divided and carried in different directions through several pipes or columns at a time; nor do I claim one undivided draught carried through several pipes or columns at a time. But what I do claim as my invention is the combination and arrangement of the ash or soot separate chambers and the flues, from whose external surfaces the heat is radiated into the air-chamber of the hot air furnace—that is to say, I claim the combination and arrangement of the descending flue, A¹, (at and down the back of the fireplace,) the ash-flue chamber, B¹, the ascending and descending arched pipe, C¹, the ash-flue chamber, D¹, the ascending and descending arched flue or pipe, F², the ash-flue chamber, L¹, the ascending and descending arched pipe, G¹, the ash-flue chamber, H, and the vertical flue discharge pipe, I¹, carried up against the back of the fireplace, and having a communication with the fireplace and a damper, all substantially as specified.

GEO. S. G. SPENCE.

No. 9205.—*Improvement in Machines for forming Hat Bodies.*

Having thus described the construction and operation of the parts, I wish it to be distinctly understood that the apparatus for picking and separating the fur forms no part of my invention; neither does the movable trunk; all these parts being well known and in ordinary use in cotton pickers and gins. Neither do I claim retaining the fibre on the former by exhaustion by a blower, that being public property, having been shown in a patent issued to T. R. Williams, in England, in 1833; neither do I claim the use of water to form the packing for the cylinder, *i*, that having been used in other machinery; and hot and cold water have been used in felting cloth and hat bodies: therefore this forms no part of my claim.

I do not limit myself to the screw to raise and lower the former and trunk, as a rack and pinion, or similar means, may be used. But what I desire to secure by letters patent is—

First. I claim the combination of the water-packed cylinder, *i*, former, *k*, and sliding and revolving shaft, *n*, for the purposes and as described.

Second. I claim giving alternate motion to the former, *k*, and blower-case, *f*, so that one is raised while the other is lowered, in the manner and for the purposes described.

Third. I claim the hood, *r*, with its lining, by which steam or other gaseous pressure is made to force the bag or lining on to the hat or former, in combination with the standing perforated pipe, 18, or its equivalent, by which the bat is wetted through the perforations in the former, as described and shown.

THOS. WALBER.

No. 9206.—*Improvement in Calorifères.*

What I claim as my invention is the combination of the water supply reservoir, the chamber or bed of sand, and a furnace or chamber of combustion; the whole being made to operate substantially as specified.

SAMUEL WHITMARSH.

No. 9207.—*Improvement in the Currier's Beam and Knife.*

What I claim as my invention, and desire to secure by letters patent, is the construction of a currier's beam, B, with flaps, C, C, on its edges, furnished with springs, *a*, and gauges, D, D, or their equivalent, for the purpose of dispensing with the kneeing and prevention of cutting through, and production of regular thickness of leather.

I also claim the construction of a knife, made adjustable by the eccentric handle, J, *j*, *k*, or its equivalent, in connexion with the gauges or guides, D, D, substantially as and for the purpose set forth in the foregoing specification and accompanying drawings.

J. D. WILLOUGHBY.

No. 9208.—*Improvement in Processes for making Paints.*

I am aware that various mixtures of gelatine, albumen, gums, and gum resins, have been used in watery solutions for making a cheap paint that cover extensive surfaces; but such paints as the gums dry, crack, and leave fissures in the surfaces so covered, and have other defects. I do not, therefore, claim the use of watery solutions with such materials; but what I claim as my invention is the use of a watery solution of the sulphate of zinc, to be mixed with white lead, zinc white, or other oil paints, in the manner herein set forth.

WASHINGTON F. DAVIS.

No. 9209.—*Improved Fastener of Bits to Braces.*

Having thus described my improved hand-drill or brace, what I claim as new therein, and desire to secure by letters patent, is the combination of the cam-lever with the lever spring catch for securing the bit in the socket, and releasing it therefrom; the same being constructed, arranged, and operating substantially as described.

ERASMUS SMITH.

No. 9210.—*Improvement in Manufacturing Cord Buttons.*

What I claim as my invention, and desire to secure by letters patent, is the preparation of the cords in the process of manufacturing cord buttons by gluing them together, substantially in the manner and for the purpose herein set forth.

NELSON PERKINS.

No. 9211.—*Improvement in Bill Registers.*

Having thus described my invention, I will now proceed to state what I claim, and desire to secure by letters patent:

In combination with the perpetual calendar, in the same table, frame, or box, A, I claim the bill-register, consisting of the strips or sheets of paper, or other material, D, D, suitably ruled for names and amounts, and inserted in or attached to the table, frame, or box, in any convenient way, so as to be easily removable or renewable on either side of the column of days of the month and week, under suitable headings, which denote whether the bills are payable or receivable, as herein substantially set forth.

J. N. AYRES.

No. 9212.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the placing the separators, *a* and *b*, in the front and back descending and ascending flues of a cooking stove, to divide the products of combustion, whilst they are permitted to pass undivided over the top and under the bottom plates of the oven, substantially as described in the above specification.

R. J. BLANCHARD.

No. 9213.—*Improvement in Instruments for Lasting Boots.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the two levers, (L, L,) connected together and connected to the jaws, (J, J,) also connected to the step, (S,) by which combination (on opening the pincers) the simultaneous motion of the two jaws is guided, so as to take hold of both sides of the leather, by pressing the handles towards each other, and bring up the leather with equal tension on both sides. I claim this for the purpose and in form substantially as above described.

HEZEKIAH CONANT.

No. 9214.—*Improvement in Machine for Cutting Cheese.*

I do not claim the mere combination of a disk and spindle; but what I do claim as my invention is the combination of the groove, *b*, and the slot, *a*, with the spindle and its sustaining board, so as to guide the point of the knife and support the pointed end of the knife when the knife is forced down through the cheese as stated.

And in combination with the groove, b, slot, a, and plate, or board, A, I claim the secondary rotary board, C, to be applied and used substantially in manner and for the purpose as specified.

W. K. FOSTER.

No. 9215.—*Improvement in Beds for Invalids.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is suspending the sheet, hammock, or mattress upon which the patient lies to a carriage which moves on a frame placed over or around a common bed, so that by said carriage the patient may be raised up or let down upon the bed, or moved from one place to another, or gently exercised; the whole being arranged and operating substantially in the manner herein described and fully shown.

S. D. HOPKINS.

No. 9216.—*Improvement in Instruments for Lasting Boots.*

I do not claim as my invention the screw, f, the standard, e, the nut, g, or the arms, a, a, a, a; but what I do claim as my invention, and desire to secure by letters patent, is the mode of bringing the arms together by the means of the slots in the arms and the bolt operating in the slots, when this is used in combination with the standard, e, substantially in the manner herein described.

BENJAMIN LIVERMORE.

No. 9217.—*Improvement in Telegraph Signals.*

What I claim as my invention, and wish to secure by letters patent, is the formation of a complete system of telegraphic signals by means of a vertical arrangement of white and colored lights, or their equivalents, by which any number and species of signals may be made with ease and simplicity.

CHARLES LATIMER, *U. S. N.*

No. 9218.—*Improvement in Churns.*

I claim, first, the forcing of the milk through a rack by revolving the churn in an orbit, without turning it on axis.

Second. The bow and rods connected together, as above described.

RUFUS MAXWELL.

No. 9219.—*Improvement in Abutment Motion for Reversible Rotary Engines.*

What I claim as my invention, and desire to secure by letters patent, is the combination, for the purpose of withdrawing the sliding heads at proper intervals and returning them, whichever way the engine is working, of the rods, b, c, b^1, c^1, b^{11}, c^{11}, the levers, f, f^1, f^{11}, and, g, g^1, g^{11}, the wheels, I and I^1, with their wedge-shaped projections, or inclines, l, and the springs, M; the whole arranged and operating in any way, substantially as set forth.

C. A. MILLS.

No. 9220.—*Improvement in Machines for cutting Hand Rails.*

What I claim as my invention, and desire to secure by letters patent, is arranging the rollers, W, X, one above the other, within a revolving frame, Y, so as to allow of the curved roller, X, or its equivalent, being substituted for the roller, W, at the time desired, and in the manner and for the purpose herein fully specified.

GEORGE B. PULLINGER.

No. 9221.—*Improvement in Horse Powers.*

Having thus fully described my improved horse power, what I claim therein as new, and desire to secure by letters patent, is, first, the combination of the canting tread-wheel, $(f,)$ and horizontal sweep shaft, $(g,)$ and friction wheel, $(h,)$ for producing motion in the manner described, by which the wheel (h) is always running down hill by throwing the weight of the horse on to the canting wheel, $(f,)$ just forward of it, as above described.

DAVID RUSSELL.

No. 9222.—*Improvement in Mechanism for Griping Wood Screw Blanks.*

What I claim as my invention, and desire to secure by letters patent, for operating the griping-jaws on the mandrels of machines for threading or shaving the heads of wood screws, is the employment of a wedge on a stem within the mandrel, to act on the jaws to close them, substantially as specified, when the said wedge-stem is combined with a sliding frame, (or its equivalent,) by means of an interposed spring, substantially as specified, for the purpose of adapting the jaws to the gripers of blanks of varying sizes, as set forth.

And I also claim, in combination with the said spring connexion, for the purpose specified, the making of the wedge faces curved, substantially as specified, to insure an equal, or nearly, force on the griping-jaws, as set forth.

THOS. J. SLOAN.

No. 9223.—*Improvement in Threading Pointed Wood Screws.*

What I claim as my invention, and desire to secure by letters patent, is giving to the mould or former, or its equivalent, motion, substantially as specified, whereby the cutting away of the metal at the end of the shank is divided amongst several threading motions, instead of being cut away at the first threading motion, as heretofore practised.

THOS. J. SLOAN.

No. 9224.—*Improvement in Railroad Trucks.*

I claim as my invention, first, the combination of the brake, I, with the wheel, C, and rail, E, arranged and operating substantially as described; and second, making the wheel, C, substantially as herein described, for the purposes of preventing from clogging with snow or other substances, and giving it a better hold upon the rail, as above suggested.

EDWIN STANLEY.

No. 9225.—*Improvement in Apparatus for Feeding Boilers.*

What I claim as my invention is the combination of the heater, or vessel, D, and its pipes, I, K, and stop cock, L, M, or either of them, with the tank, boiler, and force pump, so as to operate therewith, or enable the force-pump to be operated, substantially in manner and under the circumstances as above set forth.

ANDREW WALKER, Jr.

No. 9226.—*Improvement in Mills for mixing Clay and mashing Vegetables.*

What I claim as my invention, and desire to secure by letters patent, is the use of grated hollow cylinders operating together so that the grates of one cylinder mash between the grates of another cylinder of like construction, thereby forcing the material operated upon from the periphery of the cylinder, or cylinders, to the inside of such cylinders, thereby mashing, grinding, and mixing the same, as above set forth.

CLARK ALVORD.

No. 9227.—*Improvement in Reverberatory Furnaces.*

Having thus explained my invention, I claim the reverberatory furnace constructed as described. The fuel, with the fire-box, A, being above the metals to be melted in the chamber B, and bringing the flame and heated products of combustion vertically down through the metals in the chamber B, in the manner and for the purposes set forth.

CHRISTOPHER GUY BEST.

No. 9228.—*Improvement in Wash Boards.*

What I claim, and wish to secure by letters patent, is the curved or circular form of crimp, giving a better chance for the seeds and water to remain amid the clothes during the process of rubbing, and also keeping the water near the centre of said board; thus rendering the work easier than the old-fashioned form.

LESTER BUTLER.

No. 9229.—*Improvement in Saw Sets.*

Having thus fully described our improved saw set, what we claim therein as new, and desire to secure by letters patent, is the stamps, *e, e,* &c., alternating with the spaces, *i, i,* &c., upon the end of a cylinder, E, in combination with a bevelled cylinder, F, which is caused to revolve with equal velocity in the direction opposite to that of the cylinder, E; arranged in the manner and for the purpose substantially as herein described.

ABEL BRADWAY.
ELIJAH VALENTINE.

No. 9230.—*Improvement in Kilns for Burning Pottery.*

Having thus described the nature and objects of my said improvements, together with the manner of carrying the same into effect, I have to add, that what I claim as my invention, and desire to secure by letters patent, is the arrangement of the fire hearth below the oven bottom, and provided with suitable apertures for the admission of air to regulate the combustion, substantially as described, when this is combined with the oven or heating chamber, provided with a tube, or the equivalent thereof, as specified, for discharging the heat above the bottom of the oven and diffusing it in the oven; and also provided with outlet flues or apertures at or near the bottom, and with apertures or tubes at or near the top, for the discharge of gases or steam, all substantially as herein described and for the purposes specified.

GEORGE ROBINS BOOTH.

No. 9231.—*Improvement in Blind Operator and Fastener.*

Having thus described the nature of my improvement in blind operators, what I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the sliding plate, (*f*,) provided with a notch, (*d*,) and extension rod and handle, (*a, b*,) with the vibrating link (*h*,) and fastening, (*l*,) and with the catch, (*i, j*,) and notches, (*k*,) by which I am enabled to operate a blind from the inside, by a straight shove or pull, as the case may be, and to fasten it shut, or partially open, as required.

JAS. R. CREIGHTON.

No. 9232.—*Improvement in Artificial Legs.*

I do not claim the use of a spring to throw the lower part of the leg forward; but I am not aware of any straight or curved spring having been used with a skeleton knee, as herein shown.

I do not claim the open skeleton to receive the stump, as the ordinary wooden legs have been secured by straps and bands, acting in the same manner and for the same purpose.

What I desire to secure by letters patent is—

First. I claim the skeleton knee piece, *d* and *e*, in combination with the spring, *f*, attached at its ends to the upper and lower parts of the leg, as described and shown.

Second. I claim the arrangement of the spring toes, 4, on their centre, *o*, kept down by the spring, 5, as described and shown.

Third. I claim the locking piece, *r*, and hook, *s*, to allow of the bending of the leg, as described and shown.

JOHN S. DRAKE.

No. 9233.—*Improvement in Oil Cans.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the receiving chamber, D', with the chamber, D, and flange, L; the whole being constructed and arranged, and operating in manner and for the purpose substantially as herein set forth and specified.

SAMUEL FIELD.
CHAS. W. HEALD.

No. 9234.—*Improvement in Printing Presses.*

Having thus fully described and explained my improvements, I do not claim the periphery of a cylinder as a distributing surface for the ink; nor the segment of the cylinder to form a place for the form of type, so arranged by catches and stops that it may be turned over any distance to receive the form, (as in the Voorhies press.) But what I do claim is the arrangement and application of a cylinder which always remains stationary in its own position, as well while receiving the form as when used as a distributing surface.

I do not claim an arm or single frame to carry one set of rollers around the periphery of a cylinder, (as in the Voorhies press.) But I do claim the combination and arrangement of several sets of rollers in *one frame*, to traverse round the periphery of a cylinder, when these sets of rollers alternately, or consecutively, pass over the form and admit an impression to be taken between the time one of the sets leaves the form and the next set arrives to it, for the purpose of giving slow motions to the inking, with rapid impressions upon the same form, thus effecting more speed as regards the amount or number of impressions to be produced in a given time.

I do not claim the continuous sheet, nor feeding a continuous sheet of paper to a printing press. But I do claim the arrangement of the gauge, (1,) guides, (2,) pawl, (*r*,) cranks, (*s* and *d*'',) rod, (E',) pin, *f*, and wheels, (*a*'',) in combination with the shears for cutting off the sheet after it is printed, and the cam, (*y*,) from which it receives its motion, the whole of these parts operating as described; all of which is herein fully described and set forth.

GEO. P. GORDON.

No. 9235.—*Improvement in Washing Machines.*

Having described my improvement, what I claim as my invention, and desire to secure by letters patent, is the providing a washing machine with a hinged flap rubbing board, E, or its equivalent, for turning the clothes in the tub, in combination with the dasher, B, and hinged presser, C, for the purpose set forth and shown in the specification and accompanying drawings.

J. T. MUDGE.

No. 9236.—*Improvement in Governors for Steam Engines.*

What we claim as new, and desire to have secured by letters patent, is the combination of the quadrants, (*i*, *i*,) and the cylindrical rack, (3, 3,) arranged and operating substantially as set forth, not confining ourselves to the cylindrical form of the rack; other forms may be used if found to suit, such as square or any polygon form.

GEO. S. STEARNS.
WILL. HODGSON.

No. 9237.—*Process for Restoring Shape and Tempering Articles of Hardened Steel.*

And having now described my said invention, and the manner in which the same is to be performed, I declare that what I claim is the curing or remedying the distortion which has taken place in steel plates during the operation of hardening, by compressing them between dies, previously heated to a sufficient degree to "bring back," or "let down" the temper; the mechanical pressure to be applied while the plates are in the course of being tempered, (the pressure being continued during the process of tempering,) as before exemplified and described.

JOHN SILVESTER.

No. 9238.—*Improvement in Brick Machines.*

Having thus described our improvements, what we claim, as of our invention, is as follows:

We claim combining with the percussion machinery the lower piston, or pistons, and machinery, to produce a compression of the bottom surface of the brick, and machinery to produce a compression of the *top surface* of the brick, the whole being substantially as herein-before described; not meaning such compression of the same as is produced by the percussion of the ram, but as a separate compression, effected by other means, as described.

We also claim the improvement of constructing each of the orifices of the *mould charger* with the flaring or inclined sides inclining inward towards each other as they descend; the whole being substantially in manner, and to effect the object or overcome the difficulty, herein-before stated.

We also claim the improvement of combining with the adjustable gate or striker a mechanism that will cause it to *rise upwards* as the mould-charger moves forward towards the moulds, such rising upwards of the striker being for the purpose herein-before explained.

ARAD WOODWORTH, 3D.
SAML. MOWER.

No. 9239.—*Improved Metallic Stuffing-Box for Packing in Steam Engines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of an elastic ring, made to fit tightly on the rod, and loosely in the stuffing-box, and having an intercepting tongue and spring-plate to prevent the steam from escaping through the slot therein, with the plate, D, or its

equivalent, fitting tightly over the ring, and loosely encircling the rod, and the gasket or its equivalent above said plate, substantially as described.

EBENEZ. WINSHIP.

No. 9240.—*Improvement in Electro-Magnetic Fire Alarms.*

I claim the combination and arrangement of a signal wheel with two electric circuits, so that when one is broken the wheel may revolve, and operate a key in the other circuit.

Second. I also claim the mode of constructing an elastic circuit, by breaking, lapping, and binding with a combustible material, or equivalent, for the purpose of making it sensitive to fire, as herein described.

HENRY VAN ANSDALL.

No. 9241.—*Improvement in Smoothing Irons.*

What I claim as my improvement, and desire to have secured by letters patent, is—

Firstly. The basket grate formed by the bars, (1, 1, 1, 1,) as mentioned in the specification.

Secondly. I claim the concave form (7) in the top of the smoothing portion of the iron, (*c*, *c*,) all for the purposes set forth.

FEDRAL C. ADAMS.

No. 9242.—*Improvement in Machines for making Carriage Wheels.*

What I claim as my invention, and desire to secure by letters patent, is the manner of feeding up the boring spindle slowly and bringing it back speedily, whilst the driving spindle is turned constantly in one direction, and with the same velocity, viz: by connecting the driving spindle, *p*, to the boring spindle, *q*, by means of the collared-bar, *l*, and by a cog-wheel, *n*, on the former, gearing into a pinion, *o*, on the latter, and by screw-threads formed upon the said spindles, which can be alternately operated upon by the segmental nut, *r*, which is placed between them, and actuated by the lever, *s*, substantially as herein set forth.

CHAUNCEY H. GUARD.

No. 9243.—*Improvement in Refrigerators of Wort.*

Having thus described my improved apparatus for cooling beer and other fermentative liquors, what I claim as new, and desire to secure by letters patent, is the series of deep, narrow, open chambers, a^1, *a*, when made with vertical partitions, *b*, *b*, so as to form passages, *c*, at the bottoms thereof, for imparting to the wort a direction downward and upward through the said chambers, in combination with shallow chambers, *e*, with which the aforesaid chambers successively communicate, and the enclosed chambers, *h*, through which flows, in direction opposite to that of the wort, a current of cold water, in the manner and for the purpose herein set forth and shown in the drawing.

ADOLPH HAMMER.

No. 9244.—*Improvement in Apparatus for Feeding Chickens.*

I do not claim attaching and arranging the doors to the case so that said doors will open outwardly, as this has been previously done. But what I claim as new, and desire to secure by letters patent, is attaching and arranging the doors, E, E, to the case in such a manner that said doors will open inwardly instead of outwardly when the fowls tread upon the steps, F, G; the doors being attached to the case and arranged as described, or in any equivalent way.

SIMEON WILLARD ALBEE.

No. 9245.—*Improvement in Railroad Signals.*

I do not claim the simple combination of a bell hung to a spring, a cord or chain leading therefrom, and a tripping lever or apparatus, which, when moved in one direction, shall pull the cord and cause the bell to vibrate, as this is a well known combination, applied todoors, for the purpose of sounding an alarm. But what I do claim as my invention, is the combination of a single bell, D, a spring, E^2, two cords, E, E^1, and two or more tripping arms or levers, F, F^1, as applied to a railway and supporting frame at a road-crossing of such railway, and so that the contraction of one of the two ropes by change of temperature, or otherwise, may be counterbalanced by that of the other, and not draw the bell laterally out of place, as it would be likely to were but one rope or wire used.

And I claim the combination of the weighted or heavy flag or signal board, M, with its suspension chains or cords, *m*, *m*, the windless barrel, O, the overbalance weight or weights, P, P , and suspension cords or chains, Q, Q^1, the leading cord, R, or R^1, passing over the pulley S, or S^1, the tripping lever, T, or T^1, the spring-catch, U, and its cord, *r*, and the tripping lever or arm, *u*, all being arranged and made to operate together, substantially as specified.

AURIN BUGBEE.

No. 9246.—*Improvement in Preserving India Rubber.*

And be it further known that the nature of my discovery is applying the before-mentioned quantity of Campeche salt, or muriate of soda, to the rubber in its sap state, and by so doing preventing putrefaction and fermentation of the juice, to which more especially I confine the claim of my invention, and for which I desire to secure letters patent.

F. BRONNER.

No. 9247.—*Improvement in Grain Harvesters.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The arrangement and combination of two cylinders, A, A, with each other, for the purpose of cutting and bringing the cut grain into the middle between them, and delivering the same to the crib, as above described.

Second. The construction of the cam-cutter, W, and cam-fingers, (H,

I, J,) so constructed as to be drawn in for the purpose of allowing the cylinders to throw the cut grain into the crib, as above described.

Third. The use of a slot or channel, U, to regulate the movement of the fingers, as above described.

Fourth. The arrangement and construction of a crib, (F,) made to receive from the two cylinders, A, A, and hold the cut grain upright, so that it can be readily taken out for binding, in the manner above described.

DANIEL FITZGERALD.

No. 9248.—*Improvement in manufacture of Common Salt.*

What I claim, and wish to secure by letters patent, is the use of a screen, false bottom, or floor in the vat or pan containing saline waters or brine for manufacturing salt, to separate impurities or bitterings from the salt, substantially as herein described, or any other mode substantially the same.

JAMES P. HASKIN.

No. 9249.—*Improvement in manufacture of Sulphuric Acid.*

What I claim as my invention, and desire to secure by letters patent, is concentrating sulphuric acid in leaden vessels to the strength of 66° Baumé, and at a temperature below the boiling point of the acid.

I also claim the long conducting and escape pipe, in combination with the agitating apparatus, for condensing the deleterious gases, and preserving a pure and wholesome air in the neighborhood of the establishment.

CARL HINRICHS.

No. 9250.—*Improvement in the Composition of Enamels.*

What we claim as our invention or production, and desire to secure by letters patent, is the enamel herein-before described, and its application to brick and iron.

JOHN G. DUNN.
ALFRED F. HOWES.

No. 9251.—*Improvement in Apparatus for heating Feed Water of Locomotives, &c.*

What, therefore, I claim as my invention, is to combine the vessel, H, with the deflector, R, the heater, W, and the chimney-pipe, P, substantially as described, whereby such deflector shall not only form the bottom of the said vessel, H, but that the smoke and exhaust steam may be made to heat said vessel by impinging against the deflector as specified.

And I also claim the improvement of throwing the waste steam directly into the heater or vessel, H, and there partially or wholly condensing it, before it is passed into the tank of the tender; not meaning to claim the throwing of it into the tender from the blast pipe, and through a single pipe connecting the blast pipe and tender, but the combining the tender and the blast pipe, E, and the heater or vessel, H, by pipes, substantially in the manner represented in the drawing, whereby the advantages herein-before stated, as well as others, are obtained.

ISRAEL P. MAGOON.

No. 9252.—*Improvement in Whiffletree Hooks*

What we claim as our invention, and desire to secure by letters patent, is the head turning upon the shaft to close the hook, the sliding catch to prevent its opening, and the spring within the head, acting upon them, the whole combined and operating substantially in the manner specified.

EDWIN A. PALMER.
ADOLPHUS J. SIMMONS.

No. 9253.—*Improvement in Air-tight Mail-bags.*

We are aware that hinged clasps or clamps have been used for drawing together, and keeping closed, the mouth of the bag; such, therefore, merely of themselves, we do not claim. But what we do claim as our invention, and desire to secure by letters patent, is forming the jaws of the clasp with a tongue and groove on their inner faces, for crimping in the elastic material of the bag, and causing it to act as packing, in effectually making air and water tight the mouth of the bag, as herein shown and set forth.

CHAS. A. ROBBINS.
HARVEY ALLEN.

No. 9254.—*Improvement in Blow-pipes for Dentists, &c.*

Now I do not claim the connecting a common blow-pipe with a bellows by means of either a flexible or inflexible tube; nor do I claim the invention of a lamp for blow-pipe purposes, which may be operated with alcohol, burning fluid or oil, or any other combustible substance; nor do I claim the use of a glass flame for blow-pipe purposes, instead of a spirit or other flame. But what I do claim as my invention, and desire to secure by letters patent, is—

First. The combination in one instrument of the flame of gas, or a lamp with a blow-pipe, so that both, operating together, may be held in one hand, and the flame applied on any spot, in any direction, and for any length of time, at the will of the operator.

Second. The arrangement of the thumb piece, E, or its equivalent, in combination with the flame of gas, or a lamp, and a blow-pipe, so that, while the instrument is held in one hand, a movement of the thumb will adjust the blow-pipe to the flame in such a way as to produce any desired variation in the flame, as above described and set forth.

I do not intend, by this claim, as I have intimated above, to restrict myself to the mode of construction herein or above described, but to reserve the right to vary the same as I may deem expedient, while I attain the same ends by means substantially the same.

JULIUS THOMPSON.

No. 9255.—*Improvement in preparing Stone in imitation of Marble.*

What I claim as my invention is the improvement in preparing the surface of the slate or absorbent stone, or mineral matter, for better receiving and retaining colors, and for its quicker and better induration, than by the ordinary process of baking oil or japan on it; the same consisting

in applying a drying oil or vehicle to it, as above set forth, in combination with baking it, and charring it, or with burning it thereon, essentially as above specified; the charring or burning the oil being the principle of my invention or discovery under the circumstances as stated.

And I also claim the improvement in applying the veining and ground colors to such indurated surface, or other surface, the same consisting in applying the graining colors first, and drying them on, in combination with subsequently covering the whole surface, together with such veining colors, with one or more coats of black or other colored japanning, and, after the same has been dried, grinding down japanning from the veining colors, and leaving it between them, so as to form a ground as stated.

HIRAM TUCKER.

No. 9256.—*Method of making Lamp-tops, Rivets, &c.*

What I claim as my invention, and desire to secure by letters patent, is the method of making lamp-tops, stoppers, rivets, and other similar articles, from a disk or plate of metal by bending it, and forming it substantially as described, so that the rim, I, I, is formed of two thicknesses of metal, and the centre and flange, M, M, of one thickness, as described.

LUTHER C. WHITE.

No. 9257.—*Improvement in Clothes Pins.*

I do not claim the invention of pins for securing clothes to the line; neither the invention of the coiled spring or lever; neither the combination of the parts of the same. But I do claim, and desire to secure by letters patent, the improvement of manufacturing clothes pins from wire of any suitable metal, with the aforesaid jaws attached, operated by a spring or lever, as being the most simple, cheap, effective, and durable of any kind in use.

SAMUEL ALDRICK.

No. 9258.—*Improvement in Connecting Joints for Washing Machines or other purposes.*

What we claim as our invention, and desire to secure by letters patent, is the construction of the joint (by which the connecting rod is attached to the spring board) by means of the knife edges, disposed in a right line, and confined by the straps and backing piece, substantially as herein set forth.

S. L. EGBERT.
S. W. GREEN.

No. 9259.—*Improvements in Printing Presses.*

Having thus fully described the construction and operation of my improvements, I will now point out the parts which I claim as my invention, and desire to secure by letters patent.

First. I claim a pair of nippers, so constructed as to draw the paper from the form by griping the margin of the paper firmly between the jaws of the said nippers, and at the same time holding the paper a little distance from the platen, as herein described and set forth.

Second. I claim the adjustable spring, *i*, and rod, *j*, for holding the nippers up from the platen, as herein described.

Third. I claim the fingers, *r*, for holding the edge of the sheet, in combination with the swing platen, as herein set forth.

CHARLES W. HAWKES.

No. 9260.—*Improvement in Lightning Rods.*

Having thus fully described the nature of my improvements in lightning rod points, what I claim therein as new, and desire to secure by letters patent, is—

First. The formation of the point of a lightning rod of successive sections, of different metals, each being of greater fusibility than the one below it, and having oblique junctions, so that an overcharge of the electric fluid simply melts off the upper section, without enlargement of the point below, either by its own partial fusion or by the lodgement of the upper metal upon it.

Second. Uniting the successive sections of an obliquely sectional lightning rod point by solder, or brazing, which is at each joint fusible, at a lower temperature than the section immediately above it, so that the melting of the point shall remove the entire uppermost section, and thus more certainly prevent the lodgement of any portion of the melted section upon the point thus exposed.

H. H. HOMAN.

No. 9261.—*Improvement in Smut Machines.*

What we claim as our invention, and desire to secure by letters patent, is making the blowing apparatus, with the drawer, P, *f*, *f*, *g*, and spout, M, movable, substantially as described, so as to allow of the wind-chest, J, and pipe, L, being easily taken out, and turned in either direction, to admit of the machine being driven in whichever direction may be desired.

CHARLES KEELER.
JAMES KEELER.

No. 9262.—*Machinery employed in the Manufacture of Coiled-Wire Ferrules.*

I am aware that clamps, or holders, and cutting-dies, have been worked by cranks, and by cams. I therefore do not claim these, as such, as my invention; but what I do claim as my invention, and desire to secure by letters patent, is the method of cutting the wire at right angles to the axis of the coil, so that the ends of the ferrules will be perfectly true, without wasting any of the stock, by the use of the short mandrel, (*c*,) the clamp, or holder, (*h*,) and the cutting-die, (F,) when the machine is constructed, arranged, and made to operate substantially as herein described.

I also claim the combination of the method of cutting the coil (as described above) with the method of supporting the long coil, and of

feeding it, and of throwing off the piece when severed, when combined, arranged, and operated substantially as herein described.

WM. T. RICHARDS.

No. 9263.—*Improvement in Shuttle-Guides for Looms.*

I therefore claim as my invention—

First. The guide, A, B, or its equivalent, either with or without the flange, B, in combination with cloth-weaving looms, or as applied and used therewith, substantially in the manner and for the purpose of guiding the shuttle as specified.

Second. I claim the spring, H, and finger, I, or their equivalents, so arranged as to hold the guide, A, B, in its proper place, substantially as specified.

HORACE T. ROBBINS.

No. 9264.—*Improved Machine for manufacturing Porte Monnaies.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The manner, substantially as described, of putting the leather or other material in the frames, *g*, by forcing a sufficient quantity through the frame with a die, or plunger, B, at the back side, and then, by a larger die, F, pressing the part so forced through, and folding it over the inner edge of the frames.

Second. The form and construction of the clamp, E, E^1, which holds the frame, *g*, and the leather or material, to wit: the lower part, E, having an opening, C, just large enough to allow the die, B, to pass through, and the upper part, E^1, having an opening, *d*, large enough to allow the die, F, to pass through and fold the leather or material over the frame, and having a recess in its inner or bottom face around the said opening, *d*, to receive and hold the frame in it, so that the leather or material is held independently of the frame, and allowed to be drawn through the frame, substantially as herein described.

B. S. STEADMAN.

No. 9265.—*Improvement in Door Locks.*

The dividing plate, being well known, is public property, and therefore forms no part of my claim; neither do I claim any of the parts operated from the outside key-hole, as these may be of any usual form. But what I desire to secure by letters patent is the tumbler, *k*, enclosed by the dividing plate, *h*, to be operated on solely by the key when entered from the inner key-hole, in combination with the revolving check, or its equivalent, and the bolt, for the purposes and as described and shown.

WILLIAM MOORE.

No. 9266.—*Improvements in Forging Machines.*

I claim the sliding guide traversing upon the side-bars, as described, having a pin, pivot, or fulcrum, one end of which is attached to the sliding-guide, while the other end enters the end of the hammer, in which it is so fitted as to allow the hammer to turn a short distance, when power is applied to it by means of the crank-cam or eccentric, and the connecting rods, H.

GEO. H. RICHARDS.

No. 9267.—*Improved Alarm Time Pieces for Lighting Lamps.*

What we claim as our invention, and desire to secure by letters patent, is the use of a revolving vertical section of a cylinder, (as G,) when combined with a spring, (as J, C,) to revolve it, when these are combined with the appropriate levers, (as E and F,) and connected with the alarm wheel (as B) of an alarm time-piece by an appropriate connecting rod, (as C,) for the purpose of lighting a lamp, in connexion with the alarm given by an alarm time-piece, when the whole is constructed, combined, and arranged substantially as herein described.

WM. H. ANDREWS.
RANDAL T. ANDREWS.

No. 9268.—*Improvement in Tuning Pegs for Guitars, &c.*

What I claim as my invention, and desire to secure by letters patent, is making the tuning-pegs of guitars, and other like stringed instruments, with the journal part of much greater diameter than the barrel on which the string is coiled, substantially as and for the purpose specified.

JAMES ASHBORN.

No. 9269.—*Improvement in Carving Machines.*

What I claim as my invention, and desire to secure by letters patent, is the folding frame, and wheels or pulleys, constructed substantially as above described, in *combination* with the double cross sliding ways and vertically sliding cylinder or tracer, for the purpose of tracing from patterns or other device, in the manner above specified.

CHARLES E. BACON.

No. 9270.—*Improvement in Coating Iron with Copper.*

Having thus described my invention, I do not claim the preparation of iron with zinc in the manner described; but I claim—

First. Coating cast, malleable, or wrought iron with copper, or any of the alloys of which copper forms a part, by employing a coating of zinc (or zinc and tin) to cover the iron as a positive medium to make the molten copper or its alloy adhere to the iron, in the manner substantially as described.

Second. I claim the employment of an infusible or partially infusible substance or substances, especially the fluoride of calcium, as a wiper and non-conductor, as herein set forth.

THEODORE G. BUCKLIN.

No. 9271.—*Improved Hand Drilling Machine.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the geared mandrel, which elongates to feed the drill, with the arm (g) that projects from the sleeve, (e,) to steady the gearing, and the slot (g^1) in the stock, (A,) to guide and steady the arm while traversing therein, to permit the drill to be advanced and withdrawn, as herein set forth.

REUBEN DANIELS.

No. 9272.—*Improvement in Horse Collars.*

We do not claim a rigid collar, nor a collar capable of expansion and contraction sidewise when the sides are connected by a third or intermediate part, or supported by a frame; but what we do claim as our invention, and desire to secure by letters patent, is the construction and arrangement of the two sides of the collar so that they fit together, and can be moved towards and from each other by a parallel motion, to diminish or enlarge the aperture for the horse's neck, and then be fastened by a set screw, or its equivalent, to form a rigid frame, substantially as herein described.

J. H. HALL.
JOHN LOWREY.

No. 9273.—*Improvement in Portable Wardrobes.*

Having thus described my improved wardrobe, I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is a wardrobe susceptible of dismemberment, with the parts held together by means of the sliding bolts, b, b^1, which fit into sockets, j, j^1, and the notched studs, f, f^1, which fit into the grooves, g, g^1, the top piece preventing the back from slipping by the bolts, b^1, b^1, and the sides being prevented from slipping by the projecting pieces, $l\,l, l\,l$, which press the braces, h, h^1, forward and keep the studs, f^2, f^2, pressed forward, as above described.

SETH L. HOBART.

No. 9274.—*Improvement in bevelling the edges of Skelps or Metallic Strips, &c.*

What I claim as my improvement, and desire to secure by letters patent, is arranging the rollers in the frame so as to receive a lateral movement, as may be desired—in other words, giving the rollers end play one over the other, thereby increasing or diminishing the distance between the bosses, (according to the width of the plate or strip,) and providing suitable means for retaining the same in place.

ROBERT KNIGHT.

No. 9275.—*Improvement in Rakes.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the slotted swinging arm with the slotted rake handle and crank, E, in the manner as above described, for moving the cut grain from the platform.

AMZA B. LEWIS.

No. 9276.—*Improvement in Paper Cutting Machines.*

Having thus fully described the nature of my invention, what I claim as new therein, and desire to secure by letters patent, is the arrangement of the movable platform and sliding clamp, as described, in combination with the vibrating knife, as described.

JAS. E. MALLORY.

No. 9277.—*Improvement in Crayon Rubber.*

I do not claim as new the casting of particular forms of vulcanized rubber in moulds; but what I do claim as my invention, and desire to secure by letters patent, is the crayon rubber, made in the manner herein before substantially set forth, for the purpose of applying and blending the crayons in the bichromatic and other kindred styles of drawing.

D. F. POND.

No. 9278.—*Application of a Free Joint Tube in circumstances where it is exposed to external pressure.*

What I claim as my invention, and desire to secure by letters patent, is the application of the improved metal tube, made in the manner and for the purposes as herein-before described—that is to say, of a metal tube with a free joint (neither welded nor brazed) to boilers of steam engines, or other vessels requiring metal tubes, of such a character as to resist external pressure effectually.

RICHARD PROSSER.

No. 9279.—*Improvement in Galvanic Clocks.*

What I claim as my improvement or invention is the combination of the impulse spring, s, and the pallets, f and b, respectively, connected with the armature of the magnet and the pendulum, and made to operate together and to make the pendulum operate or impart impulse to it, substantially as described.

MOSES G. FARMER.

No. 9280.—*Improvement in Shoes and Gaiter Boots.*

What I claim as my invention is the improved gaiter boot or shoe as made with a lap piece separate from both the quarters, and extended up from the instep part of it, in combination with so applying button-holes and buttons, or their equivalents, to the said lap piece and the two quarters, as to enable the two quarters to be directly connected by the lap piece, all substantially as above specified.

JOSEPH BRAKETT

No. 9281.—*Improved Jointed Bed-plate Saw Gummer.*

I do not claim the cylindrical cutter, C, separately, as that has been previously used; but having thus described the nature of my invention, and the manner in which it is operated, what I claim as new, and desire to secure by letters patent, is the employment or use of the cylindrical cutter, C; said cutter having a rotary and also a reciprocating rectilinear motion, in combination with the jointed bed-piece, B, in which the saw is placed; the cutter, C, having the above motions communicated to it in the manner as described or in any equivalent way, and the bed-piece being constructed substantially as shown and described; by which combination saws may be filed, gummed, and jointed in an expeditious and proper manner, as set forth.

HOSEA O. ELMER.

No. 9282.—*Improvement in Piano Forte actions.*

What I claim as my invention, and desire to have secured to me by letters patent, is jointing the "fly" of the jack to the stem of the same, so as to constitute a lever, the short arm of which has to move but little distance before it strikes against the regulating button, for the purpose of preventing any noise or "slapping," as above set forth.

GEO. HOWE.

No. 9283.—*Improvement in Throstle Spinning Machines.*

What I claim as my invention is the escapement wheel, O, its escapement lever, (composed of the arm, *h*, and pallets, *i*, *k*,) and stud, *y*, in combination with the reciprocating rotary mechanism, composed of the wheel, P, its concentric and endless grooves, row of pins, the pinion, *p*, and pendulous bar or arm, *r*; the whole being applied to give motion to the shaft, N, its pinion, the gear of the shaft, K, and the said shaft, K, in order to effect the movements of the spindle rail or rails, essentially as above specified.

CHARLES H. HUNT.

No. 9284.—*Improvement in Saw Mills.*

Having thus fully described my improvements in saw mills, what I claim therein as new, and desire to secure by letters patent, is the adjustable ways of the saw gate, when they are connected with each other, in such a manner that they can be simultaneously and uniformly varied and adjusted in their positions whilst the saw-gate is in motion, for the purpose of varying the amount of the cutting action of the saws, substantially as herein set forth.

I also claim the connecting and arranging of the feeding apparatus with the saw-gate and the adjustable ways thereof, in such a manner that the feeding motion communicated to the material operated upon will invariably be in perfect harmony with the cut of the saw; and also in such a manner as will enable me to ease the action of the saw when passing through knots, and at any time adapt it to the nature and the depth of the material operated upon, substantially as herein set forth.

HAZARD KNOWLES.

No. 9285.—*Improvement in Brick Kilns.*

Having thus fully described the construction and operation of my improved kiln in the several processes of burning brick, I would state that I do not claim constructing a stationary kiln of masonry. But what I do claim as my invention, and desire to secure by letters patent, is so arranging the several compartments of the kiln, each provided with a fireplace, in a circuit, and connecting them with each other and with the fireplaces and chimneys, by means of flues and dampers, that one compartment after another may be charged with fresh brick, and the brick be successively dried and heated by the waste heat, burned, cooled down, and removed, substantially in the manner herein fully set forth.

RICHARD E. SCHROEDER.

No. 9286.—*Improvement in Lath Machines.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of the method of rotating the log or bolt from which the laths are to be cut, by means of the poppet wheels, J, J^1, arranged respectively on the shafts, E^1, E, which form a part of the mandrel at each end of the log, and the gear wheels, I, I^1, or their equivalents, moving with equal velocities, so as to prevent any wrenching or twisting of the log on its centres, and to hold it firmly up to the knives whilst being operated upon by them, and the method of clutching and releasing the log, by means of the dog, A, hollow bearing, C^1, for containing the clutch-head, G, and hollow shaft, E^1, for receiving the rod, F, which screws into said clutch, and by which the dog may be driven into the log, or the log released; the whole being arranged and operating substantially in the manner and for the purpose set forth.

H. C. SMITH.

No. 9287.—*Improvement in Sounding-Boards of Piano-Fortes, &c.*

What we claim as our invention, and desire to secure by letters patent, is making the sounding-board, A, of a piano-forte, or other stringed musical instrument, and arranging the strings and all appendages thereto in the form of a cylinder or part of a cylinder, or in any of the forms we have mentioned as considered to be equivalent; the said board having its ends secured between two disks, or heads, B and C, and having no other support except that derived from the said disks or heads.

ALFRED SPEER.
ERNEST MARX.

No. 9288.—*Improved Machinery for Forming Sheet-Metal Tubes.*

I do not claim the manner of forming tubes by means of a rod and concave bed, irrespective of the manner of operating the rod, for they have been previously employed; the rod being operated or driven in the bed by means of a mallet or hammer operated by hand or by means of levers or cranks moved by gearing. What I claim, therefore, as my invention, and desire to secure by letters patent, is—

First. The method of mounting and operating the rod, E, within the concave bed, C, in the manner as shown and described, viz: the ends of the rod, E, being attached to the slide rods, E, H, said slide rods passing through the vertical guides, B, B^1, and having spiral springs, G, I, around them; the lower ends of the slide-rods being attached to levers, J, K, by operating which the rod is forced within the concave bed and the lower portion of the tube formed.

Second. I claim the hinged folders, O, O^1, attached to the wings, L, M, which are hung on pivots, N, N; said pivots being in line, longitudinally, with the centre of the rod, E, and operated in the manner and for the purpose of forming the upper or remaining portion of the tube, as herein set forth.

ORSON W. STOW.

No. 9289.—*Improvement in Registers for Omnibuses, and for other purposes.*

What I claim as my invention, and desire to secure by letters patent, is fitting toll passages with a registering step, combined with mechanism, in such manner that the aggregate number of full and fractional tolls due from passengers will be reduced to the denomination of full tolls, and registered, whatever the proportions may be in which the aggregate is composed, of fractional and full tolls, substantially as herein set forth.

J. Z. A. WAGNER.

No. 9290.—*Improvement in Bellows for Reed Instruments.*

What I claim as my invention, and desire to secure by letters patent, is the employment, in all reed musical instruments, of bellows, having two chambers, in one of which a vacuum is produced, and in the other air is compressed; the said chambers being on opposite sides of the reeds, and communicating with each other through the reeds, so that when one forces air through them, the other, by the vacuum, draws it through at the same time. This I claim without reference to the precise construction of the bellows or the mode of operating them.

ISAAC T. PACKARD.

No. 9291.—*Improvement in Electro-Magnetic Engines.*

What I claim as my invention, and desire to secure by letters patent, is the application of a spring or springs, or their mechanical equivalent, used as recipients of the excess of power in the closing of the electro-magnets and armature, to be imparted again to the next, as described and set forth.

JOHN S. GUSTIN.

No. 9292.—*Improvement in Machines for Polishing Leather.*

What I claim as my invention, and desire to secure by letters patent, is connecting or fastening the stand or stands that hold the polishers or burnishers to a belt, so as to traverse them in ways or grooves, or under a plane, substantially as described.

J. MORTON POOLE.

No. 9293.—*Improvement in Grain Separators.*

I am aware that revolving screens, separately considered, are not new; also, that the conveyor, or endless apron, has been employed, in combination with a thrashing cylinder, vibrating shoe, and fan; such, therefore, of themselves, I do not claim. But what I do claim as new, and desire to secure by letters patent, is the use of a hollow revolving cylinder, so constructed and so moved as herein fully set forth, for the purposes of a straw-carrier, by which the advantages above enumerated and explained are obtained.

JACOB BERGEY.

No. 9294.—*Improved Vise.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the sliding-bar, with screw attached thereto, with reference to the fast jaw, A, and the moving jaw, B, when said sliding bar is provided with a series of holes, or their equivalents, and said jaw, B, is provided with a pin, or its equivalents, whereby B can be set at varying distances with respect to A, and that distance afterwards regulated by the screw.

W. BUTLER.

No. 9295.—*Improvement in Hand Printing Presses.*

Having thus described my improvements in printing presses, what I claim as new, and desire to secure by letters patent, is—

First. The arrangement, substantially as described, in a hand power-press, of guide-bars resting upon adjusting points, or hinged at their rear ends, and guided at their front ends to a vertical vibration, concentric with said points or hinge, so that the entire bed, guide-bars, and their appendages, shall move bodily upward upon giving the impression, and return by their own weight to the state of rest, whether operated by a shaft, (*j*,) extending below the bed, and working a toggle joint beneath the bed or bars, as described, or in any equivalent way.

Second. I claim, in connexion with the before-described arrangement, the ascending grade at the fore end of the guide-bars, for the purpose of limiting the range of the toggle at the period of giving the impression.

CHAS. FOSTER.

No. 9296.—*Improvement in Seed Planters.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the employment or use of the adjustable tire, or tires, for the purpose of varying the diameter of the wheel, A, to allow the seed to be deposited the required distance apart.

D. HALDEMAN.

No. 9297.—*Improvement in Rotary Stove Grates.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combination of the rotary movement of the bottom grate with the vertical annular grating, or its equivalent, surrounding the same, for the purposes substantially as herein set forth.

Second. I claim the rotary movement of the bottom grate with the controllable tilting movement of the same, substantially as herein described.

Third. I claim the combination and arrangement of the several parts whereby the aforesaid rotary and tilting movements of the bottom grate are effected, substantially as herein described.

ALEXANDER HARRISON.

No. 9298.—*Improvement in Seed Planters.*

What I claim as my invention, and desire to secure by letters patent, is the corn planter sieve and its appendages, for the purpose of sifting and depositing the fine earth upon the grain, and throwing off stones and such matter as would obstruct the young sprout in coming through the ground, substantially as described and illustrated herein.

ROBERT M. JACKSON.

No. 9299.—*Improved Spark Arrester.*

Having thus described the nature of our invention, and the manner in which it is operated, what we claim as new, and desire to secure by letters patent, is the revolving screen, F, in combination with the chamber, E; the lower part of said chamber communicating with the smoke-pipe, A, at a point below the tops of the exhaust tubes, C, C; by which arrangement a downward draught is created within the chamber, E, and the cinders drawn from the screen, F, as it revolves, thus preventing the clogging of the screen, as set forth.

VOLNEY P. KIMBALL.
BRUCE KIMBALL.

No. 9300.—*Improvement in Bee Hives.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The use of a shallow chamber, substantially as described, in combination with a perforated cover, for enlarging or diminishing at will the size and number of the spare honey receptacles.

Second. The use of the movable frames, A, A, fig. 4, or their equivalents, substantially as described; also their use in combination with the shallow chamber, with or without my arrangement for spare honey receptacles.

Third. A divider, substantially as described, in combination with a movable cover, allowing the divider to be inserted from above between the ranges of comb.

Fourth. The use of the double glass sides in a single frame, substantially as and for the purposes set forth.

Fifth. The construction of the trap for excluding moths and catching worms, so arranged as to increase or diminish at will the size of the entrance for bees, substantially in the manner and for the purposes set forth.

L. L. LANGSTROTH.

No. 9301.—*Improvement in Upright Piano Fortes.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Extending the upper part of the metallic plate, or cap, I, at the part where the shorter of the strings, J, J, are placed, over the sounding board, H, and supporting it by blocks, or supports, *c*, *c*, which pass through the sounding board to the frame timbers, substantially as set forth, whereby the higher end of the bridge, K, or that part on which the strings of the higher notes rest, is allowed to be brought nearer to the centre of the sounding board, to get a better vibration.

Second. The combination, in the manner substantially as described, of the cushioned block, *p*, and the adjustable button, *o*, on the upright wire, *h*, attached to the key, for the purpose of preventing the entire descent of the hammer, after striking, until the key is left free.

R. E. LETTON.

No. 9302.—*Improvement in Machines for Wringing Clothes.*

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is keeping the ends of the clothes sack distended during the progress of wringing, to equalize the twisting of the same at all parts by means of the elliptical spring leaves and elastic wings, substantially as described.

JOS. P. MARTIN.

No. 9303.—*Improved Apparatus for Puddling Iron, etc.*

Having thus described my automatic puddling apparatus, what I claim as new, and desire to secure by letters patent, is—

First. The combination of an automatic rable with a revolving or moving basin, arranged and operated substantially as herein set forth, or with a stationary basin, or bottom, whereby much manual labor is dispensed with for stirring the iron in the process of puddling.

Second. The arrangement of the hollow shaft, D, cooler, C, and moving basin in such manner that a stream of water can be kept circulating round the bottom and sides of the latter to prevent it from being overheated, substantially as herein described.

Third. The combination of the crank and swinging guides, or their equivalents, which enables the operator to make the rable stir over different parts of the bottom and at different angles to the side of the furnace, and also to remove it out of the way when necessary.

JAMES McCARTY.

No. 9304.—*Improvement in Piano Fortes.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The combination of the wind chest, F, and flute, or other similar wind pipes, E^5, E^6, E^7, E^8, with the horizontal piano forte action, in the manner substantially as set forth, to wit: the pipes being placed horizontally at the bottom of the case below the piano forte action, and the wind chest placed below the front ends of the piano forte keys, in such a manner as to allow the valves to be operated directly by the said keys.

Second. The manner of opening the valves of the flute, or wind pipes, to play an octave lower than the piano, either at the same time that they are being played at the same pitch as the piano, or not, by means of the series of levers, g, g^1, g, g^1, arranged and operated upon by the blocks, S, S^1, upon the vertical pins, i, i^1, i, i^1, under the piano key.

JAMES McDONALD.
JOHN McDONALD.

No. 9305.—*Improvement in Printing Presses.*

Having thus fully described my rotary cone printing press, what I claim as new, and desire to secure by letters patent, is not the use of conical impressing cylinders, but the peculiar arrangement and combination of conical impressing cylinders, one or more in number, each provided with a set of conical distributing inking rollers, adapted thereto, and with a rotating wheel or disk, substantially as described.

I also claim, in combination with the conical impressing cylinders, the position and arrangement of the clamp, consisting of the metal plate, K, spring, N, and arm or lever, I, which retains the paper at the required angle to receive the impression, and releases the same when the impression is taken, substantially as set forth.

JOHN G. NICOLAY.

No. 9306.—*Improvement in Expanding Window Sashes.*

What I claim as my invention, and desire to secure by letters patent, is the sash constructed in two pieces, so that both, when brought together, shall be narrower than the distance between the bottoms of the grooves in the jambs of the frame in which the sash is designed to be placed, by at least the thickness of one of the stop-strips of the frame, and connecting these two pieces of the sash in such manner that one will slide past or into the other, so that the sash can be contracted or expanded, as may be required, to make it fit different window frames, and to adapt itself to the varying width of the same frame, and also to admit of its being put into and taken out of the frame without removing the stop strips therefrom; the two parts of the sash thus moving towards and from each other having springs, or the equivalent thereof, adapted to them, so as to give them a constant tendency to diverge from each other, that the sash may at all times expand promptly and fill the frame, to hold itself firmly in place, substantially as herein described.

MIGHILL NUTTING.

No. 9307.—*Improvement in Milling Machines.*

What I claim as my invention, and desire to secure by letters patent, is the construction and combination of the vertically moving cutter stock, or poppet head, with the driving pulleys; &c , mounted on a swinging frame, hung with a pivot hinge at the bottom, the connexion between the two being effected by radius rods, in the manner and for the purpose substantially as herein set forth and described.

WM. H. ROBERTSON.

No. 9308.—*Improvement in method of Priming Fire Arms.*

What I claim as my invention, and desire to secure by letters patent, is the priming of fire arms by throwing a pellet of percussion or priming material over the nipple at the time the cock is descending thereon, so that the priming shall be struck down in its flight between the cock and the nipple, and exploded.

CHRISTIAN SHARPS.

No. 9309.—*Improvement in Window Frames.*

What I claim as my improvement, and which I desire to secure by letters patent, is the pulley style, constructed of the pieces, L, D, M, as set forth, in combination with the springs, E, E, by which means I am enabled to make use of solid or immovable bead strips, *m*, and bands, K, I, and to remove the sash at pleasure from the frame, in the manner substantially as described.

HENRY CLAY SMITH.

No. 9310.—*Improvement in Time Pieces.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Hanging the balance of a clock, or time-piece, on a spring or strip of metal, E, which is fixed or prevented from turning at both of its ends, but capable of twisting between the ends, substantially as and for the purpose herein described.

Second. Making one part of the fork or crutch wire, K, flat and thin, substantially as shown at *k*, or otherwise constructing it to allow it to bend or move in a similar manner, and connecting the said fork or crutch wire with the balance in any manner, as shown at *i*, which causes it to give its impulse in the same direction as the motion of the balance; the said bending or motion of the fork or crutch being for the purpose of allowing it to transmit the impulse in the above direction.

SILAS B. TERRY.

No. 9311.—*Improvement in Churns.*

Having thus described our apparatus and its operation, what we claim as our improvement and invention, and desire to secure by letters patent, is the combination of the tub, E, including the appendages described, with the frame, A, A, and stands, B, B, or any other convenient frame-

work adapted to the use of the tub, in a vertical and a horizontal position, but in manner and for the purposes substantially as herein set forth and described.

LUCIAN A. BROWN.
HUBBARD BIGELOW.

No. 9312.—*Improved Apparatus for Heating Feed Water of Steam Boilers.*

What we claim as our invention, and desire to secure by letters patent, is the arrangement of a heater for the feed-water of steam boilers, with respect to the chimney, smoke box, and the blast-pipes of the escape steam, substantially as herein described, so that the heated smoke and gases from the smoke-box, and the exhaust steam from the cylinder, shall pass separately through the heater in distinct tubes or channels, in such manner that they cannot mix until both have passed the heater, as herein set forth.

M. W. BALDWIN.
DAVID CLARK.

No 9313.—*Improvement in Mill Stones.*

I am aware that holes or apertures in upper and under mill stones have been some time in use, and I do not claim simply the making of holes or apertures in mill-stones as my invention; but I do claim the making in under mill-stones of holes or apertures, covered with wire-gauze cloth, perforated metal plates, or any other substance that will allow part of the meal to pass through, after it is sufficiently ground, in combination with holes or apertures in upper mill-stones, containing sweepers, brushes, or rubbers, for the purpose of sweeping, rubbing, or brushing the meal over or through the wire gauze cloth, perforated metal plates, or other substances, without confining myself to the exact detail described in the above specification.

THOMAS BARNETT.

No. 9314.—*Improvement in Gang Ploughs.*

Having thus fully described the nature of my invention, I will now state what I claim as new, and desire to secure by letters patent. I claim the manner herein described of constructing the mould boards, D, D, D, D, D, D, and combining them with the blade, E, in the manner substantially as herein specified.

CHARLES BISHOP.

No. 9315.—*Improvement in Sugar Boiling Apparatus.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The arrangement and combination of the simmering vesssel, *c*, 1, with the ball cock and the scumming trough, *h*, substantially as described in the first part of the foregoing specification; and I claim this arrangement and combination, whether alone or in further combination

with a partial covering of the bottom of the simmering vessel, or the introduction of the steam-worm, as there described.

Second. The agitator, O, arranged and operating in the manner and for the purposes substantially as described in the second and fourth part of the foregoing specification.

WM. H. CLEMENT.

No. 9316.—*Improvement in Scumming Apparatus for Sugar Pans.*

I claim as my invention, and desire to secure by letters patent, the application in the manufacture of sugar of rotating paddles or leaves, for skimming or taking off the scum and gummous matters from the surface of the liquor.

WM. H. CLEMENT.

No. 9317.—*Improvement in Distilling Apparatus.*

What I claim as my invention, and desire to secure to myself by letters patent of the United States, is—

First. The combination and arrangement of the boilers, A and P, connected by the pipes, B and L, with the column, Z, which enables me to work continually and without interruption by distilling the contents of one boiler while the other boiler is being filled, and thus distilling the contents of one boiler immediately after the other, as seen in the description of the work in the former part of this specification.

Second. The combination and arrangement of the worm, V, situated between the two boilers, A and P, and of the pipes, U and X, which connect the boilers, A and P, with the worm, V, enabling me to test and ascertain the nature of the liquid contained in the boiler under operation, and to ascertain when the contents of that boiler are distilled.

CHS. DELESCLUZE.

No. 9318.—*Improvement in Illuminating Gas Apparatus.*

What I claim as my invention, and desire to secure by letters patent, is the return-pipe, D, in combination with the retort, substantially as set forth.

I claim, in combination with said pipe, the false bottom and lining as described.

I claim the arrangement of the decomposing chamber, 6, in combination with the return-pipe in the vertical retort.

I claim the employment of the series of decomposing trays, under the arrangement in the vertical retort, substantially as described, in combination with the central pipe.

I claim refrigerating the gas by air, substantially in the manner described.

ROBERT FOULIS.

No. 9319.—*Improvement in mode of making India Rubber Bat Cloth.*

What I claim as my invention, and desire to secure by letters patent, is passing the bat or fleece of cotton, flax, silk, or other fibrous substance,

together with dissolved or softened caoutchouc, gutta-percha, or other vulcanizable gum, or the compounds or preparations thereof, between calendering rollers, with an elastic substance interposed between the bat or fleece and one of the rollers, as described, or between the glazed apron and one of the rollers, substantially as described.

CHAS. GOODYEAR.

No. 9320.—*Improvement in Electro-Magnetic Engines.*

What I claim as my invention, and desire to secure by letters patent, is supporting the principal part of the weight of the armatures of the electro-magnets, mounted upon sliding guides, or their equivalents, upon the reciprocating frame, as described, by means of springs, or their equivalents, attached to said frame, so as to preserve the balance of weight in the moving parts, substantially as set forth.

JOHN S. GUSTIN.

No. 9321.—*Improvement in Safety Valves.*

What I claim as my invention, and which I wish to secure by letters patent, is the introduction of the cock in the connecting pipe, E, by which the resistance to the pressure is taken off, and at which the steam will be allowed to escape.

ALFRED GUTHRIE.

No. 9322.—*Improvement in Double-Seaming Machines.*

Having thus fully described the construction and operation of my improved machine, what I desire to secure by letters patent is the mandrel, with heads removable at pleasure, in combination with two or more pressure rollers operating with the same, and with a mallet acting simultaneously with said mandrel and pressure rollers.

I also claim the adjustable steadying rollers, (G,) or their equivalent, arranged with reference to the mandrel, and acting substantially in the manner and for the purpose herein set forth.

WALTER HAMILTON.

No. 9323.—*Improvement in Hominy Mills.*

Having thus fully described the nature of my improved machinery for making hominy and samp, what I claim therein as new, and desire to secure by letters patent, is the combination of the beating cylinder, arranged and constructed as set forth, with the adjustable discharging apertures, *(f, g,)* by means of which the hulls and eyes are separated from the grain, and the latter is retained within the range of the beaters for a shorter or longer period, according to the grade or size of hominy or samp which is desired.

JAMES HUGHES.

No. 9324.—*Improvement in Presses for bundling Flocculent and other substances.*

Having thus described my improved press, what I claim as new therein, and desire to secure by letters patent, is the combination of the pressing box, made with openings in its sides, with the platen and bed turning on swivels, and formed with channels, so arranged as to admit of the passage of the needle and cord through the pressing-box for the purpose of singly and doubly binding fleeces of wool or other substances while under pressure.

DANIEL KELLOGG.

No. 9325.—*Improvement in Gas Regulators.*

Having thus fully described my improved gas regulator, what I claim therein as new, and desire to secure by letters patent, is producing a uniform pressure of gas in the branch pipe which supplies the burners, by means of the inverted cup, C, the vibratory lever, *f*, and the induction valve, *d*, arranged and operating within the chamber, A, of the branch pipe, substantially as herein represented and described.

WALTER KIDDER.

No. 9326.—*Improvement in Gas Regulators.*

Having thus fully described my improved gas economizing regulator, what I claim therein as new, and desire to secure by letters patent, is producing a uniform pressure of gas in the branch pipe which supplies the burners—which may not be varied by the number of burners supplied, nor by the variations of pressure in the main—by means of the counterpoising double inverted cups, E, F, the vibratory lever, *g*, and the induction valve, *d*, so arranged with reference to the main and the branch pipe, that one of the said inverted cups will be acted upon by the gas in the main, and the other by the gas in the branch pipe, as herein represented and described.

WALTER KIDDER.

No. 9327.—*Improvement in Gas Regulators.*

Having thus fully described my improved gas economizer, what I claim therein as new, and desire to secure by letters patent, is the producing at all times a proper and uniform pressure of gas in the branch pipe which supplies the burners—which will not be essentially varied by the number of burners supplied, nor by the variations of pressure in the main—by means of the induction valve, *m*, the vibratory lever, *c*, and the counterpoising inverted cup, B, combined, arranged, and operating within the chamber, C, of the main, substantially as herein represented and described.

WALTER KIDDER.

No. 9328.—*Improvement in Harness Saddle Trees.*

Having thus described the nature of our improvements in harness saddle-trees, what we claim therein as new, and desire to secure by letters

patent, is the crupper loop, (*e*,) having a shank, (*f*,) which, being inserted through the cantle and into the pommel, is secured to the latter by the pad hook in the manner described.

THOMAS MARDOCK.
WM. C. KELLAR.

No. 9329.—*Improvement in the Apparatus for transporting Trains on inclined planes of Railroads.*

I do not claim as my invention dividing the axles of the car, and providing the inner ends of the two parts with independent journals, as this has before been done; neither do I claim the use of an auxiliary track running down into a pit. But what I claim as my invention, and desire to secure by letters patent, is making the axles of the safety-car in two parts, the inner end of each part being provided with an independent journal, constructed and operated as described, when this is combined with the auxiliary wheels, and auxiliary converging track and pit, substantially in the manner and for the purpose specified.

SAM'L McELFATRICK.

No. 9330.—*Improvement in Grinding Mills.*

What I claim as my invention, and desire to secure by letters patent, is the pointed projections, *b*, on the front edges of the teeth of the cylinder, E, when used in combination with the teeth, *c*, *c*, in the concave formed with concavities in their front edges, substantially in the manner and for the purpose herein set forth.

OLDIN NICHOLS.

No. 9331.—*Improvement in Expanding Window Sashes.*

What I claim as my invention, and desire to secure by letters patent, is the method of varying the pressure of the edges of the expanding sash against the jambs of the window frame, by means of the combination of the adjusting screws and springs with the set screws, or the equivalent thereof, for limiting the extent of the expansion of the sash, substantially as herein set forth.

MIGHILL NUTTING.

No. 9332.—*Improvement in Plough-Fastening Devices.*

I do not claim, exclusively of itself, hooking the land side to the mould-board. But what I do claim as new and useful, and desire to secure by letters patent, is holding the share, E, to its place by a tightening wedge, F, having a lip, *m*, for lap or bite on the share, in conjunction with the headed or lipped studs, *i*, *i*, for further securing the same.

JAMES ROBB.

No. 9333.—*Improvement in Seed Planters.*

I do not claim, exclusively of itself, giving to the drill-tooth the curvilinear movement specified, as such is old. But what I do claim as my invention, and desire to secure by letters patent, is—

First. Causing the point of the drill-tooth, when raised out of the ground, to slope backward, by the arrangement of the drag bar attachment, the friction pulley, and the curve of the upper part of the drill-tooth, to avoid breaking the tooth, as herein described.

Second. I claim the combined device of endless screw and curved rack and pinion, for producing the result herein specified.

JAMES ROBB.

No. 9334.—*Improvement in Burners for Spirit Gas Lamps.*

I do not claim the reservoir, burner-tube, or arrangement of the wick. What I claim as my invention, and desire to secure by letters patent, is the combination of the lower chamber or chambers, F and G, with the upper chamber, E, for the purpose specified, viz: the lower chamber or chambers answering the purpose of a heater to volatilize or turn into gas the fluid in the chamber, E, the flame being regulated as above described, and the whole arrangement being substantially as above set forth, without restricting myself by this claim to the precise form of the burner described.

RUFUS W. SARGENT.

No. 9335.—*Improvement in Packing Water-Wheels.*

Having thus described my improved water-wheel, what I claim as new therein, and desire to secure by letters patent, is the arrangement of the packing between the edges of the chamber or case and the wheels, in such manner that the packing on the lower portion of the chamber is adjustable from the interior, while the packing round the upper portion of the chamber is set up from the outside of the said chamber, substantially as specified, so that the whole of the packing is on the upper side, and none of it under the case, and all capable of being set up or adjusted without the necessity of getting under the case.

ERASMUS SMITH.

No. 9336.—*Improvement in Governors.*

Having thus described my invention and improvement in governors, what I claim as new, and desire to secure by letters patent, is the combination of the winding cords or chains, G, retarders or disks, J, hub, H, and spindle, E, arranged and operating in the manner and for the purpose substantially as herein set forth.

I also claim operating the governor-valve of steam and other engines by the twisting and untwisting of a flexible cord or chain, or equivalent thereto, attached to revolving retarders and to the driving pulley placed above the same, and detached from the spindle.

I likewise claim constructing the clasp, O, with shoulders upon each part, which fit against corresponding shoulders upon its opposite part, and prevent the opening of the clasp, when they are united by the screw, *t*, substantially as set forth.

JOHN TREMPER.

No. 9337.—*Improvement in Glass Buttons.*

What I claim as my invention is the inserting of figures of uniform or variegated colors upon the inside of glass centred buttons, substantially in the mode above described.

ARAD W. WELTON.

No. 9338.—*Improvement in Sewing Machines.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is, in combination with the needle bars, J, the spring-holders, K, and adjustable guides, *b*, through which said bars pass, for the purpose of regulating the length of the stitch, substantially as herein described.

I also claim, in combination with the apparatus for regulating the length of the stitch, the weight, or its equivalent, for drawing the cloth forward as it is alternately released from the needles, by which means the feed motion is regulated, and made dependent on the length of the stitch, substantially as described.

OTIS AVERY.

No. 9339.—*Improvement in Spreading Lime and Manure.*

What I claim as new and useful, and desire to secure by letters patent, is so constructing the pulverizing and fertilizing apparatus as to effect the several functions of pulverizing and distributing manures of various kinds at will, by so arranging the roller, D, that it can be raised or depressed in the discharging opening of the bottom of the hopper to any required level, so as to discharge a larger or smaller quantity of material previously brought to the desired degree of fineness in the hopper, and, at the same time, to act as a valve to close more or less tightly the bottom of the hopper; the same roller likewise serving as a distributor of seed in sowing broad-cast without any alteration of the machine, substantially as herein set forth.

LEWIS COOPER.

No. 9340.—*Improvement in Tools for cutting Pegs out of Boot Soles.*

Having thus fully described the nature of my invention, I will state what I claim as new, and desire to secure by letters patent. I claim the adjustable float, or cutter, C, D, E, connected to a shank, B, by means of the pin, or pivot, *b*, which turns loosely in the bearing, or standard, *a*, so as to permit the float to adjust itself to the proper positions to cut the pegs from the heel to the toe of the boot, in the manner herein set forth.

D. D. ALLEN.

No. 9341.—*Improvement in Grain Separators.*

What I claim as my invention, and desire to secure by letters patent, is the method herein described of regulating the blast of winnowing machines by means of a flap on the fan-case, arranged and adjusted substantially as herein set forth.

I also claim the reciprocating toothed bars, G, with the trough, A, whose bottom is divided into three portions, the lowermost being tight, and acting merely as a conveyor, the middle one acting both as a conveyor and screen to separate the wheat from the straw and allow it to pass into the winnower, and the upper or third portion acting as a conveyor for the straw, and a coarse screen to separate therefrom the heads of unthrashed grain that would not pass through the lower screen; the teeth of the reciprocating bars moving the straw regularly along the trough, and working or shaking the grain and heads so effectually through the screens that none is left to pass off with the straw when it is discharged from the upper end of the trough.

PETER GEISER.

No. 9342.—*Improvement in Printing Presses.*

What I claim as my invention, and which I desire to secure by letters patent, is the combination of a reciprocating type bed with an impression cylinder which has the half rotary (or reciprocating rotary) movement, and also a movement to and from the type bed, as herein set forth and described.

LUCIUS T. GUERNSEY.

No. 9343.—*Improvement in Seed Planters.*

Having thus described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the rail, *(h,)* with the rod, or rods, *(g,)* connecting it with the hopper, *(a,)* the said rods occupying traversing collars, *(i,)* with tightening screws, *(k,)* by means of which the relative distances of the axle and the feed-shaft are adjusted to suit different arrangements of gearing, according to the rate of feed desired.

EDSON HART.

No. 9344.—*Improvement in Apparatus for elevating and discharging Bilge Water, etc.*

I am aware that rocker pumps have been constructed to be operated by hand power, but in these no adequate provision has been made for receiving and retaining the water as it is raised up; besides, their action is limited to a continuous rapid propelling power; whilst by my arrangement any varying inclination of the vessel from a horizontal line, however slow, puts the apparatus in operation, and, as heretofore constructed, could not, without encumbering the hold of the vessel, be placed therein. I do not, therefore, lay claim to any such pumps; but what I do claim herein as new, and desire to secure by letters patent, is, in combination with a series or system of tanks and tubes, or their equivalents, the ventilating tubes, D, substantially as described, for the purpose of elevating and discharging water from the holds of vessels; the whole being operated or worked by the motion of the vessel, as set forth.

NEHEMIAH HODGE.

No. 9345.—*Improvement in Water Wheels.*

I claim the application of an adjustable lip sliding on the inner face of the buckets of a turbine-wheel, to regulate the openings between the outer edges of the buckets, and thereby the flow of water from the wheel, in manner and form substantially as set forth in the above specification, and thus adapting the lines of the turbine to the head of water and amount of work to be done, however varying.

IRA JAGGER.

No. 9346.—*Improvement in making Soda Ash and Carbonates of Soda.*

Having thus fully described my invention, and the means by which the same may be reduced to practice, what I claim therein as new, and desire to secure by letters patent, is—

First. The process of making soda ash by heating the mixture of sulphate of soda and carbonaceous matters, without the use of lime or any other foreign matters, as preparatory to converting the same into other products, substantially as described.

Second. The process of treating the aqueous solution of the above heated products by carbonic acid, then boiling to dryness, to form a monohydrated carbonate of soda, to be treated again in the dry state by carbonic acid, to form bicarbonate of soda, as set forth in the specification.

HENRY PEMBERTON.

No. 9347.—*Improvement in Bedsteads.*

What I claim as my invention, and desire to secure by letters patent, is the swinging foot-board to serve the purpose of a clasp for securing the bed clothes, it being held down by a ratchet and pawl, or otherwise.

D. W. SMEAD.

No. 9348.—*Sash Stopper and Fastener.*

What I claim as my invention, and desire to secure by letters patent, is the construction of a window or sash stopper, operated by a winding spiral spring; the whole arranged and combined substantially as herein.

JAMES D. SMITH.

No. 9349.—*Improved Life-Preserving Seat.*

I claim the said improved life-preserving seat as made of a combination of the seat, A, the head, or block, B, the air-tight vessel, D, and the connecting rods, or grasping bars, C, applied together, and used substantially in manner and for the purpose as specified.

G. W. TEWKSBURY.

No. 9350.—*Improved Burglar-Proof Plates for Doors, Safe-Walls, Vaults, etc.*

What I claim as new and of my invention, and desire to secure by letters patent, is a method of making burglar-proof plates, doors, and chests of iron, which, in the process of being cast into the form required for such plates, doors, and chests, surrounds or imbeds malleable iron rods, or bars, or their equivalents, arranged substantially as described and shown by the specification and drawings herewith accompanied, or in an equivalent manner.

I do not claim in said plates, doors, and chests the casting in of straight rods or bars of malleable iron, or their equivalents, imbedded parallel with each other in only one general direction.

LINUS YALE, Jr.

No. 9351.—*Improvement in the mode of forming Crucibles and other articles of Earthen Ware.*

What I claim, and desire to secure by letters patent, is the cutter, *k* and *l*, on the stock, *i*, in combination with the mould, *e*, to either or both of which a rotary motion is given, so as to remove the surplus material and shape the crucible, as described and shown.

JOHN AKRILL.

No. 9352.—*Improvement in Boot Crimps.*

I do not claim as my invention the form of the brake, or of the clamps: But what I do claim as my improvement on crimping machines, is arranging a spring lever, K, upon the back of the crimping lever, H, substantially in the manner and for the purpose herein set forth.

LUMAN BARRETT.

No. 9353.—*Improvement in Bit or Drill Stock.*

What I claim as my invention is the improvement of combining with the bell crank, A, and handle, B, of the bit stock the rotary bit holder or shaft, E, the shaft, K, the pulleys, M, L, and endless band, N, (or two gears, as stated,) and the pulleys, G, I, and band, H, or gears, all substantially as described, and for the purpose of accelerating the rotary motion of the drill beyond that of the bell crank when the instrument is used as stated.

DEXTER H. CHAMBERLAIN.

No. 9354.—*Improvement in Gilding Daguerreotypes.*

I claim and desire to secure letters patent for my mode of gilding daguerreotype plates, substantially as described—that is to say, by the employment of the electric current, and of hot solutions of the cyanides of gold, previously boiled; and I claim the kind of zinc circle, or tray, designated by the figure 6.

CHARLES L'HOMDIEU.

No. 9355.—*Improvement in a Machine for making Bags of Paper.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Giving the proper form to the piece of paper, or material from which the bag is to be made, by means of the shears, *e* and *f*, which cut

on the edges of, or on edges attached to, the stationary table or inclined plane, J, on which the paper is delivered, and cut out a rectangular piece, as shown in figures 6 and 8, from that part which is to form one side of the bag so as to leave a lapping piece on the part which is to form the other side of the bag, as herein substantially set forth.

Second. The pasters, 13 and 39, in combination substantially as described with the feeders, 15 and 60, which revolve or pass through the paste and supply them with a proper quantity for pasting each lap.

Third. The combination of the creasers, 22 and 44, and the lappers, 19 and 38, with the intermittingly moving feed-rollers, W, Z, and aprons, U, Y, in the manner substantially as described; the said creasers and lappers being brought successively into operation on the bags during the intermissions in the motion of the feed-rollers, as set forth.

FRANCIS WOLLE.

No. 9356.—*Improvement in Machinery for Combing Wool.*

Having thus set forth our invention, we would have it understood that what we claim is the combination, (viz: the plate, c^1, the endless belt, c, and the rotary spring bar or bars, b, b, or equivalent therefor,) operating as described, by which we draw the fibres from the gill combs and carry them forwards to the revolving brush; the whole constructed and made to operate substantially as specified.

And we also claim the peculiar manner in which the revolving brush that takes the wool from the nipping apparatus and conveys it to and lays it upon a circular band or belt of upright teeth, a, is constructed and operated, the same consisting in making the said brush in sections, (g^4, g^4, g^4,) and combining therewith mechanism by which not only a range of these sections can be thrown into a straight line with each other, but another and opposite range can be thrown into a curved or bent line, as herein-before described; the said mechanism for effecting the movements of the sections of the ranges being as herein before explained, and as represented in figure 4 of the drawings.

S. C. LISTER.
G. E. DONISTHORPE.

No. 9357.—*Improvement in Watch Keys.*

I claim the key, e, retained in a countersink in the black plate, c, of the watch by a spring or similar means, as herein set forth.

CHAS. E. JACOT.

No. 9358.—*Improvement in Hot-Air Furnaces.*

What I claim as my invention is as follows:

I claim the improved mode of making and supporting the grate, viz: by the combination of a single journal, a socket piece, and a crank-key shaft, as applied to the furnace and grate, and made to operate substantially as specified.

I also claim the peculiar combination and arrangement of the horizontal flues, P, R, the vertical flues, Q, Q, Q, and the flue space, K, surrounding the chamber of combustion; the whole being essentially as above specified.

AUGUSTUS M. RICE.

No. 9359.—*Improvement in Cooking Stoves.*

What I claim as new, and desire to secure by letters patent, is giving the arched fire plate, 6, 6, great elevation above the level of the oven top on which its upper edge rests, and giving great capacity thereby to the air-chamber formed by the arched fire-plate and the oven plates; the under side of the arched fire-plate being furnished with ribs, 7, 7, which divide this air-chamber into flues transverse the stove, so that the full force of the fire draught is thrown upon the boiler openings and from the top plate of the oven, thereby protecting it from a surcharge of heat, and so that, in concert with the flues around the ovens as described, the air must pass from the openings in the side-plates to the centre, and thence back to the sides of the stove to the flues leading to the front of the stove, for the purpose of being thrown, very thoroughly heated, and in great quantity, around the front oven, and, when the damper is opened, around both ovens; it being distinctly understood that I do not claim a fire-plate, in itself, nor ribs for guiding air along a fire plate, in themselves, but only my mode of pitching the arch of the fire plate, and arranging the air-chamber in combination with the flues and damper, as described, so as to produce the afore-mentioned effect.

HOSEA H. HUNTLEY.

No. 9360.—*Improvement in Hot-Air Furnaces.*

What I claim as my invention, and desire to have secured to me by letters patent, is a spiral radiator, constructed substantially as above described, whether the pipe be of a round, square, or oval form in section, or the coils be round, square, or other shape.

APOLLOS RICHMOND.

No. 9361.—*Improvement in Locks.*

I do not claim the tumbler, A, or the lever, B; for they are employed in many locks, and have been long known. But what I claim as my invention, and desire to secure by letters patent, is the employment or use of a guard, F, constructed, arranged, and operating in the manner substantially as herein described, whereby the lock is prevented from being picked by obtaining a pressure upon the bolt, as set forth.

F. C. GOFFIN.

No. 9362.—*Improvement in Constructing Ploughs.*

What I claim as the invention of the aforesaid Wm. L. Hunter and myself, in the construction of the above described plough, is bolting the standard mould board, landside, and share, to the block, F, or its equivalent, instead of bolting or fastening the parts to each other, as has been practised heretofore; which block, F, may be connected to the beam by a bolt, K, or otherwise, substantially as described and represented.

ALBERT GARDNER.

No. 9363.—*Improvement in Pile Wires and Pincers for Weaving Pile Fabrics.*

Having pointed out the nature of my invention and its mode of operation, I would remark, that I do not wish to confine myself to the precise form of the parts represented; nor do I claim as new constructing pile-wires with heads or eyes, for this is the usual mode of constructing them for hand looms. But what I do claim, and desire to secure by letters patent, is making one part of the pile-wires which is to be grasped by the pincers, wedged form, or oval shaped, in combination with grooves in the jaws of the pincers to conform thereto, substantially in the manner and for the purpose specified.

E. B. BIGELOW.

No. 9364.—*Improvement in Edge Planes for Shoemakers.*

What I claim as my invention, and desire to secure by letters patent, is securing the plane iron or knife in a sliding tongue, passing through a mortise in the body or handle of the plane, substantially as herein set forth, whereby, with great simplicity of construction, I obtain the facility of adjusting the instrument to the thickness of the sole of the boot or shoe, and of employing the draw cut.

NICHOLAS BUCHER.

No. 9365.—*Improvement in Sewing Machines.*

What I claim as my invention or improvement is as follows: I do not herein intend to claim in the mechanism for feeding the cloth, "a notched bar, which has a vertical or up and-down motion, for fastening the cloth upon, and relieving it from, the notches of said bar, by striking it against a yielding plate, and a lateral motion, or motion forwards and back;" but what I do claim as an improvement thereon, is the employment of one or more burr wheels, *g*, applied to the carriage K, and kept continually against the cloth by a spring, (so as to preserve the cloth from falling away from the spring plate or presser over it,) in combination with a spring brake, *k*, operated as described; the whole being combined and made to operate together substantially as specified.

And in combination with the presser, G, and the lower needle, I claim a mechanism by which an increase of thickness of the cloth is made to move the lower needle to the left, the distance required to bring it into correct position with respect to the upper needle, so as to prevent the said upper needle from passing into the cloth before passing into the bow of the thread of the lower needle, as set forth.

And I claim the combination of the slide rod, m^2, the box, n^1, screw, S, slotted arm, *v*, shaft, *w*, arm, *x*, connecting rod, f^1, slide, a^1, stationary plate, b^1, and cam plate, c^1, as applied to the fulcrum pin, W, of the lever, V, and to the presser, for the purpose of moving the lever with respect or nearer to the cam, U, for the purpose and in the manner herein described.

CHRISTOPHER HODGKINS.

No. 9366.—*Improvement in Vibrating Propellers.*

What I claim as my invention, and desire to secure by letters patent, is the combination in a field or row of a multiplicity of inclined planes or sculls, secured by gudgeons on one of the sides thereof in a frame vibrating horizontally, and the graduation of their propelling velocities by a similar multiplicity of check pins or stops, so adapted to the respective planes or sculls that, in vibrating the same, they may propel as nearly as possible in equal times, and thereby reduce the propelling principle of the tail of a fish, as nearly as may be, to mechanical purposes, substantially as above described, for the propelling of all kinds or classes of vessels or boats by the power of steam or other power, and with or without sails, as occasion may require.

FRANKLIN KELLSEY.

No. 9367.—*Improvement in Gas metres.*

What I claim as my invention, and desire to secure by letters patent, is the chamber, B, and syphon, M, in combination, in the manner substantially as described, with the pipes, I, J, or other pipe or pipes having an opening or openings similar to J, at the required level of the liquid in the metre, for the purpose of preserving the level, and discharging the surplus liquid from the metre.

JOHN LAIDLAW.

No. 9368.—*Improvement in Saw-gummers.*

Having thus fully described my improved apparatus for gumming saws, what I claim therein as new, and for which I desire to secure letters patent, is the combination of the frame, *a*, *b*, shoe, *g*, and set screws, *h*, in the manner and for the purposes set forth.

J. D. OTSTOT.

No. 9369.—*Improved manufacture of Wire Ferrules.*

What I claim as my invention, and desire to secure by letters patent, is the manufacture of ferrules from iron wire by cutting them from a helical coil in such a manner that both ends of each ferrule will be perfectly smooth, true, and square across, at right angles to the length, so that no other finishing of the ends will be needed to render them fit for use, and so that, when soldered, they will be the most convenient and durable ferrules which can be made, when manufactured in the manner substantially as described.

WM. T. RICHARDS.

No. 9370.—*Improvement in Seed Planters.*

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is the two hollow disks combining a hopper, plough, and carrying wheel, substantially as described, in combination with the segment plates, *g* and *h*, or their equivalents, by

which the discharge of seed is regulated, operating substantially as in the manner and for the purpose herein fully set forth.

CHAS. RANDALL.

No. 9371.—*Improvement in Cooking Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the guard plate for carrying the products of combustion under the oven, that part thereof may pass around and over it to the front, and the rest continue to and up the back flue, substantially as specified, in combination with the recess in the rear of the fire chamber, for extending a portion of the fire near to the oven, and the deflection plate for dividing the draught, and carrying it towards each end of the oven, substantially as and for the purpose specified.

MANLY C. SADLER.

No. 9372.—*Improvement in Seed Planters.*

In combination with the regular and positive discharge of seed by means of the ordinary seed distributor of seed drills, I claim the supplemental or occasional discharge of seed by a supplemental seed distributor, put in and out of action at the discretion of the operator of the machine, substantially as herein set forth.

FRANCIS TOWNSEND.

No. 9373.—*Improvement in Seed Planters.*

What I claim is the combination of the perforated register plate, *e*, the adjusting screw, *f*, and the springs, g, g^1, arranged and operating as described.

C. S. TREVITT.

No. 9374.—*Improvement in Seed Planters.*

Having thus described my improvement in the distributing apparatus of seed planters, it will be understood that I do not mean to claim the use of a reciprocating gauge plate, having oblique feed openings therein, operating in combination with openings of different obliquity in the grating plates and bottom of the hopper, for increasing or diminishing the feed of the seed to be sown, while the machine is in motion, by increasing or diminishing the traverse or sliding movement of the gauge plate. But what I do claim as my invention, and desire to secure by letters patent, is the employment of the pivoted oscillating plate, M, when made with oblique openings, N, on opposite sides of its centre, reaching to, and forming outlets at the circumference of said plate, in combination with segmental or other similar openings, L, above the oblique openings, and a central annular opening, P, in the ring plate, O, whereby, during the oscillation of the pivoted plate, M, the seed is not only discharged from the outlets of the oblique openings over the circumference of the ring plate, but also through the central annular opening, P, of the ring plate from the centreward ends of the oblique openings.

H. VERMILLION.

No. 9375.—*Improvement in Ventilators.*

I do not claim a ventilator made of a series of flat plates arranged in a circle, with openings between them; nor do I claim one made of a series of plates arranged in a circle, or around an axis, and with openings between them, and each made to stand tangential or curved (transversely) to the arc of a circle or curved line of the set of plates; but what I do claim as my invention is a ventilator constructed of a single series of curved or angular plates, *a*, *b*, *c*, &c., and openings, *i*, *i*, *i*, &c., and capped, connected with a tube or flue, and having each plate curved or made angular, convexly, or concavely, out of the general line of their arrangement around a common axis, as represented in the drawings.

DAVID WELLS.

No. 9376.—*Improved method of securing Vault and Safe Doors, &c.*

I do not claim the employment or use of a detached flanch or single lock bolt, operating similar to the flanches herein described, for that has been previously used; but, having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is securing or fastening the doors of safes, bank vaults, &c., by means of movable flanches, D, E, J, arranged and attached as herein shown and described, by which means a continuous bolt is formed all around between the door and its mouth piece, preventing the admission of air into the safe, which is thereby rendered secure against fire, and the door against force.

F. C. GOFFIN.

No. 9377.—*Improvement in mode of counterbalancing Harness in Looms.*

I do not claim the mere upright position of the jacks, or the mere counterbalancing of the harness; but what I do claim, and desire to secure by letters patent, is the construction of the long double heddles or jacks, D, D, in such a manner, and so hanging them on the axle, E, by a short arm, or its equivalent, that, in their vibrations, neither end of them shall pass beyond a vertical plane passing through the axle on which they rock or oscillate, so that the weight of the jacks shall be thrown outside of their points of suspension, thus counterbalancing the weight of the harness.

JAMES GREENHALGH.

No. 9378.—*Improvement in Self-acting Mules.*

Having thus fully described my invention, I will proceed to state what I claim and desire to secure by letters patent, without confining myself to the precise construction and arrangement of the parts, or to the precise manner of operating them:

First. I claim backing off or reversing the spindles to unwind the yarn from them, and regulating or altering the amount of backing off as the building of the cops progresses, by means of a step or incline of varying form, extending along a revolving cam, substantially such as is exemplified in the part from 25 to 5, on the cam, B; the said step or incline governing the revolution of the spindles.

Second. I claim the mechanism for making the finger, d, through which the irregular surface of the cam, B, or its equivalent, acts upon the mechanism which drives the spindles in backing off and building on, traverse the said cam or equivalent, and keep it to the surface, consisting of the screws, e and k, the nut, j, cord or chain, f, lever, G, and stud, h, operating in combination, in the manner substantially as described.

WANTON ROUSE.

No. 9379.—*Improvement in machine for Drilling Stone.*

I claim the arrangement, (in a swinging or other frame,) for the purpose of drilling rocks, of two cross heads, the one with a reciprocating motion, and the other connected therewith, and bearing the drill, with a reciprocating and progressively advancing motion, substantially as described, and this however such alternate advance and recession may be effected.

I also claim the arrangement of, substantially, a sliding bar, for the purpose of changing both the rate of rotation and the rate of advance of the drill by one movement, for the purpose and in the manner substantially as described.

I do not claim the ratchet wheel and pawl-holder, operated by the inclined groove, by itself; but I claim the making the ratchet-cylinder, or equivalent rotating arrangement, slide upon the mandrel or drill-stock, as the same advances, in such manner that the pawl holder projection retains its place in the inclined groove, substantially as herein described.

LEM. P. JENKS.

No. 9380.—*Improvement in Sewing Machines.*

I claim as my improvement the *two* rotating draft-hooks, (or their equivalents,) separate from the needles, in combination with the *two* needles and two thread-guides, made to operate together, substantially as specified.

And I claim the improvement of so constructing and operating the needles and thread-guides, that each needle, directly after passing into and through the cloth, shall pass through the thread-guide, which is on that side of the cloth opposite to the side of it in which the needle first enters, meaning to claim the arrangement of each needle and its thread-guide respectively on opposite sides of the cloth, they being constructed and operated in the manner specified. In F. R. Robinson's machine, they are arranged and made to operate on the same side of the cloth.

And I also claim the combination of the rocking thread-lifter, or its equivalent, with the needle and presser; the said thread-lifter being operated, as described, by the thread-guide lever, or any other proper means.

JOHN G. BRADEEN.

No. 9381.—*Improvement in Hand Seed Planters.*

What I claim herein as new and of my invention, and desire to secure by letters patent, is—

First. A *seed planter*, having a tube or tubes, b^1, which, in operating the planter, is or are closed when placed in the ground, and so arranged that it or they can be opened while in the ground, for the purpose of letting the seeds out.

Second. The arrangement of two or more tubes, b^1 and b, in such a manner that the operator can place the seeds in a hill at specified distances apart.

Third. The feeders, k, having a sloping cavity at the outer ends, and being so arranged that, as the seeds are carried up, they will slide out and pass into the tubes.

And, fourth. The arrangement of the feeders, k, and jaws, e and d, or valves of the tubes, b^1, in connexion with the handle by which the machine is carried, so that the feeders and jaws, or valves, can be operated by the same hand with which the machine is carried.

WM. BULLOCK.

No. 9382.—*Improvement in Oil Presses.*

What I claim therefore as my invention is the arrangement of the screw within the body or interior of the box in combination with so applying it to one head of the box and to the platen, that by its revolution in one direction the platen will be drawn towards the said end of the box, all substantially in manner and for the purpose as above specified, not meaning to claim the combination of a screw, platen, and box, but intending to limit my claim as above described.

WM. P. CHADWICK.

No. 9383.—*Improvement in Printing Presses.*

What I claim as my invention, and desire to secure by letters patent, is the combination, substantially as described, of the fingers or grippers, f, f, f^1, f^1, for seizing the sheets and holding them to the cylinder, and the fingers, e, e, e^1, e^1, for throwing the sheets off from the cylinder, said fingers or grippers being attached to shafts arranged longitudinally to the cylinder and attached thereto, and being turned to give the necessary movements to the fingers by the revolution or vibration of the cylinder, through the agency of cranks and rods, or their equivalents.

JOEL DENSMORE.

No. 9384.—*Improvement in Marine Signals.*

Having thus fully described the nature and operation of my invention, I will state what I claim as new, and desire to secure by letters patent: I claim placing the lamp on a movable pedestal, E, or its equivalent, inside the many-sided signal box, B, and raising and lowering the same from one colored glass to another by means of the cord, H, H^1, and pulley, G, or their equivalents, the whole being constructed, arranged, and operating in connexion with a signal, B, C, in the manner and for the purposes substantially as herein described.

THOMAS H. DODGE.

No. 9385.—*Improvement in Turning Jaw Vises.*

I am aware that the revolving jaw of a vise has been set, and then secured to any desired angle with the fixed jaw, and I do not claim the

so doing. But what I do claim as my invention, and desire to secure by letters patent, is constructing the jaw, H, of a revolving vise with a flange or projection, J^1, provided on the edge thereof with a female screw, in which mesh the screw, L, or other equivalent, operating on said jaw in the manner and for the purposes set forth and shown, by which I am enabled to both set and secure the revolving jaw at the same time.

ABIJAH HULBERT.

No. 9386.—*Improvement in Saddles.*

Having thus described the nature of my improvements, what I claim therein as new, and desire to secure by letters patent, is the construction of a saddle, with seat attached to the pommel and cantle by lips, as described, or in any equivalent manner, so as to be easily removable for the inspection, and if need be alteration, of any part of the saddle.

THOMAS MARDOCK.

No. 9387.—*Improvement in mode of Throwing Shuttles in Looms.*

Having thus fully described the construction and operation of my "Columbia Bagging Loom," what I claim, and desire to secure by letters patent, is the combination and arrangement of the spring-triggers, *f*, *f*, cords, *h*, *h*, and treadles, 1, 2, 3, &c., so that the depression of any one of these treadles shall release the triggers on the forward movement of the lay, and allow the picker-staff to actuate the shuttle, substantially as set forth.

S. C. MENDENHALL.

No. 9388.—*Improvement in Hand Looms.*

Having thus fully described our invention, what we do claim, and desire to secure by letters patent, is the combination of nerve, K, operated by lay inclined plane, O, and its guides, M, M^1, and adjustable pin, W, or their equivalents, combined and operating as described, so that we can operate and vary the number of heddles substantially as and for the purpose set forth. We are aware that the picker-staff has been operated by hooks alternately raised from the shoulders on the picker-staff by pins on a vibrating slide operated by grooves in the treadle cam; this we do not claim. But we do claim the combination of the inclined plane, Q, on picker-staff, spring, T, and hooks, R, R, for the purpose of lifting the hooks in the manner and for the purpose specified.

STEPHEN C. MENDENHALL.
OBED KING.
EZRA KING.

No. 9389.—*Improvements in Steering Submarine Vessels.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the shaft of the propeller so as to pass through, and be guided by, the tiller, or the equivalent thereof, mounted on a universal joint, in order that the propeller may be driven by one hand, while the vessel is steered in any direction by the other, substantially as herein set forth.

I likewise claim the combination of a universal rudder with a series of keels arranged on the top, bottom, and sides of the vessel, to aid in steadying her, and to facilitate the steering of her in various directions, by means of a universal rudder, substantially as herein set forth.

L. D. PHILLIPS.

No. 9390.—*Improvements in Horse-Shoe Machinery.*

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure letters patent, is the arrangement of shifting dies and adjustable levers and cams substantially in the manner and for the purpose set forth.

SOLOMON SHETTER.

No. 9391.—*Improvement in Twisting Tubes in the formation of Roving.*

Having thus fully described my invention and its adaptation, what I claim as new, and desire to secure by letters patent, is—

First. The construction and use of tubes for giving countertwist to roving, by having a slot in the side in such a manner that the roving can be laid into the tube without the use of a hook, as described.

Second. The construction, arrangement, and use of tubes, for giving countertwist to roving, in such a manner that, without disengaging the driving apparatus, the tube can be so turned on its support, that a hook can be passed between the bosses of the rolls through the revolving tube, to draw the roving into the tube without stopping the parts, as described.

Third. The construction and use of tubes for giving countertwist to roving by making them in two parts, into one of which the roving can be adjusted, and then dropped into the other, giving it the necessary rotary motion to form the twist.

HARVEY SILVER.

No. 9392.—*Improvements in Machinery for Crimping Metal Bars.*

We do not claim the flexible die, E, nor the combination of the permanent die, D, and flexible die, E, as they have been previously used. But what we do claim as our invention, and desire to secure by letters patent, is the peculiar manner of operating said dies as herein shown and described, viz: by means of the pressure rollers, G, G, and B, B^1; the lower rollers B, B^1, being fixed permanently in the frame, and the upper rollers, G, G, arranged so as to yield to the die when necessary; the movable bed, C, being attached by cord or chain, to the roller B^1, by turning which the bed, C, is drawn between the upper rollers, G, G, and the lower rollers, B, B^1; the upper rollers forcing or compressing the flexible die, E, upon the permanent die, D, and bending or crimping the bar, as set forth.

GILES SLOCUM.
M. T. SAYLES.

No. 9393.—*Improvement in Cooking Range.*

What I claim as my invention is my improved combination of a heat radiating chamber applied to the rear end, and two draught flues applied to each of the four faces at top, bottom, and two sides of an elevated oven of a cooking range—that is to say, I claim the combination of the heat radiating chamber, *q*, (against the end of the oven,) two draught flues, A^1, D^1, (against the bottom of the oven,) two flues, B^1, C^1, (against one side of the oven,) two draught flues, E^1, F^1, (against the other side of the oven,) and two draught flues, G^1, H^1, (against the top of the oven,) all connected and made to operate together substantially as specified. My said combination of flues, as they are above arranged, causing the smoke and other volatile products of combustion to pass from the back of the flue space under the boiling chamber into a flue leading under the rear part of the oven, and *transversely* across, or from side to side of the oven; thence up a flue leading against the side of the oven; thence down a flue leading against such side of the oven; thence into a reservoir flue leading *transversely* across, and under, and against the bottom of the oven; thence upwards into and through a flue leading horizontally and along the other side of the oven, and from front to rear of it; thence into and through a flue leading horizontally against such second or other side of the oven; thence into a flue leading across the top of the oven, and from side to side of it; thence into and through another flue leading over and against the said top, and in an opposite direction to that last mentioned; and thence into the chimney, or discharge flue.

GEO. S. G. SPENCE.

No. 9394.—*Improvement in Brick Machines.*

What we claim as our invention, and desire to secure by letters patent, is the roller, (P,) in combination with a reciprocating series of moulds, for the purpose of gauging the quantity of clay to be compressed into the said moulds; the several parts being arranged and operating as herein described.

We also claim the method herein described of finishing the surface of dry clay bricks in moulds, by first shaving off the surplus material, and then smoothing the shaved surface by rubbing it under heavy pressure, *while confined in the mould,* to prevent it from breaking under the operation, as it would do if not so confined.

H. H. STAWBRIDGE.
DANIEL TYSON.

No. 9395.—*Improvement in Automatic Fans.*

What I claim, and desire to secure by letters patent, is not mounting a fan upon a rocking chair and operating it from the motion of the chair, as that has been done before; but what I claim as my invention, and desire to secure by letters patent, is the mode of operating the fan by means of the rod, G, impinging upon the floor, and made to react by means of a spring, substantially as herein set forth.

SETH E. WINSLOW.

No. 9396.—*Improvement in Gas Burners.*

Having thus described my improvements in gas burners, what I claim as my invention, and desire to have secured to me by letters patent, is the use in a gas-burner of a distributer, constructed substantially as above described, for the purpose of producing a steady jet of flame, and for preventing the blowing and waste of gas in the burner.

A. H. WOOD.

No. 9397.—*Improvement in Reciprocating Die Spike Machinery.*

I do not claim a series of two or more griping or holding dies, made to rotate around one common axis or shaft; nor do I claim reciprocating dies, each provided with its own griping die. But what I do claim as my invention, is the combining the two reciprocating bed dies, G, H, (affixed to a carriage having a horizontal movement, as stated,) with the griping lever, D, as the upper die for both, so as to operate therewith, substantially in the manner as above described.

MOODY BELKNAP.

No. 9398.—*Improvement in Expanding Bits.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is so forming and combining the movable and stationary parts of an expansion bit for boring different sized holes, that a cutting edge shall at all times be preserved entirely across the bit, and, at the same time, the cutting point on the movable part thereof shall always be parallel with the shank of the bit, or the line of the hole, substantially as herein described.

I also claim the rising and falling of the movable part of the bit, as it is contracted or expanded, by means of the inclined slots and set screws, or their equivalents, so that the lip on the movable part shall become the cutter when boring the largest size holes, (the other lip being at rest,) and the lip on the stationary part shall become the cutter when boring the smallest size holes, the other lip being at rest, by which means I am able to form the lips of the proper shape for different sized holes without changing the cutters, substantially as described.

CHAS. L. BARNES.

No. 9399.—*Improvement in Seed Planters.*

Having thus described our improvements in seeding machines, what we claim as our invention, and desire to secure by letters patent, is the employment of the sigmoid or other similarly curved or angular receiving and discharging openings, *g*, *h*, *i*, in combination with the reciprocating slide, S, and feeding stubs, U, for the purpose specified, the said reciprocating slide, S, having angular points, Y, projecting into the aforesaid sigmoid openings, for effecting the discharge of the seed from the outlets from which the stubs, U, are receding, while the latter are feeding the seed toward the opposite extremities or outlets of the openings, during

each movement of the slide, S, by means of the inclined sides of said points, Y, and the movement of the slide.

L. H. DAVIS.
SAMUEL PENNOCK.
MORTON PENNOCK.

No. 9400.—*Improvement in Flax Pullers.*

What I claim as my invention, and desire to secure by letters patent, for the purpose of pulling and gathering flax, is the employment of one or more pairs of rollers, substantially as described, in combination with the fingers or separators, or their equivalents, for presenting the stalks to the bite of the rollers to be drawn in, substantially as described.

I also claim, in combination with the rollers for drawing in the flax, as specified, the employment of the revolving arm or arms, for collecting and drawing the stalks to the bite of the rollers, as described; and finally I claim, in combination with the rollers for drawing in the stalks, as described, the employment of the fulcrum bar, substantially as described.

LEWIS S. CHICHESTER.

No. 9401.—*Improvement in Carpet Looms.*

Having thus described my improved loom, for weaving carpets and other fabrics by power, what I claim therein as new, and desire to secure by letters patent, is—

First. Actuating a positive let-off for the delivery of yarn, a positive take-up of the woven cloth, and a variable winding upon a beam of the cloth delivered from the take-up rollers, by the combination of the crank-pin, or cam, *z*, on the disk, *f*, or the equivalent thereof, with the alternating bar, *g*, and its appendages, substantially as herein set forth.

Second. The method herein described of working the trap boards, with suitable intervals of rest and motion, by means of the crank-cam, (A, *g*,) the rock shaft, (c^1,) and its arms, the lifting-rods, (*b*,) the cam, (P,) and lever, (P^1,) and the other devices, acting in connexion with these, for raising, and lowering, and oscillating the lifting-rods; the whole operating substantially as herein described.

Third. I claim the temples, constructed, arranged, and operated substantially as herein described, so that they will be open during the time the take-up rollers are acting, and closed at the time the lay beats up.

JOHN A. VAN RIPER.

No. 9402.—*Improved Machine for making Thimbles for Rigging, etc.*

Having thus described my improved machine for forming thimbles, etc., what I claim therein as new, and desire to secure by letters patent, is arranging the two halves of the forming groove upon the adjacent ends of two independent revolving mandrels, or shafts, which are free to slide towards and from each other, so as to hold the two halves of the groove in contact while the article is being shaped, and to separate the two halves of the groove to allow the finished article to drop out.

I also claim the combination of the divided shaping groove with a reciprocating former, operating in connexion therewith, substantially as herein set forth.

WILLIAM FIELD.

No. 9403.—*Improvement in Cotton Seed Planters.*

Having thus described my machine for planting cotton seed, what I claim as my invention, and desire to secure by letters patent, is, in combination with a rotating cylinder, or box, *f*, having apertures, *g*, in its perimeter, the projecting edges, or wings, *h*, *h*, radial ribs, or plates, *i*, and projecting fingers, or prongs, *k*, arranged around the axle, *j*; the whole operating to separate or disentangle the seeds to be sown immediately previous to the disposition thereof in the furrow, as set forth.

WM. A. GATES.

No. 9404.—*Improved Sash Stopper and Fastener.*

What I claim as my invention, and desire to secure by letters patent, is as follows:

First. The combination of the rocking plate (E) with the angular lever, (*f*, f^1,) the swinging lever, (*c*, *m*,) and the spiral spring, (F,) constructed and arranged, and operating in the manner and for the purposes herein specified.

Second. The rocking plate, E, combined with either a simple or compound lever, in the manner and for the purpose herein specified.

J. B. S. HADAWAY.

No. 9405.—*Improved Blind and Shutter Operator.*

What I claim as my invention, and desire to secure by letters patent, is the tubular shanked box hinge, with roller contained therein, as arranged with respect to the roller within the building, when the rollers are connected by a chain, and the whole is constructed as herein described, constituting a convenient blind or shutter operator.

R. V. JONES.

No. 9406.—*Improvement in Tanning.*

Having thus described the manner in which my chemical compound for tanning is compounded and used, what I claim as my invention, and desire to secure by letters patent, is the use of borax, in combination with nitre, alum, and terra japonica, in solutions of tannin, substantially as and for the purposes herein set forth.

The property of the borax I have found of essential use in raising the hides in the tanning process, and preparing it without injury for speedy and safe tanning.

DAVID KENNEDY.

No. 9407.—*Improvement in Bottle Stopper.*

Having thus fully described the manner of constructing our self-acting bottle and can stopper, we will proceed to state what we claim as our

improvement, and desire to secure by letters patent. We claim the combination of the ball stopper, f, together with the rod, E, attached to it, and the guides, c, c, in the manner and for the purpose substantially as herein set forth.

EDWARD KINSEY.
D. KINSEY.

No. 9108.—*Improvement in Cylinder Printing Press.*

Having thus fully described the construction and operation of my improved press, what I claim as my invention, and desire to secure by letters patent, is—

First. Such a combination and arrangement of a horizontal bed and cylinder of a printing press as will enable each forward movement of the bed to impart a revolution to the cylinder, for the purpose of taking or giving an impression, and permit it to remain stationary during the reverse movement of the bed, substantially as herein described.

Second. I claim, in combination with a horizontal cylinder moving in one direction, with alternate rest and motion, the inking and flying apparatus, substantially as described.

JOEL G. NORTHRUP.

No. 9409.—*Improvement in Perspective Drawing Apparatus.*

Having thus fully described my invention, I would state that I am aware that natural and other objects have been traced through and upon the surface of glass or other transparent medium, and I do not claim it, neither do I claim any of the parts of my apparatus taken separately; but what I do claim, and desire to secure by letters patent, is delineating natural and other objects in a diminished or increased size, with a lens, when used with the apparatus and in the manner described.

Prof. ADOLPH RICHTER.

No. 9410.—*Improvement in Printing Presses.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is so hanging or balancing the bed which holds the form, and moves up and down for each impression, upon springs, that its own weight shall compress the springs to a great extent, and the entire compression of them be completed by drawing the bed farther down whilst in motion, and that the elasticity of the springs when the bed is to rise will raise it up to the extent of their power, and the upward motion be completed by a separate arrangement, whilst in motion, for the purpose of relieving the machine from overcoming the inertia in moving the bed from a state of rest; the power to complete its motion being applied near the termination of its movement, substantially as described.

I also claim the arranging of the frisket and the inking rollers in separate carriages, moving on the same ways with such relative velocities as not to interfere with each other, and so that the frisket may carry off and bring back the sheet quickly, whilst the inking rollers may travel more slowly, and do more perfect work, substantially as described.

I also claim the pointing of the sheet, whilst being prepared for receiving the first impression, by an automatic movement attached to some moving portion of the press, and so that the operator may use both his hands in guiding and controlling the sheet.

I also claim the application of a blast of air, or its equivalent, for the purpose of forcing the sheets upon the registering points when the paper is being prepared for the reverse impression, so that the operator may use both his hands in guiding and controlling the sheet.

I also claim the removing of the sheet from the frisket, or from the press, by means of atmospheric pressure, applied in the manner herein described, or its equivalent, for the purpose of turning over the sheet in its delivery, substantially as described.

I also claim making the registering points adjustable in the paper table by passing it through a friction plate secured between two plates, and so that it may be moved in any direction by a slight tap, for the purpose of allowing for the unequal shrinking or drying of the paper, or of any movement of the form after the first impression is taken, substantially as herein described.

I also claim the combination of the open toggle and adjustable eccentric shaft, or pin, which operate the bed, for the purpose of regulating the impression by increasing or diminishing the distance between the bed and platen, substantially as described.

STEPHEN P. RUGGLES.

No. 9411.—*Improvement in Bracing and Supporting Card Teeth.*

Having described my improvement, I will state what I claim as my invention, and desire to secure by letters patent. What I claim, therefore, is the application of the material herein described to the front side of the leather fillet holding the card teeth, for the purpose of bracing and supporting said teeth.

CORNELIUS SPEER.

No. 9412.—*Improvements in Serving Mallets.*

What I claim as new in my invention, or improvement, and desire to secure by letters patent, is—

First. I claim the attachment and use of the clasp or hook to the hollow or concave part of saddle, A, of a serving mallet, for the useful purpose of holding it to the rope, while the operator brings the end of the marline from the spool over the pulley in the handle and upper edge of the saddle to the rope, where it is made fast without being wound round both saddle and rope, as is done in using other mallets; the whole being constructed and arranged substantially in the manner and for the purposes described.

Second. I claim the attaching to a serving mallet one or more sets of thumb screws, or any analogous device, for the purpose of pressing upon the spool, for the useful purpose of enabling the operator to serve the rope with any degree of tightness the yarn will bear without winding it round both saddle, rope, and handle, as is done in using other mallets; the

said screws being attached and operating substantially in the manner and for the purposes described.

DANIEL H. SOUTHWORTH.

No. 9413.—*Improvement in Railroad Car Seats.*

What I claim as my invention, and desire to secure by letters patent, is the employment of the double jointed slides, G, and jointed rods, H, with the jointed arms, E, jointed seat and back, A, B, pillars, D, and supports, K, arranged and operating substantially in the manner and for the purposes herein fully set forth.

DANIEL H. WISWELL.

No. 9414.—*Improvement in Cordage Machinery.*

What we claim as our invention, and desire to secure by letters patent, is regulating the speed of the receiving reel by the tension of the rope, substantially as herein described.

HEZEKIAH T. JENNINGS.
CHARLES S. COLLIER.
THOMAS P. HOW.

No. 9415.—*Improvement in Machines for Drilling Stone.*

I claim the improvement of making the drill rod to slide through the piston rod, substantially in manner as above set forth.

And I also claim the combination of the rocker lever, K, the wedge, M, the bolt, P, within the lever, the two cam plates, N, O, the spring catch, Q, the spring and the two projections, *c*, *d*, as applied to the drill shaft, the carriage or block, I, and the slide-ways thereof, and made to operate together, and to actuate the drill, substantially in manner as herein-before set forth.

J. J. COUCH.

No. 9416.—*Improvement in Swinging Churns.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the swing slotted board, wheel, rock-shaft, and lever, for the purpose of producing two complete motions of the dash from one full oscillation of the pendulum bars, substantially as herein described, to be denominated the "oscillating double acting dash churn."

WM. F. DAVIS.
NATHAN DAVIS.

No. 9417.—*Improvement in Pincers for Operating Pile Wires.*

Having thus fully described the nature of my invention, what I claim therein as new, and desire to secure by letters patent, is the manner herein described of constructing and operating the claw for withdrawing, carrying, replacing, and releasing the figuring wires, viz: by making one of the jaws, *c*, fixed, and providing it with a pin or projection, *e*, extending into a suitable slot in the sliding part, *a*, of the claw, so that as said part, *a*, moves back and forth in contact with the fixed part of the jaw, the pin or projection therein will, when the figuring wire is to be seized, keep it in position for being properly caught in the claw, and when it is to be released will prevent it from moving with the sliding jaw, as set forth.

AUGUSTUS FAULKNER.

No. 9418.—*Improvement in Spaces for Setting Type.*

What I claim as my invention, and desire to secure by letters patent, is the cyma recta, or other more suitable shaped elastic space, A, for facilitating the art of setting type, or for saving the time and labor usually expended in "spacing out," "thin spacing," regulating the distance of words in the same line from one another, and "correcting proof," in the manner herein set forth.

E. C. HARMON.

No. 9419.—*Improvement in the mode of Generating Heat.*

We do not claim the use of tar as a fuel, as that is well known and practised in the manufacture of gas. But what we do claim as our invention, and desire to secure by letters patent, is the adaptation of, or rendering available, tar as a fuel for the production of the intense and steady heat required for the melting and manufacturing of glass, by introducing water, or the vapor of water, into the furnace, in contact, or in close proximity, or in combination or mixture, with the tar, substantially in the manner set forth.

WILLIAM HARTELL.
JOSEPH LANCASTER.

No. 9420.—*Improvement in mode of Fastening the Palings to the Rails in Iron Fences.*

What I claim, and desire to secure by letters patent, is the circular projection, or its equivalent, on the rail and lower part of the paling, in combination with a corresponding cavity on the lower rail, so arranged that by giving a partial rotation to said rail, the palings will be clamped to the rails, in the manner and for the purpose herein described.

GEO. HESS.

No. 9421.—*Improvements in Machinery for making Wadding.*

What I claim, and desire to secure by letters patent, is—

First. I claim ironing the two surfaces of the combined material, after it has been sized and doubled, by giving the ironing rollers a reverse motion to that of the bat, for the purpose and in the manner set forth.

Second. I also claim the arrangement of the frames supporting the sizing and drying apparatus, one above the other, so that the sheets of fibrous material forming the outsides of the wadding may be more readily sized and dried independently of each other, and also for the purpose of

facilitating the introduction of any number of bats of fibrilous material between the sizing sheets, in order to increase the thickness of the wadding or batting, substantially in the manner herein described.

HIRAM T. LAWTON.

No. 9422.—*Improvement in Processes for preparing Paints.*

What I claim as my invention, and desire to secure by letters patent, is the process of treating magnesian minerals, such as serpentine, silicates of magnesia and iron, and similar rocks, by mineral acids, to prepare from the sedimentary, or insoluble, or undecomposed portions of such rocks a mineral product, which I call a basis, to be used in the preparation of pigments, substantially as set forth in the specification.

HEMAN S. LUCAS.

No. 9423.—*Improvement in Harvesters.*

Having thus described my improvements, and indicated some of the modifications of which they are susceptible, what I claim as my invention, and desire to secure by letters patent, is—

First. The arrangement of the track scraper and driving wheel in such manner that the latter, while the machine is cutting one swath, will run in the track cleared by the former when the machine was cutting the previous swath, as herein set forth; but in this patent I make no claim whatever to the track-scraper itself.

Second. The projections (7) on the under-side of the upper bars (5) of the finger, in combination with the chamfer or recess on the lower inside corners of said bars, to counteract the tendency of wire-grass and other fibrous obstructions to pass in between the cutter bar (*e*) and the sides of the recess in the upper part of the finger in which it is guided.

Third. Forming the guard fingers (*o*) of two parts, (*m* and *n*,) interlocked at the point, substantially as herein set forth, so that the grass cannot lodge in the joint and form an impediment to their entering between the stalks of the standing grain.

Fourth. In combination with a raker stand or seat, I claim a removable platform, or raking bottom, constructed with a wing that extends from the outer end of the cutter over the frame, and holds up the butts of the straws above the stubble, which otherwise would obstruct the discharge of the grain from the platform, substantially as herein set forth.

JOHN H. MANNY.

No. 9424.—*Improvement in Printing Presses.*

I do not claim placing the bed plate in a vertical position, as I am aware this has been done before; but what I do claim as my invention, and desire to secure by letters patent, is placing the bed plate in a vertical position when a reciprocating motion is imparted to it, by which two impressions can be made at each forward movement of the said bed plate, substantially as herein set forth.

I also claim the combination of the vertically acting bed with a cylinder or cylinders, arranged in such a manner that the forward movement of the bed will impart motion to the cylinder or cylinders, to give or take

an impression, and allow said cylinder or cylinders to remain stationary during the return-movement of the bed, substantially as herein set forth.

CHARLES MONTAGUE.

No. 9425.—*Improvement in Boot Trees.*

Having thus described my invention, what I claim therein as new, and desire to secure by letters patent, is—

The arrangement and combination of the levers, *d*, friction rollers, *e*, screw, *c*, and slide, *k*, or their equivalents, with the back part of the tree, which when contracted all bed closely therein, as and for the purpose herein described.

DAVID SADLEIR.

No. 9426.—*Improvement in Printing Presses.*

Having thus fully described our improved printing press, what we claim therein as new, and desire to secure by letters patent, is—

First. The arrangement and combination of the movements in connexion with the bed, D, by which an extent of motion is imparted to the said bed much larger than that of the sweep of the operating crank, whilst the whole of the said movements only occupy the space within the frame work of the press below the bed, viz: the pinion shaft, A, having pinions upon it, which gear into stationary racks, B, B, made fast to the sides of the frame, and into racks, C, C, secured to the under side of the bed, D, the forked lever, E, (or its equivalent,) having its forked extremities connected to the said pinion shaft, and its opposite-end jointed to the lever, F, that rises from the oscillating shaft, G, and the pitman, H, connecting the said lever, F, with the crank on the driving shaft, I, or the equivalents of the said movements when combined and operating substantially as herein set forth. Disclaiming, however, the principle of imparting motion to a printing press by direct application of power to the bed.

Second. We claim the combination and arrangement of the pressure cylinder, J, and the bed, D, with the conveying bands, *p*, *p*, the nippers secured to the said bands, and the cams for operating the said nippers, substantially as herein set forth.

Third. We also claim the arrangement of the upper and lower tables, K and L, with the pressure cylinder, J, the bed, D, the conveying bands, *p*, *p*, the nippers attached to the said bands, and the cams for operating the nippers, in such a manner that an impression can be made at each right and each left movement of the form under the cylinder, and the sheets be deposited, after receiving their impressions, upon the said lower tables, substantially as herein set forth.

AARON H. CRAGIN.
MARTIN BUCK.
J. H. BUCK.
F. A. TENNEY.

No. 9427.—*Improvements in Whiffle-tree.*

Having thus described the construction and also the operation of my improved safety whiffle-tree, what I claim therein as new, and desire to

secure by letters patent, is a shaft with the ends bent at right angles, and the lever, making part of the same, arranged and operating substantially as herein set forth.

DEWITT C. WILLIAMS.

No. 9428.—*Improvements in Machinery for screwing Bolts, &c.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The movable ways running in yielding bearings back and forth under the machine and supporting the vise, substantially as set forth.

Second. The adjustable stop or gauge on the side of the friction nut working in contact with the movable finger, or any similar projection in the die chuck.

JOHN CASWELL.

No. 9429.—*Attachment for converting the Ordinary into a Taper Vise.*

What I claim as my invention, and desire to secure by letters patent, is an attachment to the vise substantially as herein described, and for the purposes set forth, which attachment is removable at pleasure, and requires no change in the construction of the vise to which it is applied.

JEREMY W. BLISS.

No. 9430.—*Improvement in Hoes.*

The improvement that I claim as my invention, and desire to secure by letters patent, is the extension of the blade of the common cotton hoe upward and backward, in a curve form, B, in such form and manner as to enable the laborer, by inverting his instrument and pushing it from him, to remove, by the cutting edge, B, any grass, weeds, superfluous plants, &c., as described.

WM. C. FINNEY.

No. 9431.—*Improvement in Mortising Machines.*

Having thus fully, clearly, and exactly described the nature, construction, and operation of my improvement in mortising machines, what I claim as new, and desire to secure by letters patent, is the sliding wrist, O, connected with the chisel, and also with the driving power, in the manner described, in combination with the mechanism described, or its equivalent, for sliding said wrist, so that the operator can, during the motion of the machine, vary the depth of cut of the chisel, or cause it to be suspended, without disconnecting the driving power.

JOSEPH GUILD.

No. 9432.—*Improvement in Endless Belts to Thrashing Machines.*

Having thus described the nature of my improvement in machinery for thrashing and separating grain, I wish it to be understood that I lay no claim to originality in passing the screenings a second time through the thrashing apparatus, as that has already been done; neither do I claim the use of a continuous apron with open slats or interstices for carrying off the straw. But what I claim herein as new, and desire to secure by letters patent, is the continuous open apron, having its belt formed of links, whose cogs are, at one part of their rotation, (in connexion with the pinions,) a means of propulsion, and are, at another part of their rotation, (in connexion with the rollers or other stationary objects,) a means of agitation of the said apron.

JOHN R. MOFFITT.

No. 9433.—*Improvement in the construction of Ploughs.*

In my cultivator plough there are several parts which are common to ploughs, or such as have been more or less separately, or in connexion, used by others—the central bar, A, or body of the plough, from which is reared the standard or sheath, B, the angular wings or stirrers, F, F, confined to the central bar, A, the double share or mould board, D; therefore to these parts no special claim is made, either separately considered or in combination. But I claim as my improvement, mounting the double pointed share, D, upon the central shoulder-piece, C, and fastening the same by a link-piece, K, as described.

F. E. RICHARDSON.

No. 9434.—*Improvement in Rotary Knitting Machines.*

What I claim as my invention, is the combination of the mechanism, termed the stop motion, with the rotary knitting machinery of the kind as above specified, the object of the stop motion being to arrest the operations of the machine on breakage of the yarn.

HORATIO G. SANFORD.

No. 9435.—*Improvement in Rotary Knitting Machines.*

I do not claim the combining one or more draft rollers and a take-up roller or drum in one *frame*, which, when put in rotation, shall carry them simultaneously around with it, so as to draw forward and wind up a rope or cord, or like manufacture, formed of strands twisted together; nor do I claim the application of a take-up roller or mechanism, as used on either a common warp or flat braid knitting machine. What I claim as my invention is to so combine a draft and take-up roller, and mechanism for revolving it, with a rotary series or set of needles and other mechanism of the above mentioned peculiar kind for knitting, that such draft roller shall rotate simultaneously or with the same velocity with such series of needles, so as to prevent the longitudinal rows of stitches from being produced in helical lines, and the evil consequences resulting to the fabric therefrom.

I also claim the arrangement of the draft and take up mechanism, in connexion with the knitting mechanism, supported by two separate frames, A, T, and also their connexion with the mechanism for producing an equal and simultaneous rotation of these frames, A, T, all substantially as described, whereby there shall not only be no connexion between the frames, A, T, to extend through the fabric, but no projec-

tion from the frame, A, to come in contact with the presser, stitch wheels, and cam bar, or their respective supports, during the simultaneous and equal rotations of both or either of the said frames, A, T.

DANIEL TAINTER.

No. 9436.—*Improvement in Cooking Stoves.*

Having thus fully described my improved cooking stove, what I claim therein as new, and for which I desire to secure letters patent, is the combination and arrangement of the front and rear flues, *e* and b^1, and air chamber, *c*, substantially as herein set forth.

H. J. RUGGLES.

No. 9437.—*Improvement in the manufacture of Stone and Earthen Ware.*

What we claim as our invention, and desire to secure by letters patent, is—

First. We claim the mode of attaching the mandrel so that it may revolve on its axis by means of friction with the clay, and at the same time be moved from side to side within the mould.

Second. The mode adopted for varying the relative thickness of the different parts of the manufactured article.

JACOB WISE.
FREEMAN WISE.

No. 9438.—*Improved machinery for Bending Pail Bails, &c.*

Having thus described the construction and operation of my machine, what I claim as my invention, and desire to secure by letters patent, is the combination of the saddles, Q and R, the brake, N, N, the bar, L, and the movable block, V, all operating in the manner and for the purpose substantially as herein described and set forth.

ROBERT BUNKER.

No. 9439.—*Improvement in Seed Planters.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is making the cells in the tops of the grooves, made as described, so that they shall carry single grains, and combining therewith a cleaner, which extends into the groove behind the seed as each cell in turn arrives at or over the seeding tube, for the purpose of carrying around and depositing with certainty the seeds or grains singly, substantially as described.

L. W. COLVER.

No. 9440.—*Improvements in Saw Gummers.*

What we claim therein as new, and desire to secure by letters patent, is the nut, (*i*,) having gudgeons (*j*) occupying open notches (*k*) in one of the jaws of a saw gumming apparatus, in which the cutting portion is situated between the power and the fulcrum, for the objects explained.

RICHARD S. CRAMER.
CYRUS C. BLOSSOM.

No. 9441.—*Improvements in Drilling Machines.*

What I claim as new, and desire to secure by letters patent, is—

First. The peculiar manner of giving the slow automatic feed motion to the spindle and the fast receding motion, by means of the sliding pinion, G^2, collar, F, and screw, C, which is attached to the spindle, B, combined with the two sets of cogs, or their equivalents, upon the face of the same disk; the several parts above named being constructed, arranged, and operating in the manner and for the purpose as herein shown and described.

Second. I claim the peculiar method of constructing and arranging the clutch, M, as herein shown and described, by which the inclination of the clutch may be changed, as described, and the position of the clutch also moved or changed bodily in a horizontal direction.

CHARLES W. COE.

No 9442.—*Improvement in Hats.*

I am aware that metallic rings or bands have been used in helmets and similar articles, for the purpose of a support; but I do not know of any hat in which a thin strip of foil has been inserted between the leather or sweat and the hat; therefore what I desire to secure by letters patent, is the metallic strip or strips inserted between the leather or sweat and the hat, and attached to either or both the hat or sweat, as described and shown.

FRANCIS DEGEN.

No. 9443.—*Improvement in Tonguing and Grooving Apparatus.*

Having described my invention and its operation, what I claim, and desire to secure by letters patent, is the shaft, T, connecting rods, Q^1, Q^2, cutter stocks, N^1 and N^2, and cutters, P^1 and P^2, and slides, M^1 and M^2, in combination with the stationary tonguers and groovers, for the purpose of tonguing and grooving boards, &c., as set forth.

PHINEAS EMMONS.

No. 9444.—*Improvement in Hot Air Furnaces.*

Having thus described my invention, I will state that I do not claim the employment of a series of upright tubes or flues over a fire chamber for the purpose of heating air; nor do I claim the use of deflecting plates simply as such; but I do claim the combination of the deflecting plates with the system of upright flues directly over the fire chamber, when such flues are arranged in the manner set forth, so that each flue of itself shall act as a deflector and insure a complete circulation through the whole system, substantially in the manner described.

STEPHEN GATES.

No. 9445.—*Improved machinery for Bending Carpet-bag Frames, &c.*

I do not confine myself to the use of any particular mechanism for closing the clamps, and griping the bars, C, C, nor for drawing them

down upon the edges of the bars. But what I claim as my invention, and desire to secure by letters patent, is the employment, for the purpose of bending and forming carpet-bag frames, or for bending two or more flat metal bars edgewise for any purpose, of a pair of clamps, C, C, each moving independently of the other, in the direction of the width of the bars, and having recesses, *a*, *a*, and self adjusting movable pieces, N, N, as described, combined in any way, substantially as set forth, with a table, A, and bending plate, O.

E. L. GAYLORD.

No. 9446.—*Improvement in Grain and Grass Harvesters.*

What I claim as new, and desire to secure by letters patent, is the combination of the crown wheel with the shafts, E, E, with their respective pallets, (J, J,) acted upon alternately by the cogs of the wheel, the shafts being connected so as to turn in opposite directions, whereby a vibratory motion is given to the blade.

I do not claim either of these singly, but when combined, for the purposes and in the manner substantially as above described.

C. B. BROWN.

No. 9447.—*Improved Galvanic Battery.*

What I claim as my invention, and desire to secure by letters patent, is the within-described improved arrangement of the old voltaic pile, the same consisting in so separating each galvanic pair from that next it in the series, and connecting them with short wires, and forming the plates with suitable perforations, that the strips of leather or flannel, or their equivalent, may be at once saturated with the exciting liquid, by immersing the battery therein.

LOUIS DRESCHER.

No. 9448.—*Improved Hinge for Moulders' Flasks.*

Having thus described the construction and operation of my hinge, what I claim as new, and desire to secure by letters patent, is a hinge for moulders' flasks, constructed substantially in the manner as described and represented, by means of which the cope is raised in the jaws of the hinge, as set forth.

GEORGE GRANT.

No. 9449.—*Improvement in Chairs.*

What I claim as my invention in the above-described chair, and desire to secure by letters patent, is operating the leg-rest from the motion of the seat and back, by means of the lever, L, and rod, V, or their equivalent.

JNO. T. HAMMITT.

No. 9450.—*Improvement in machines for manufacturing Hat Bodies.*

Having thus fully described my improved method of planking hat bodies, what I claim therein as new, and for which I desire to secure letters patent, is—

First. The feeding belts, constructed substantially as described, with jointed chains, having cloth stretched between them, as set forth, by which their motion is exactly determined and equal.

I also claim the combination of the revolving endless planking board or table, with the feeding belts, both moving with the same velocity, for the purpose as described.

LANSING E. HOPKINS.

No. 9451.—*Improved Lock.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the circular tumbler, F, or its equivalent, in combination with the slotted collar, G, which encompasses the spindle, D, of the knob; said collar and tumbler, or its equivalent, being constructed and operating in the manner substantially as herein described.

RICHARD KETCHUM.

No. 9452.—*Improved Pad Lock.*

What I claim as my invention, is giving a forward motion to the hasp, and acting upon the tumblers, by means of the same key, when the parts are arranged so that the key acts directly upon a portion of the hasp, substantially in the manner described.

Secondly. I claim the double-acting spring herein described only when used in connexion with such a form and arrangement of hasp as will cause it to actuate the tumblers, and not only throw the hasp out, but hold it thrown out and fully open, in the manner described, confining my claim to this device.

RHODOLPHUS KINSLEY.

No. 9453.—*Improvement in the mode of Frosting Glass.*

What we claim as our invention, and desire to secure by letters patent, is—

First. Frosting and figuring glass by fixing the plates to be treated in a trough or vessel containing sand, pebbles, and water, and subjected to a short, quick, vibratory motion, in a longitudinal direction, by any suitable mechanical movement, thus causing the glass to pass through the mass of gritty material before any considerable momentum is imparted to that mass, as more fully set forth herein.

Second. We claim forming ornaments upon the glass by the application of patterns or designs, in connexion with the process of frosting by the action of the sand and pebbles, substantially as set forth herein.

JOHN LEVY.
CHARLES JONES.

No. 9454.—*Improvement in Manufacturing Wooden Type.*

I do not claim the use of a press and dies for the purpose of making wooden type. But what I do claim as new, and desire to secure by letters patent, is the arrangement of the propelling lever, D, so that, by its

return movement, in combination with the feeding lever, G, spring, H, dog and feeding tube, I, it will move forward, as required, the blank wood to receive the impression, as above described and set forth.

JOHN McCREARY.

No. 9455.—*Improvement in Pill Making Machines.*

What I claim as my invention, and desire to secure by letters patent, is—

First. Moulding or forming pills by means of two cylinders, B, B, having each a number of recesses, *a, a,* in its periphery, the recesses in one cylinder matching with those in the other, and each matching pair forming a mould of the required form of the pill, the said cylinders revolving in opposite directions, and the pill mass being conducted between them, substantially as herein described.

Second. The bands, I, I, of India-rubber, or any sufficiently elastic material, passing round or partly round the mould cylinders, for the purpose of expelling the pills from the recesses, *a, a,* after the moulds are open, substantially as herein set forth.

ERASMUS A. POND.

No. 9456.—*Improvement in Shingle Machines.*

Having thus fully described my improved shingle machine, what I claim therein as new, and desire to secure by letters patent, is—

First. The combination of the rifting knife, K, (connected with the main driver, I, by means of the elastic arms, L, L,) with the inclined planes, M, M, placed upon the rails, J, J, as described, for the purpose of enabling the knife to be carried forwards under the block during the forward movement of the said driver, and then be elevated to the proper height to split off a shingle during its return movement, substantially as herein set forth.

I also claim the arrangement of secondary driver, N, placed above and acting independently of the main driver, I, in such a manner that it will drive the rived shingle from under the block, and deposite it upon the bed, O, forward of the main driver, in such a position that it will be carried forwards to be dressed during the forward movement of the said driver, substantially as set forth.

WILLIAM STODDARD.

No. 9457.—*Improved Screw-Driver.*

What I claim as my invention, and desire to secure by letters patent, is the screw-driver, E, spring catches, F, F, attached to the flat portions of the screw driver, and permitting longitudinal as well as lateral adjustment, and the barrel, C, in which the whole is placed, in combination with the brace and stock, A, B, or their equivalents; the whole being constructed and arranged, and operating in the manner and for the purpose substantially as herein set forth.

J. W. SWITZER.

No. 9458.—*Improvement in Reels for Harvesters.*

What we claim as our invention, and desire to secure by letters patent, is extending the axle of the driving wheels so far beyond the carriage as may be necessary to form a pivot for the reel to turn upon, and allow of its rotation by a band, as described, independent of the rotation of the axle, substantially as set forth.

WARREN W. WRIGHT.
CLARK C. WRIGHT.

No. 9459.—*Improvement in utilizing Slags of Furnaces.*

What I claim as my invention, and desire to secure by letters patent, so as to have the exclusive right therein, is the process of utilizing the slags of iron and other like furnaces, refining and working the same, substantially in the manner and for the purposes set forth in the specification, whereby I bring into successful operation, for useful purposes, a class of hitherto useless products.

WILLIAM H. SMITH.

No. 9460.—*Improvements in Machinery for making Wood Screws, &c.*

Having thus described my improved machinery for the manufacture of screws, what I claim therein as new, and desire to secure by letters patent, is—

First. The feeder, composed of a sectional trough, with a close bottom and open top, into which the blank drops and arranges itself, before a traversing rod, which pushes it into the griping jaws, substantially as described.

Second. The combination of the traversing rod, actuated substantially as described, with an adjustable stop, for the purpose of setting the blank between the jaws in the exact position required, as herein set forth.

Third. The method of operating the jaws and holding them closed with the requisite force to hold the blank firmly between them without end strain upon the mandrel by means of toggle or knuckle joint levers, which are thrown slightly past centres, when the jaws are closed, to hold them closed when they are used in connexion with elastic and long shank nippers, substantially as herein described, whereby all end strain of the mandrel against its bearings is prevented during and by the griping and holding of the blank.

Lastly, I claim the spring discharging punch, constructed and arranged in such manner that the same shall be compressed by the entrance of the blank between the griping jaws, and shall throw the blank out of the jaws the instant they relax their hold of it sufficiently; such pushing out depending upon such relaxation and the force of the spring, and being entirely independent of the motion of any other part of the machine.

CULLEN WHIPPLE.

No. 9461.—*Improvement in Lining for Iron Safes, &c.*

What I claim as my invention, and desire to secure by letters patent, is the application of amorphous zinc oxide as a lining for safes and re-

frigerators and as a covering for steam pipes, steam chambers, locomotive boilers, hot-air flues and chambers, in such manner as to prevent the transmission or conduction of caloric into or from such chambers or flues.

WM. P. BLAKE.

No. 9462.—*Improvement in Trip-Hammers.*

What we claim as our invention, and desire to secure by letters patent, is the employment of the peculiar-shaped movable tappets, D, D¹, of different sizes; the said tappets being arranged loosely on the driving shaft, F, and moved back and forth, or one substituted for the other by means of the lever, G, in combination with the hammer, B, having a rectangular notched or peculiarly formed slot, C, cut in it; the whole being constructed, arranged, and operated in the manner and for the purpose herein described.

We likewise claim so arranging the lever, G, that when the large or small "tappets" are moved from one position to the other, or the small tappet made to occupy the place of the large one, the controlling spring, H, will also be operated upon and made to assume a proper position to suit the size of the "tappet," the arrangement for effecting this object consisting of a hook-shaped shifter, I, and movable collar, J, which are constructed, arranged, and operated in the manner substantially as herein set forth.

JAMES C. FORREST.
GEORGE BAKER.

No. 9463.—*Improvement in Field Rollers for Cutting Stalks and Weeds.*

Having thus described the nature and operation of my invention, what I claim as new, and desire to secure by letters patent, is the employment or use of the knife roller, said knives being either of straight or spiral form, in combination with the pins, F, F, and fork, G, the knives, as the machine moves along, cutting the stalks from the roots, and also the stalks into pieces while lying upon the ground, and the pins and prongs of the fork drawing the stalks within range of the knives, as herein specified.

JOSEPH H. GEST.

No. 9464.—*Improvement in the manufacture of Ball Castors.*

I claim the improvement in making the case of the ball castor, viz: of a combination of two halves or parts, *m*, *n*, the curved lip, *o*, and the ring, *s*, as constructed and applied together, and to the leg or socket-ferrule thereof, substantially in manner and for the purpose as above set forth.

R. HINTON.

No. 9465.—*Improvement in Stone Picks.*

What I claim as my invention, and desire to secure by letters patent, is the addition of a guard to the inner side of the hammer of mill-stone

picks, which guard will intercept the chips of stone, and protect the hand and person of the picker, using for that purpose the metallic guard above described, or any other substantially the same, and which will accomplish the same result.

I do not claim as my invention the mode of constructing the pick as described, in other respects than as pertains to the guard.

JOSEPH U. HOUSTON.

No. 9466.—*Improvement in Buckets for Endless Chain Pumps.*

What I claim as my invention, and desire to secure by letters patent is the globular, elastic, and adjustable bucket for chain pumps, constructed substantially in the manner and for the purpose herein set forth.

CLARK POLLEY.

No. 9467.—*Improvement in Apparatus for Treatment of Fractures.*

Having thus fully described my invention, I will proceed to state what I claim, and desire to secure by letters patent:

I claim—First. The hip brace, I, of semi-circular or nearly semi-circular form, and the strap, J, passing over it and around the limb, the said strap and brace operating as and for the purpose substantially as set forth.

I claim—Second. The knee fork, F, attached either to the upper part, A¹, or lower part, A, of the double inclined plane, for the purpose of attaching a band which clasps the limb, to effect extension or counter-extension at the knee, as herein explained.

I claim—Third. The application of the adjustable braces, L, L, to the crests of the ilium, substantially as and for the purpose described; the said braces being attached to a seat piece, K, or its equivalent.

I claim—Fourth. The seat, K, in combination with an adjustable back piece, N, attached to two double inclined planes, substantially as herein described, for the purpose of moving the cripple without changing the adjustment of the splints, for the purpose set forth.

ZIMRI HUSSEY.

No. 9468.—*Improvement in Seed Planters.*

What I claim as my improvements, and desire to secure by letters patent, is—

First. The construction of the compound grain slide, *e*, fig. 7, as described, by which the amount of grain required to be sown is graduated at pleasure, as herein fully set forth.

Second. The mitre bar, E, constructed as described, to raise the apparatus for lifting the drill teeth, and throwing the slides out of gear, completely out of the way of the operator, thus allowing him to get at the drill teeth, for the purpose of clearing them of obstructions, with a facility altogether unknown in machines constructed with a horizontal bar in the rear.

HENRY NYCUM

No. 9469.—*Improvement in Scythe Snaths.*

What we claim as our invention, and desire to secure by letters patent as a new manufacture, is a scythe or cradle snath composed of a wrought metal tube, which possesses the advantages of great durability and facility of being bent into any desired form without increasing its ordinary weight, or impairing its usual strength and firmness.

We also claim the longitudinal rib, *e*, or its equivalent, on the snath, in combination with a series of notches in the ring of the neb, for the purpose of adjusting the nebs securely upon the snath, substantially as herein set forth.

ABRAM CLOW.
CHARLES CLOW.
CHAS. N. CLOW.

No. 9470.—*Improvement in Straw Cutters.*

What I claim as my invention, and desire to secure by letters patent, is, in combination with the rake and spring, the pressure piece (*m*) and the roller, (K,) constructed and arranged in the manner and for the purpose as herein before set forth.

JOEL DAWSON.

No. 9471.—*Improvements in Machinery for Forging Metals, &c.*

Having thus described my machine for forging metals, what I claim therein specifically is—

First. The mandrel, or its equivalent, for chucking or griping the metal to be forged, and holding the same in the proper position, and from time to time changing its position between the reciprocating rollers, in combination with reciprocating rollers for shaping the metal so held, whose action upon the metal is regulated by a pattern guide, substantially as herein set forth.

Second. The method of regulating the thickness and shape of the metal being forged without stopping the rollers, or withdrawing the metal therefrom, by the simultaneous adjustment of the pattern guides, substantially as herein described.

WILLIAM FIELD.

No. 9472.—*Improvement in Apparatus for the cure of Club Feet.*

Having thus fully described the nature, construction, and operation of my invention, I will proceed to state what I claim, and desire to secure by letters patent:

I claim the side pieces, A, A, to which are attached the adjustable foot pieces, connected and adjustable to each other, in the manner substantially as described, by the back piece, B, plates, *a*, *a*, and *c*, *c*, bolts, *b*, *b*, and *d*, and slots, b^1, b^1, and d^1.

ZIMRI HUSSEY.

No. 9473.—*Improvement in Plough Regulators.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the arms, D and E, with the connecting and regulating bar, I; the arms, D and E, and the connecting bar, I, forming an arch, and working on an axle which passes through the beam, in the manner and for the purpose substantially as herein described and set forth.

HARVEY SPRAGUE.

No. 9474.—*Improvement in Spike Machines.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the hinged pointing die, (E,) pressed forward by a spring, with the guard or stop, (*a*,) or the equivalent thereof, which guides the die and limits its forward movement, substantially as herein set forth.

PHILIP P. TRAYSER.

No. 9475.—*Improvement in Seed Planters.*

What I claim as new and as my own invention, and desire to secure by letters patent, is the reciprocating bar, B, having wings, b^2, b^2, projecting horizontally and obliquely on the front and rear sides of the same, to scoop the seeds in the discharge apertures, arranged and operating in the manner and for the purpose above specified.

MOSES D. WELLS.

No. 9476.—*Improvement in Grain and Grass Harvesters.*

Having thus described my improved harvesting machine, what I claim as my invention, and desire to secure by letters patent, is the method herein described of supporting the stand for the raker, at the back of the platform, by means of a brace, extending to the outer end of the frame, and so arranged as not to impede the action of the raker, or the discharge of the cut grain; the several parts being constructed and arranged as described.

I also claim the method herein described of protecting the gearing of the machine from injury, by the working and twisting of the main frame, by mounting the said gearing in a supplementary metallic frame, constructed as described, and rigidly connected to one end of the main frame, upon which it is mounted, as herein set forth.

WILLIAM H. SEYMOUR.

No. 9477.—*Mechanism for pointing and threading Screw-blanks in the same Machine.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the pointing and chasing tools on the same tool-holder in such manner that they are operated by a common motion, substantially as herein set forth.

CULLEN WHIPPLE.

No. 9478.—*Improvement in Machines for cutting Whale Blubber.*

I am aware that in machines for cutting straw, or such like matters, a cutting cylinder has been made to operate on a bed roller, and that the knives on the said cutting cylinder have been arranged in a helix upon it. It is not claimed that such constitutes in any respect the invention of the said Ricketson, deceased.

But what is claimed is the wheel composed of two or more spiral knives, made to rotate on an axis, arranged parallel, and in the direction of movement of the strip of blubber to be cut, all substantially as above set forth, meaning to claim two or more spiral knives formed, arranged and made to operate with respect to and in combination with a set of bed and feed rollers, substantially in the manner and for the purpose of cutting blubber substantially as above described.

LYDORIANN RICKETSON.

No. 9479.—*Improvement in Rakes to Grain Harvesters.*

Having thus described my invention, I desire to state that I do not confine myself to the exact mechanical devices and arrangements shown and described for operating the rake, as these may be modified or others substituted for them. What I claim, and desire to secure by letters patent, is the exclusive use of the herein-described combination of the crane post, (c^1,) rock shaft, (h^1,) and crank, (l^1,) to operate the jointed arm, (a^1, d^1,) and hands, (D^1, E^1,) which collect the grain in gavels and deposite it in rear of the harvester, in the manner specified, as the machine moves forward, when applied to machines for harvesting any grain which requires to be so collected and deposited; the combination being connected by gearing with the driving wheel of the harvester, and operating through mechanical devices, substantially as described, as an automaton to perform the above-specified operation.

JEARUM ATKINS.

No. 9480.—*Improvement in Water Closets.*

I do not claim any of the parts of the pan, basin, or hopper, as these may be of any desired character, and, if used with the hopper closet without a pan, the part which moves the pan, *r*, may be dispensed with; what I desire to secure by letters patent, is the cylinder, *n*, and plunger, 18, by which the force of the water is made to raise the lever, S, depressing and emptying the pan, *r*, as described and shown.

WILLIAM S. CARR.

No. 9481.—*Improvement in Ventilators.*

Having thus described my improved ventilator, and the method of operating the same, I wish it to be understood that I do not claim a ventilator with slats or shutters fixed in the sides of a cupola or dome, or other structure, placed on the top of the building or elsewhere; but what I do claim as my invention, and desire to secure by letters patent, is the arrangement of the frame, E, in the sides of the cupola or dome, projecting slightly beyond the face thereof, to admit the lips or turned ends of the slats or shutters to lap over the same, in order to form tight joints, and the manner of hinging or jointing the slats or shutters to the same by the joint pins, G.

I likewise claim the radial wings, K, when combined with the frame of the dome or cupola, for directing the currents of air to the spaces between the slats or shutters, as described, and thence to the trunk.

A. S. DOZIER.

No. 9482.—*Improvement in Straw Cutters.*

What I claim as my invention, and desire to secure by letters patent, is constructing the rotating cutting cylinder, substantially as described, with a series of parallel annular grooves and ridges, and a series of cutting arms or knives, in combination with a series of fixed knives, so arranged that they enter the grooves and interlock or lap past the annular ridges on the cylinder, and thereby prevent the stalks of straw, &c., from descending between the fixed knives and cylinder without being cut, substantially as herein set forth.

WARREN GALE.

No. 9483.—*Improvement in Ploughs.*

Having thus described my improvement in the cotton scraper, what I claim as my invention, and desire to secure by letters patent, is the rhomboidal plate, *c*, *d*, bent on one of its diagonals, and constructed and arranged substantially as described, so that either leaf can be used as a landside or share, at pleasure; the edges of the share becoming, when the plate is reversed, the edges of the landside, and those of the landside the edges of the share, in the manner and for the purposes specified.

I also claim, in combination with the plate, *c*, *d*, as described, the double bifurcated brace, *f*, *g*, *h*, *i*, *j*, for attaching said plate to the beam, substantially as described.

WM. A. GATES.

No. 9484.—*Improvements in machinery for manufacturing Hat Bodies.*

I do not claim the conical vibrating rollers, for the purpose of felting or compressing a bat, or the cone separately, as that is well known; but I claim combining the hardening rollers with the perforated cone, by means of a yielding or hinged frame, in which they are placed, substantially in the manner and for the purpose herein described.

I also claim giving to said rollers, in combination with said perforated cone, a vibrating endwise motion, as well as a rotary motion, substantially as described, and for the purpose set forth.

I also claim blowing the exhaust air from the former, *f*, into the chamber, *d*, for the purpose and in the manner described.

And I also claim the mode of forming the steam-pipe outlet, as above specified, by covering the steam-pipe with cloth, and incasing it with an outer metal case.

I also claim covering the perforated cone, preparatory to a deposition of fur thereon, with a covering of thin cloth, easily pervious to air, upon

which the fur is to be deposited—said cloth or fabric to be removed at each operation, with the hat body deposited thereon.

LANSING E. HOPKINS.

No. 9485.—*Improvement in Grain Threshers and Cleaners.*

Having thus described the construction and operation of our machine, what we claim as our invention, and desire to secure by letters patent, is the combination of the upright threshing and separating cylinders with the upright concave and cylindrical sieves, operating in the manner and for the purpose as herein set forth.

JOHN JONES.
ALEXANDER LYLE.

No. 9486.—*Improved Equalizing Apparatus for Engines which use steam expansively.*

Having thus described the nature of my method of equalizing the action of steam, I claim therein as new and of my invention, and desire to secure by letters patent, the application to a reciprocating engine (in which the steam is used expansively) of the described, or equivalent, toggle movement, in combination with a pair of equalizing cylinders, which being placed at a greater or less distance, (one on each side of the mid-range of the toggle,) the most rapid accumulation of equalizing force is made to take place earlier or later in the stroke, in accordance with the period of cut-off, &c., for the purposes herein explained.

WM. HENRY MORRISON.

No. 9487.—*Improvement in Maize Harvesters.*

Having described my improvement, what I claim as my invention, and desire to secure by letters patent, is the arrangement of the shaft of the receiving arms, K, with one end resting upon the cutter-bar piece, thereby dispensing with an intermediate platform, so that the cut stalks will fall directly upon the receiving arms, K, and be thence discharged in bundles upon the ground, as set forth.

JACOB L. REAM.

No. 9488.—*Cut-Off Valve-Motion.*

Having thus fully described my invention, I do not claim placing the cut-off valve outside of the slide valve, and operating both valves by one rod or eccentric. But I do claim the lugs acting upon the hinged levers, attached at their lower extremities to the cut-off slide, and at their upper to a rod capable of a vibratory movement in a direction perpendicular to the valve seat, substantially for the purpose and in the manner set forth.

S. W. ROGERS.

No. 9489.—*Improvement in Potato Diggers.*

Having thus fully described my invention, what I claim, and desire to secure by letters patent, is the construction of a potato-digger, by the combined arrangement of the knife, *d*, wheel, *c*, and fork, *e*, with the beam, *a*, operating substantially as and in the manner set forth.

JESSE N. SEELEY.

No. 9490.—*Improvement in Lamps for Locomotive Engines.*

What we claim as our invention, and desire to secure by letters patent, is—

First. The construction of a feeder for supplying oil to the holder, by the combination of two tubes—one communicating with the interior of the reservoir, and the other fastened to a float immersed in the oil of the holder, by which the lamp is rendered self-feeding, in the manner and for the purposes herein specified.

Second. The construction of the chimney, with a broad, flat flue connecting its vertical portions, the exterior one of which is so constructed as to be forward, or on either side, of the prolongation of the chimney of the burner, substantially in the manner and for the purposes herein specified.

THOS. SNOOK.
STEPHEN HILL.

No. 9491.—*Improvement in the manufacture of Chromate of Soda.*

Having described the nature of my invention, and the manner in which the same is to be performed, I hereby declare that I claim as my invention, the process of manufacturing the chromate of soda.

JOHN SWINDELLS.

No. 9492.—*Improvement in Fulling Mills.*

What I claim, and desire to secure by letters patent, is the combination of the stop mechanism, or its equivalent, with the screw, pulley, and the elastic band leading to the pulley on the upper roller, whereby the whole machine is stopped, when the motion of the cloth is arrested in the manner described, and ceases to impart motion to the upper roller.

W. E. UNDERWOOD.

No. 9493.—*Machinery for separating Iron from Furnace Cinder.*

What we claim, and desire to secure by letters patent, is the combination of the revolving breaking and sifting cylinder with the fan, or its equivalent, substantially in the manner and for the purposes specified.

DANIEL WALROTH.
LUCIUS EVANS.

No. 9494.—*Improvement in Steam Flat Irons.*

Having thus explained my invention, I would have it understood that I claim the steam ball and socket smoothing iron as made of a combina-

tion of a spherical socketed smoothing block, F, and a hollow or chambered sphere, A, with induction and eduction passages, C, D, arranged so as to admit steam and discharge condensed water, all substantially as herein-before set forth; the block, F, being applied to the sphere, A, in such manner that it may be moved thereon in various directions transversely, while passing over and against a hat or surface to be smoothed, as specified.

C. C. WALWORTH.

No. 9495.—*Improvement in Planing Machines.*

Having thus described my invention and improvement in machines for planing, tonguing, and grooving boards, I disclaim the invention of planing by a reciprocating plane, which planes on its forward stroke and feeds the board on its backward stroke the whole distance of the stroke of the plane, as in other machines of this class; but what I do claim is the reciprocating beds arranged with respect to the stationary bed, substantially as described, in combination with the clamps, or their equivalents, attached to the plane stock, whereby the board is clamped between said movable beds and the clamps, and is free to move over the stationary planing bed, and is fed during the backward stroke of the plane the whole length of such stroke.

ARETUS A. WILDER.

No. 9496.—*Improvement in the method of Measuring Cloth on the Cloth Beam.*

What I claim as my invention, and desire to secure by letters patent, is connecting or attaching a measuring cord (constructed as described) to the cloth, so as to be wound on the cloth beam with it, in order to indicate the length of the "cut" required.

WILLIAM H. WOODWORTH.

No. 9497.—*Improved Safety Lock.*

First. I claim, in combination with the tumblers, or their equivalents, constructed and connected respectively to stops, in the manner, or in an equivalent manner to that described in the specification, and shown in the drawings at *j*, the spring, *n*; the same being an additional device co-operating with the said tumblers and springs connected therewith in rendering the movements and positions of the stops to the highest degree uncertain when an attempt is made to unlock the lock without using the proper key.

Secondly. I claim the wheel, C, and the lever, F, in combination with the tumblers, *h, h, h*, constructed as before described, or their equivalents, to raise, while in one position, and support the tumblers, O, O, that the key hole shall be equal and smooth to receive the key, and then allow them to be stopped at proper heights on the key while a revolution is performed and the bolt moved by the wheel, substantially as described.

LINUS YALE, Jr.

No. 9498.—*Improved Parrel for Yards of Vessels.*

I do not claim the rocker simply and by itself as my invention, a saddle or slide having been heretofore used and fastened into the swallow-tail of the gaft and boom of sailing vessels, applicable to fore and aft sails only; but what I do claim as my invention, and desire to secure by letters patent, is the combination of the rocker in front of the mast, and capable of a motion in two planes, with the rockers at the side of the same; said rockers being arranged with respect to each other and the yoke, substantially as described.

DANIEL S. BAYLES.

No. 9499.—*Improvements in the method of obtaining Gold, &c., by Amalgamation.*

Having thus described our improved method of separating precious metals from their ores by amalgamation, what we claim as new therein, and desire to secure by letters patent, is the bringing of the ore in a heated state into contact with mercury during the process, substantially as herein set forth.

We also claim the method of heating pulverized ore by causing it to pass in a shower through a current of some heated fluid preparatory to bringing it into contact with the mercury, substantially as herein set forth.

We also claim the method of heating the apparatus, the mercury, and the ore, by means of a current of heated fluid, circulated through chambers and pipes, substantially as described, whereby a single current of a suitably heated fluid, and a single system of circulating pipes, of simple construction, and compact arrangement, are made to heat the whole of the apparatus that requires to be heated, and to heat the ore in the process of feeding, and the mercury in the process of amalgamating, substantially as specified.

MAYBURY A. BERTOLET.
LEWIS KIRK.
A. M. DE HART.

No. 9500.—*Improvement in Winnowing Machines.*

Having described my improvement in grain winnowers, what I claim as my invention, and desire to secure by letters patent, is the combination of the piston, *k*, rack rod, *l*, pinion, *m*, valves, *i*, i^1, and eccentric pulley, *n*, in connexion with a conducting chest, *g*, and blower, f^1, for the automatic graduation or government of the blast through the spouts, *q*, *r*, of a winnowing machine, arranged and operating in the manner and for the purpose set forth.

SAM'L CANBY.

No 9501.—*Improvement in the process of making Illuminating Gas.*

What we claim as our invention, and desire to secure by letters patent from the United States of America, is the combination of woody and fatty substances in gas generators, as described, so that the excess of hydrogen in the former may combine with the excess of carbon in the

latter, and produce a rich carburetted gas of any required density, and free from sulphurous fumes.

G. DANRÉ.
PASCAL NICHOLAS.
FELIX LOPEZ.

No. 9502.—*Improvement in Temples for Looms.*

Having thus described our improved weavers' temple, what we claim as new therein, and desire to secure by letters patent, is the arrangement of parts so that the temples have a reciprocating action corresponding with the motion given to the cloth by the beat of the lay, substantially as herein set forth.

ELIHU DUTCHER.
WARREN W. DUTCHER.

No. 9503.—*Improvement in Cutting Paper.*

Having thus described the elements of the combination invented by me, and explained the mechanism I have adopted for putting them in action, in the manner as herein-before specified, I would remark that I do not intend to confine my invention to the precise form or arrangement of its parts as represented in the drawings, but intend to vary the same to any extent, while I do not change the character of the machine.

What I claim is the combination of a press, or its equivalent, for holding the book or paper to be cut, with one or more cutters or knives for trimming the front or edge, and one or more cutters for trimming one or both of the other edges of the book; the different sets of cutters being simultaneously operated while the paper or press is moved towards them, all substantially as above specified. And in combination with such cutters or knives for trimming one, or the front and other edge or edges of a book at one operation or time, I claim the improvement of combining with them, or either of them, one or more polishing surfaces, as described, or their equivalents, whereby the edges of the sheets or paper are cut and polished, or smoothed, ready for gilding, substantially as specified.

JOHN P. FARNUM.

No. 9504.—*Improved mode of mounting the Cutters of Machines for Planing Metals, &c.*

What I claim as my invention, and desire to secure by letters patent, is hanging the cutters to the stock by means of a joint pin, or its equivalent, whose axis is diagonal to the line of cutting motion, and in a plane parallel with the surface being cut, substantially as specified, for the purpose of relieving the cutting edge in two directions, as specified, when the cutter-stock is set perpendicular to the plane of the surface to be produced.

And I also claim combining together in one cutter-stock two cutters, hung substantially as specified, and with the angle of the axis of the two joint pins reversed, as specified, for the purpose of relieving both cutters from the two surfaces when cutting in both directions, as specified.

P. SAULNIER.

No. 9505.—*Improvement in Magnetic Printing Telegraph.*

What I claim as of my own invention, and desire to secure by letters patent, is—

First. The employment of electro-magnetic force, in combination with the force of a current of air or other fluid, so that the action of the former governs or controls the action of the latter, for the purpose described.

Second. I claim the construction of the electro-magnet as described—that is to say, a series of fixed magnets, in combination with a series of movable magnets, arranged upon a central axis, which axis plays between or through the line of fixed magnets, so as to effect a vibratory movement of said axis, by a force multiplied by the number of magnets of both kinds.

Third. I claim the combination of an electro-magnet with the valve for regulating and directing the force of a current of air, or other fluid, acting as a motive-power upon the piston, or other analogous device, for producing a vibratory motion, as described.

Fourth. I claim the endless band, in combination with the cylinder, K, as an inking machine for conveying and applying the coloring matter to the paper at the moment of receiving the impression from the types, as described.

Fifth. I claim the combination of the regulating bar (g^1) with the type-wheel, for the purpose of regulating the proper position said wheel should have, in connexion with a given position of the key-shaft, at the moment of printing any letters or characters.

ROYAL E. HOUSE.

No. 9506.—*Machinery for Heading Bolts, &c.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The combination of the stationary die, E, and die pivot, D, with the sliding hammers, G, actuated by the rotary grooved cams or cam collar, substantially as described, for the purpose set forth.

Second. The revolving ring or cam collar, provided with cams, or their equivalents, on its inner and outer surfaces, when arranged with radial compressing and sliding upsetting hammers, in the manner and for the purposes described.

EDWARD PAYE.

No. 9507.—*Improvement in Shuttles for Looms.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the elevator, *g*, the bent spring, D, the platform, *b*, and its recess, *a*, the passage, *c*, and the slot, *d*, as applied to the shuttle and cop spindle, and made to operate together, substantially in manner and for the purpose of causing the filling thread to be broken, so that no filling thread shall be woven into the warps under circumstances as herein-before stated.

WILLIAM TUCKER.

No. 9508.—*Improved method of Heading Screw Blanks, Rivets, &c.*

What I claim as my invention, and desire to secure by letters patent, is, in combination with the swedge header and die plate, substantially as specified, the giving of a back or receding movement at the end of the heading operation to the follower against which the point of the rod rests during the heading operation, substantially as specified, that the rod or wire may be upset outside of the die, whilst resistance is made by the follower against the end of the rod, and then, as the follower retires, cause the part so upset to be griped between the surface of the die and the swedge, to complete the form of the head, the surplus metal being thereby forced into the shank, as set forth.

WM. E. WARD.

No. 9509.—*Improved Safety Apparatus for Steam Boilers.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The safety chamber, B, and safety plate, E, combined with the boiler in any way, substantially as described, whereby the bursting of the plate by the too high pressure in the boiler causes the chamber to be filled, and the pressure in the boiler to be reduced, by the expansion of the steam.

Second. The plate, C, placed, substantially as described, between the boiler and the safety plate, E, having one or more small openings, *a*, through which the steam is allowed to pass to act on the safety plate and fill the safety chamber, whereby the water is prevented from priming or foaming and being carried up by the steam when the safety plate bursts.

HENRY WATERMAN.

No. 9510.—*Machinery for making Railroad Chairs.*

What we claim as our invention, and desire to secure by letters patent, is the movable cutter for making the cuts in the edges of the plate, substantially as described, in combination with the slides, which answer the purpose of stationary cutters, and rests, to effect the partial bending of the lips, and which afterwards complete the bending of the lips, substantially as described.

We also claim, in combination with the cutter, as described, the making of the mould or former to slide therein, for discharging the chair after it has been formed, as described.

And, finally, we claim the dies for upsetting and giving additional thickness to the lips, as described, in combination with the bending slides and cutter, substantially as described.

JOHN F. WINSLOW.
JOHN SNYDER.

No. 9511.—*Improvement in Daguerreotyping.*

What I claim as my invention, and desire to secure by letters patent, is the producing ornamental borders and designs of different shades and forms, and singly or in numbers, around any photogenic image, by the

method of irregular chemicalization, combined with the use of pattern slides or chemical cut-offs; all of which is fully described in the detail of my process.

WILLIAM YARNALL.

PATENTS REISSUED DURING THE YEAR 1852.

No. 209.—*Improvement in Planing Machines.*

Having thus fully described our improved machine, we wish it to be understood we do not claim a bench that can be raised and lowered by set screws, or similar device. But what we do claim as our invention, is, first, hinging the bed piece at one end, and raising and lowering it at the other, in combination with the revolving cylindrical cutter, in the manner and for the purpose set forth.

We also claim the combination and moving of the feed rollers (*g*) with the stationary ones, by the oblique links and gear, as described; the whole being constructed and operating as above specified.

CHARLES A. SPRING.
PETER BOON.

No. 210.—*Improvement in Machines for Planing, Tonguing, and Grooving.*

What I claim as the invention of the aforesaid Joseph Powell, Nelson Barlow, and Edward Holden, and what I desire to secure by the reissue of the letters patent granted originally to them, is—

First. The combination of the pairs of feeding rollers, G, G, and G^1, G^1, with the bed plate, C, and the rotating reducing wheel, D, substantially in the manner and for the purpose herein set forth, viz: the placing the axles of the pair of feeding rollers, G, G, preceding the reducing cutter wheel, and the axles of the pair of feeding rollers, G^1, G^1, immediately following the same, respectively, out of a vertical line with each other, thereby bringing the upper roller of each pair nearer to the shaft of the reducing wheel than the lower one, for the purpose of springing the board or plank to the bed-plate, as herein more particularly described.

Second. In making the rebates by which the tongue is formed, I claim the employment of a series of incising cutters, in combination with stationary, planing, tonguing cutters; the several cutters being so arranged as to act upon both sides of the angle of the rebate simultaneously or alternately, and cut the shavings from both the said sides, so as to form at one operation a tongue, both of whose sides and shoulders have been subjected to the action of cutting edges, substantially as herein set forth.

Third. In forming the groove, I claim the employment of a series of incising cutters, in combination with stationary, planing grooving cutters, substantially as described, for forming the tongue, being arranged so as to cut upon both sides and the bottom of the groove, as set forth.

ROBERT G. EUNSON,
Assignee of Joseph Powell, Nelson Barlow, and Edward Holden.

No. 211.—*Improvement in Machinery for Dressing Staves.*

What I claim as my invention, and desire to secure by letters patent, is—

First. The arrangement of the wheel and ring of cutters, for the purposes and in the manner substantially as herein-before described.

Second. The holding of the stave firmly in position to be dressed, in the immediate vicinity of that portion which is being cut, while all the other portions are left at full liberty to assume whatever position its configuration may indicate, for the purposes and in the manner substantially as herein before described.

Third. The employment of the two independent spring rollers, (*p* and *q*,) or their equivalent, acting with equal force upon each of the edges of the stave, irrespective of their relative thickness, in combination with the guides and the cutters, as described.

ISAAC JUDSON.

No. 212.—*Powder-Proof Lock.*

What I claim as my invention is the combination of the handle, shank and cam, one or more pins, *e, e,* &c., and their sustaining holes or apertures, in their application to the bolt and one or more tumblers, and as operated substantially as specified, meaning to claim said combination as composed of the afore-described elements and their accessories.

And I also claim to combine with, or in combination with, the bolt and tumblers, a contrivance for throwing or moving the bolt back and forth; another, or a key *separate* and distinct from each contrivance, and for the purpose of moving the tumblers into correct positions for the bolt to be moved, and which shall be perfectly stationary after it has so moved the tumblers; and a movable plate, or its equivalent, applied to the contrivance by which the bolt is actuated, and made to entirely cover the key and prevent access to it when the bolt is put in motion: not meaning by the above to claim the separate combination of either of the above-mentioned three parts with the bolt and tumblers, but intending to limit my claim to the combination of all of them therewith, so as to operate in conjunction with them, essentially as specified.

WM. HALL.

No. 213.—*Improvement in the Gearing of a Seed Planter*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is in combination with the slotted sliding seed bar, F, the stationary lugs, *b, b,* on the plate, D, and the concave, *c, c,* on the cap, G, G; the whole being arranged and constructed as herein described.

I also claim the combination and arrangement of the double bolt, *h,* with its slotted arm, *k,* rock shaft, *n,* with its arms, *m* and *p,* and pitman, *g,* for the double purpose of giving motion to the feeding apparatus, and also regulating the quantity of seed to be sown, when said pitman is operated by a long crank upon which it travels, as herein fully shown and represented.

MARSHALL J. HUNT.

No. 214.—*Improvement in the construction of Furnaces for Smelting Iron Ore.*

Having described the construction and operation of my improved furnace for smelting ores and metals, I will now state what I claim as my invention and improvement, and desire to secure by letters patent:

First. I do not claim the increasing of the draught as separately by itself.

Second. And I do not claim to generate steam, or to heat the blast by waste heat, otherwise than hereafter claimed. I therefore only claim as my invention and improvements the arrangement of the fire-chambers, opening each, by a flue, into one horizontal flue, in combination with the boiler placed in said flue for generating steam, and the pipes, I, I, therein, as a means of heating the blast; the whole being constructed and operating as described.

J. AUGUSTUS ROTH.

No. 215.—*Improvement in Washing Apparatus.*

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is placing the rotary boiler for washing clothes immediately over the fire, and so combining with it a reservoir or top boiler that said rotary boiler shall form the lower half of the flue whilst the said reservoir or boiler shall form the upper half of said flue, and from which the revolving boiler may be supplied with water and thus greatly economize heat, substantially in the manner herein described and represented.

I also claim, in combination with the rotary boiler and shielded stationary pipe, the top reservoir or boiler for receiving the excess of steam from the boiler and heating the water therein; and this I claim whether said reservoir is divided by partitions or not; the whole being arranged in the manner and for the purpose herein described.

JAMES T. KING.

No. 216.—*Improvement in Self-detaching Brakes.*

What I claim as my invention, and desire to secure by letters patent, in combination with the method of forcing the brakes against the wheels by connecting the brakes, or the mechanism which works them, with the bumpers or draw-bars, substantially as specified, is the method, substantially as specified, of releasing the brakes, notwithstanding the continuance of the forces by which they were applied, by the reversing action of the wheels on the brakes, to effect a disengagement of the pressing force, as described.

As one of the devices for applying the principle of my invention, I also claim connecting, by means of a detachable catch or hook, substantially as specified, the bumper or draw-bar with the lever, or its equivalent, which forces and holds the brake against the wheel, substantially as specified, so that, notwithstanding the continuance of the backward pressure on the said bumper or draw-bar, the connexion can be readily broken to relieve the brake, and thus leave the wheel free to run, as specified.

And I also claim making that part of the brake which acts directly on the wheel separate from, but so connected with as to slide freely on the part which receives the action of the mechanism for forcing the brake against the wheel, substantially as described; by means of which, on reversing the motion of the wheel, the one part of the brake in contact therewith is made to slide to give the required motion for effecting the disengagement, as above specified.

JOHN LAHAYE.

No. 217.—*Improvement in Apparatus for Parti-coloring Yarn.*

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as specified, of parti-coloring yarns that have been reeled by direct and free immersion by means of frames carrying the reeled yarns, and combined with the vat containing the dyeing liquor, by means of machinery adapted to let down and draw up the said frame, and measure the extent of immersion, substantially as set forth.

I also claim connecting one or both of the reels in each frame by means of slides, to admit of removing the reels from contact with the yarns whilst in the process of dyeing, substantially as specified.

ALEXANDER SMITH.

No. 218.—*Improvement in the Machine for Cutting Paper and Trimming Books.*

What I claim as my invention is the use of a knife having a lateral or end vibratory motion, for the purpose of cutting the edges of books, papers, &c., and its combination with the frame, F, and rods, P, P, or either of them, and operated by cams or other equivalent devices, to give a drawing and vibratory cutting action to the knife, substantially as set forth.

I claim also the mechanical construction of the press as arranged and combined with the parts for cutting and pressing, thereby forming an entire machine for the purpose described.

FREDERICK J. AUSTIN.

No. 219.—*Improvement in Batting of Cotton or other Fibrous Material.*

Be it distinctly known that we do not claim as our invention the mode of operating a series of carding machines to make "batting," as shown by J. Essex's drawings, nor any part of the above-described machine. What we do claim as our invention and discovery is the method of making "batting or wadding" by laying on and covering both the upper and lower surfaces of a sheet or sheets of cotton, wool, hair, or other elastic fibrous material that has been merely well picked, cleaned, and spread with layers of carded, condensed, and compact fibres, such as cotton, wool, hemp, &c., for the purpose of rendering the same smooth, strong, and more suitable for bedding, wadding, and upholstery uses.

HAMILTON B. LAWTON.
HIRAM T. LAWTON.

No. 220.—*Improvement in Bedsteads.*

I lay no claim to a combination of rest-bars or boards, spiral or wound wire springs, a sacking and closing frame used to support a cushion or mattress, such a combination having been employed in the manufacture of sofas and other articles of furniture; but what I claim as my invention is the method in which I construct the foundation of the bed or mattress by means of the above described pliances, or their equivalents, to wit: the lacing and the clamps and keys, or wedges, so as to render the bedstead portable by being taken apart, or enfolded the one part over the other, or united together or unfolded, as above described, as occasion may require: that is to say, I claim the combination of the two frames or halves of a box, each of said frames or halves consisting of a side, two ends, and bottom or slats supporting wire springs, and a sacking affixed to its side and two ends, and supported on springs or stuffing, as occasion may require, and these halves or parts so united, that when together or unfolded they form but one box or frame, supporting or holding fast the sacking at its entire extremity without any separating or supporting partition in the centre; and this union or junction of the two posts is effected by the above-described lacing, or its equivalent, and clamps and keys, or wedges, or their equivalent.

I lay no claim to any one of the elements of the aforesaid or above-described combinations when separate from the rest, but intend only to claim the whole as combinations constituting a bedstead, or foundation for a bed or mattress, to which the parts, as above described, or their equivalents, may be applied, as aforesaid.

NATH'L COLVER.

No. 221.—*Improvement in Machines for Tonguing Boards.*

I am aware that Harvey Law has described in his patent of 10th April, 1849, a mode of tonguing in which two sets of saws are arranged in a frame with the cutting teeth opposite, and cutting in one plane on opposite faces of the board, none of which devices we desire to claim; but what I do claim as the invention of Crosby and Edgcomb, is the employment of two *independent* sets of *independent* cutters, arranged in parallel planes in parallel stocks, with an open space between them, so as to cut on the *edge* of the board, all in the manner substantially as described, whereby I have the advantage combined of freedom from clogging, and the facilities of adjusting the stocks and cutters for sharpening, setting, and inspection.

RAMSOM CROSBY, Jr.

No. 222.—*Improvement in the Manufacture of Bullets, &c.*

I do not therefore claim as of my invention casting bullets, buckles, and other articles, in a series of moulds moving under a spout when the surface on which the lead is poured is unbroken; nor do I wish to limit myself to the precise construction of moulds, nor to the special arrangement of them, so long as the same results are produced by equivalent means. But what I claim as my invention, and desire to secure by letters patent, in the method of casting bullets, &c., in a succession of

connected moulds, is jointing them together, so that they shall separate and come together in vertical planes, at right angles to the line of motion of the series, or nearly so, substantially as and for the purpose specified.

GEO. W. CAMPBELL.

No. 223.—*Improvement in making Lampblack.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the mode herein described of burning lampblack—that is to say, burning it in a confined building or room without chimney or draught, substantially in the manner set forth in the above specification.

G. MINI,
Signature of John Gilbert Mini.

No. 224.—*Improvement in the Seeding Apparatus of Seed Planters.*

Having thus fully described my improvements in seeding machines, I wish it to be understood that I do not claim a reciprocating gauge-plate having apertures parallel and corresponding with apertures in the bottom of the hopper, as this I am aware is in use in other machines. But what I do claim as my invention, and desire to secure by letters patent, is the employment of a reciprocating gauge-plate, when provided with feeding apertures, in combination with corresponding apertures in the hopper bottom, which have their sides oblique to the sides of the apertures in the said reciprocating plate, and when combined with a device for giving it a variable reciprocating motion, for the purpose of sowing the seed constantly and uniformly, and varying the amount at pleasure, while the machine is moving, by simply varying the extent of its reciprocating motion, as herein described.

I also claim the pivoted rod, *m*, and the vibratory lever, *p*, which is provided with apertures arranged in the arc of a circle, whose centre is at the pivoted end of the rod, *m*, in combination with the curved or undulating disk, *s*, and the gauge-plate, *j*, substantially as herein described, for the purpose of imparting to the gauge-plate a reciprocating motion, which may be varied at pleasure by the operator, by inserting the rod, *m*, in one or another of the apertures in the lever, *p*, at different distances from its fulcrum.

LEWIS MOORE.

No. 225.—*Improvement in Steam Boilers and Apparatus to be used on board of Steamboats to prevent the explosion of boilers.*

Having described my invention, and some of its advantages, I would say that I do not claim the use of an alloy to allow steam to escape through the opening in the boiler caused by its fusion. But I do claim as my invention, and desire to secure by letters patent, the combination of a fusible alloy confined in a cup, tube, or case, with a metallic stem, rod, or other fixture not fusible at the melting temperature of the alloy, which stem, rod, or other fixture is held or kept in position, whilst the alloy remains hard; but when said alloy is fused, said stem, or its equivalent, can move or have motion; by which liberty to move, any valve may be liberated, or caused to open and let steam escape, or any alarm may be let off, or any index moved, so that this combination may act as an alarm indicator or safety apparatus.

I also claim, in combination with said alloy and plug, the heavy slotted weight, the lever, C, or its equivalent, and the safety or escape valve, and its ordinary weight, acting in the manner and for the purposes herein described.

C. EVANS.

No. 226.—*Improvement in Cream Freezers.*

What I claim as my invention, and desire to secure by letters patent, is the arrangement of scrapers, t^1 and *u*, at an angle with the bottom and sides of the vessel, as described, so that the action of the rotation shall throw the scrapers against the sides and bottom of the vessel.

E. C. SEAMAN.

No. 227.—*Improvement in Welding Cast-Iron to malleable Iron or Steel.*

Having thus fully described the nature of our improvement, what we claim therein as new, and for which we desire to secure letters patent, is uniting the steel and cast-iron, as described, by first preparing the steel in the manner set forth, and then causing the cast-iron to flow over and upon the surface of the steel thus prepared, substantially in the manner and for the purpose above set forth.

M. FISHER.
JOHN H. NORRIS.

No. 228.—*Improvement in Reaping Machines.*

Having thus fully described my invention, what I claim, and desire to secure by letters patent, is the crooked arm or coupling piece, separate or in combination with the cutter-bar, whether both be composed of one, two, or more pieces.

I also claim attaching, supporting, and sustaining said cutter-bar to the frame, relatively to the driving wheel, substantially as herein described and represented in fig. 2, and for the purpose set forth.

I also claim the endless chain sickled-edged cutter, in combination with the pulleys and rack-teeth, arranged and operating substantially in the manner and for the purpose set forth.

WM. F. KETCHUM.

DESIGNS.

No. 431.—*Designs for Stoves.*

What we claim as new and of our invention, and desire to secure by letters patent, is the design or ornament, shape, and configuration of stove plates as represented in the annexed drawings at D, E, F, figs. 1, 2, 3.

JAMES G. ABBOTT.
ARCHILUS LAWRENCE.

No. 432.—*Design for Stoves.*

What we claim as new, and desire to secure by letters patent, is the design and configuration of ornamental stove plates, substantially as described and represented at A, B, C, D, E, F, G, H, I, J, of the accompanying drawings.

JAS. G. ABBOTT.
ARCHILUS LAWRENCE.

No. 433.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the design and configuration of ornaments, arranged and combined substantially the same as represented.

SANFORD BURNAM.

No. 434.—*Design for Spoons.*

What we claim, therefore, is the use of the ornamental design, substantially as herein set forth, for the purpose of ornamenting spoons, forks, or other articles to which it may be applied.

HENRY HEBBARD.
JOHN POLHAMUS.

No. 435.—*Design for Stoves.*

What I claim as new and original, and wish to secure by letters patent, is the design and configuration of the several ornamental figures on the front and bottom plates of a certain stove, as represented in the annexed drawings, and as above described.

WM. SAVERY.

No. 436.—*Design for Stoves.*

What I claim as my invention, and desire to secure by letters patent, is the configuration and design of the several ornaments, and their mouldings, particularized on the front, sides, doors, legs, and feet of the stove, formed and arranged as depicted and described.

J. HARVEY CONKLIN.

No. 437.—*Design for Stoves.*

What we claim therein as new, and for which we desire to secure letters patent, is the foregoing described configuration of the plates, forming

an ornamental design for a stove, as represented and illustrated by the drawings.

JAMES WAGER.
DAVID PRATT.
VOLNEY RICHMOND.

No. 438.—*Design for Floor Oil-Cloth.*

What I claim as my invention, and desire to secure by letters patent, is the representation of trunks of trees and landscape, as in the accompanying drawings, for a design for floor oil-cloth.

JAS. PATERSON.

No. 439.—*Design for Coal Stoves.*

What I claim is the design and configuration of a cast stove, substantially the same as described and represented in the annexed drawing.

JOHN BURGESS.

No. 440.—*Design for Mantle, Grate-frame, and Summer-piece.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the figures, flowers, and ornaments herein represented; the whole forming an ornamental design for a mantle, grate-frame, and summer-piece.

JAMES L. JACKSON.

No. 441.—*Design for Grate-frame and Summer-piece.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented, and forming an ornamental design for a grate-frame and summer-piece.

JAMES L. JACKSON.

No. 442.—*Design for Grate-frames.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of ornamental figures herein represented, and forming an ornamental design for a grate-frame.

JAMES L. JACKSON.

No. 443.—*Design for Grate-frames.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented, and forming an ornamental design for a grate frame.

JAMES L. JACKSON.

No. 444.—*Design for Hair Combs.*

What I claim to be new and original, and desire to secure by letters patent, is the design and configuration of a ladies' hair comb as described above and represented in figures 1st and 2d.

JAS. SHIELDS.

No. 445.—*Design for Stoves.*

What we claim as our invention is the combination of the scrolls and foliage, arranged as set forth in the annexed drawings, so as to form an ornamental design for coal and wood parlor-stoves, to be known and called the Juno Parlor.

CONRAD HARRIS.
PAUL WILLIAM ZOINER.

No. 446.—*Design for Ladies' Hair Combs.*

What I claim as new, and desire to secure by letters patent, is the design, A, composed or formed of a series of ringlets or curls, (*a*,) said ringlets or curls forming a curve and placed on the upper part of the back of the comb; the ringlets or curls being in an inclined position, those on one side of the centre of the comb inclining in direction reverse from those on the other side, substantially as herein shown and described.

JAMES BLACKMAN.
CHARLES SKIDMORE.

No. 447.—*Design for a Grate-frame and Summer-piece.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented, and forming an ornamental design for a grate-frame and summer-piece.

JAMES L. JACKSON.

No. 448.—*Design for Stoves.*

What I claim therein as new, and desire to secure by letters patent, is the combination of the above ornaments, arranged as described.

JAMES LEFFEL.

No. 449.—*Design for Parlor Stoves.*

What we claim, and desire to secure by letters patent, is the design and configuration of stove, substantially the same as described and represented in the annexed drawings.

N. S. VEDDER.
WM. L. SANDERSON.

No. 450.—*Design for a Cooking Stove.*

Upon the general arrangement of said ornaments upon said stove as an original design, your petitioner asks a patent under the provisions of law in such case made and provided.

SAMUEL M. CARPENTER.

No. 451.—*Design for Cooking Stoves.*

What I desire to secure by letters patent is the configuration of and ornamenting the plates and panels of cooking stoves, substantially the same as herein represented and set forth.

JNO. J. SAVAGE.

No. 452.—*Design for Cooking Stoves.*

What we claim as our invention, and wish to secure by letters patent, is the application of the above design to cooking stoves.

ANTHONY J. GALLAGHER.
JOHN J. BAKER.

No. 453.—*Design for a Cooking Stove.*

What I claim as my invention, and desire to secure by letters patent, is the design and configuration of the conical rods, *l*, series of converging angular rays, *n*, central figure, *m*, and leg, *g*, as herein described, forming an ornamental design for a cooking stove.

S. H. SAILOR.

No. 454.—*Design for a Portable Furnace.*

What we claim, and desire to secure by letters patent, is the combination and arrangement of the ornaments herein represented and specified, making an ornamental design for a portable furnace.

JAS. G. ABBOTT.
ARCHILUS LAWRENCE.

No. 455.—*Design for a Cooking Stove.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the ornamental sheaf work, vine and flower work, &c., herein-above described and represented in the drawings, for the front, side, and back plates of a cooking stove.

APOLLOS RICHMOND.

No. 456.—*Design for Cooking Stove.*

What I claim as my invention or production, and desire to have secured to me by letters patent, is the design and configuration of the ornamental stove, all in combination, as herein substantially specified and represented in the accompanying drawings.

HOSEA H. HUNTLEY.

No. 457.—*Design for Cook Stoves.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the ornamental mouldings,

ribs, and rays, herein above described and represented in the drawings, for the side plate of a cooking stove.

THOMAS A. HERRICK.

No. 458.—*Design for a Cook Stove.*

What we claim as new, and desire to secure by letters patent, is the ornamental design and configuration of cook stove, the same as herein described and represented in the annexed drawing.

N. S. VEDDER.
WM. L. SANDERSON.

No. 459.—*Design for Ladies' Hair Combs.*

What I claim as my invention, and wish to secure by letters patent, is the design and configuration of fancy combs above described, and herein set forth.

WM. REDHEFFER.

No. 460.—*Design for a Towel Stand.*

I claim the ornamental design or configuration, substantially as represented in the drawings.

NATH'L WATERMAN.

No. 461.—*Design for a Portable Grate.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the sunken panels, leaf-scrolls, and ornamental mouldings, herein-above described and represented in the drawings, for the front of a portable grate.

DAVID THOMSON.

No. 462.—*Design for a Parlor Stove.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the several mouldings and ornaments as arranged together; the whole forming an ornamental design for a parlor stove, as herein set forth and described.

SAM'L D. VOSE.

No. 463.—*Design for a Coal Stove.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the several mouldings and ornaments as arranged together; the whole forming an ornamental design for a coal-burner stove, as herein set forth and described.

SAMUEL D. VOSE.

No. 464.—*Design for a Box Stove.*

What I claim as my invention, and desire to secure by letters patent, is the combinations of the several mouldings and ornaments as arranged together; the whole forming an ornamental design for a box-stove, as herein set forth and described.

SAMUEL D. VOSE.

No. 465.—*Design for a Parlor Cook Stove.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the several mouldings and ornaments as arranged together; the whole forming an ornamental design for a parlor cook stove, as herein set forth and described.

SAMUEL D. VOSE.

No. 466.—*Design for a Dining-room Stove.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental form, design, and configuration, as herein described and represented, of the stove as a whole, and also of the several plates, the feet, and vase, separately.

WM. L. SANDERSON.

No. 467.—*Design for a Cooking-Stove.*

What I claim as my invention, and desire to secure by letters patent, is the design and configuration of the ornaments and mouldings herein described, constituting a design for a cooking-stove.

S. W. GIBBS.

No. 468.—*Design for a Cooking Stove.*

What I claim as my invention, and desire to secure by letters patent, is the design, combination, and arrangement of the several mouldings and ornaments upon the plates forming the stove, and also the configuration of the mouldings and ornaments upon each of the doors, and of the feet, substantially as described and represented.

JAMES H. CONKLIN.

No. 469.—*Design for a Parlor Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of parlor-stove, the same as herein described and represented in the annexed drawing.

J. D. GREEN.

No. 470.—*Design for Cooking Stove.*

What we claim as our invention or production, is the ornamental design for a cooking-stove, substantially as represented in the accompanying drawings; and we also particularly claim the combination of the star, shield, and radial lance heads, as exhibited in the panel of the larger door of the side plate.

WILLIAM F. PRATT.
GEORGE W. BOSWORTH.

No. 471.—*Design for a Cooking Stove.*

What I claim as my invention, and desire to secure by letters patent, is the combination of the several mouldings and ornaments as arranged together; the whole forming an ornamental design for an air-tight cook-stove, as herein set forth and described.

SAMUEL D. VOSE.

No. 472.—*Design for a Hat and Umbrella Stand.*

What I claim as my invention, and desire to secure by letters patent, is the new design for a hat and umbrella stand, consisting of the ornamental figures above set forth, and represented in the accompanying drawings.

CHARLES ZEUNER.

No. 473.—*Design for a Portable Grate.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the gothic arches, mouldings, pendants, &c., herein above described and represented in the drawings, for a portable grate.

APOLLOS RICHMOND.

No. 474.—*Design for Parlor Stove Plates.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the mouldings, raised points, vine and leaf work herein-above described and represented in the drawings, for the top, bottom, and side plates of a parlor stove.

AMOS PAUL.

No. 475.—*Design for the front and side plates of a Cooking Stove.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the mouldings, spear-heads, and stars with rosettes, herein above described and represented in the drawings, for the front and side plates of a cooking-stove.

DUTEE ARNOLD.

No. 476.—*Design for a Medallion of Daniel Webster.*

What I claim is the design of a medallion of Daniel Webster, as represented in the drawings above referred to.

PETER STEPHENSON.

No. 477.—*Design for Cooking Stove.*

What I claim as new, and desire to secure by letters patent, is the combination of the ornaments, A, B, C, with the panels, D, E, F, raised on the surface of the side plate of the stove.

SAMUEL EBERLY.

No. 478.—*Design for a Water Cooler.*

What I claim as my production, and desire to have secured to me by letters patent, is the design and configuration of an ornamental water-cooler, substantially as described and represented in the annexed drawings.

PATRICK MOLONY.

No. 479.—*Design for a Cooking Stove.*

We do not claim the exclusive right to the general construction of the stove; but what we do claim is the design and configuration of the ornaments and mouldings, as described and set forth in the accompanying drawings.

RUSSELL WHEELER.
S. A. BAILEY.

No. 480.—*Design for a Cooking Stove.*

What we claim as our invention, and desire to secure by letters patent, is the design and configuration of the mouldings, conical rods, *f*, petals, *i*, rosette, *c*, scroll, *e*, and foot, *g*, as herein described, forming an ornamental design for a cooking stove.

GARRETTSON SMITH.
HENRY BROWN.
J. HOLZER.

No. 481.—*Design for a Grate-frame and Fender.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented, and forming an ornamental design for a grate-frame and fender.

JAMES L. JACKSON.

No. 482.—*Design for a Grate-frame and Fender.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented, and forming an ornamental design for a grate frame and fender.

JAMES L. JACKSON.

No. 483.—*Design for a Grate-frame, Summer-piece, and Fender.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented, and forming an ornamental design for a grate frame, summer-piece, and box fender.

JAMES L. JACKSON.

No. 484.—*Design for Cooking Stove.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental designs for a flat-top cooking stove, as herein described and arranged and represented in the annexed drawing.

FREDERICK SCHULTZ.

No. 485.—*Design for a Stove.*

What we claim as our invention, and desire to secure by letters patent, is the ornamental designs for a nine plate stove, as herein described and represented in the annexed drawings.

J. BEESLEY.
EDWARD DELANY.

No. 486.—*Design for a Cooking Stove.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental designs for a stove called Complete Cook, as herein described and represented in the annexed drawings.

J. BEESLEY.

No. 487.—*Design for a Parlor Stove.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the bead and lattice work and human figures herein above described, and represented in the drawings, for a parlor stove.

DUTEE ARNOLD.

No. 488.—*Design for a Six-plate Stove.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together an ornamental design for six-plate stove.

SAMUEL F. PRATT.

No. 489.—*Design for a Cooking Stove.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together an ornamental design for a cooking stove.

JOHN S. PERRY.

No. 490.—*Design for a Cooking Stove.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms represented in the accompanying drawings, forming together an ornamental design for a cooking stove.

JOHN S. PERRY.

No. 491.—*Design for Parlor Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of stove plates, the same as herein described and represented in the annexed drawings.

EZRA RIPLEY.

No. 492.—*Design of a Parlor Stove Plate.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of stove-plate, the same as herein described and represented in the annexed drawings.

SAMUEL A. HOUSE.

No. 493.—*Design for the Top and Front Plates of a Parlor Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of parlor-stove top and front plates, the same as herein described and represented in the annexed drawings.

SAMUEL A. HOUSE.

No. 494.—*Design for Parlor Stove Front.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of stove front, the same as herein described and represented in the annexed drawings.

SAMUEL A. HOUSE.

No. 495.—*Design for a Medallion of General Scott.*

What I claim is the design of a medallion of Winfield Scott, as represented in the drawings above referred to.

PETER STEPHENSON.

No. 496.—*Design for a Medallion of Franklin Pierce.*

What I claim is the design of a medallion of Franklin Pierce, as represented in the drawings above referred to.

PETER STEPHENSON.

No. 497.—*Design for a Coal Stove.*

What I claim as my invention, and desire to secure by letters patent, is the within-described design, configuration, and general arrangement of the forms, ornaments, and mouldings upon the stove as a whole, and upon the following parts individually: the side, back, and front plates, doors, bottom plate, top plate and cover, feet, water vase, cover and front of ash-pit; the whole being shown in the accompanying drawings.

WM. L. SANDERSON.

No. 498.—*Design for a Cooking Stove.*

I do not claim any detailed part of the mouldings, or configuration. What I claim as my invention, and desire to secure by letters patent, is the general combination of the several mouldings and ornaments as arranged together; the whole forming an ornamental cooking stove, as herein set forth and described.

SAMUEL D. VOSE.

No. 499.—*Design for Parlor Stove.*

What we claim as our invention, and desire to secure by letters patent, is the combination of the scrolls and foliage, arranged as set forth in the annexed drawing, so as to form an ornamental design for parlor stoves, to be known and called the "Cottage Franklin."

CONRAD HARRIS.
PAUL WILLIAM ZOINER.

No. 500.—*Design for a Cook Stove.*

I do not claim any detailed part of the mouldings or configuration. What I claim as my invention, and desire to secure by letters patent, is the general combination of the several mouldings and ornaments as arranged together; the whole forming an ornamental air-tight cook-stove, as herein set forth and described.

SAMUEL D. VOSE.

No. 501.—*Design for a Cook Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove, the same as herein described and represented in the annexed drawing.

N. S. VEDDER.

No. 502.—*Design for Parlor Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of stove plates, the same as herein described and represented in the annexed drawings.

JAMES J. DUDLEY.

No. 503.—*Design for a Camera Stand.*

I will proceed to state what I claim and desire to secure by letters patent. What I claim, therefore, is the design and configuration of the several ornaments, forming, in combination, an ornamental stand for cameras and other purposes, as described and set forth.

W. A. ALLEN.

No. 504.—*Design for a Wire Fence.*

What I claim as my invention, and desire to secure by letters patent, is the design of a wire fence, ornamented as herein described and shown in the accompanying drawings.

FRANCIS KILBURN.

No. 505.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the design and configuration, as herein shown, of the stove, as a whole, and of the front, back, and side plates, severally.

ORIN W. ANDREWS.

No. 506.—*Design for a Cooking Stove.*

What I claim as my invention or production, is the ornamental design for a cooking stove, substantially as represented in the accompanying drawings.

CHARLES B. TUTTLE.

No. 507.—*Design for a Grate-frame and Summer-piece.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented; the whole forming an ornamental design for a grate-frame and summer piece.

ADAM HAMPTON.

No. 508.—*Design for a Table-frame and Legs.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the scroll, vine, and leaf work herein above described and represented in the drawings, for the side-piece, leg, and cross-brace of a table.

WALTER BRYENT.

No. 509.—*Design for a Grate-frame.*

What I claim therein as new, and desire to secure by letters patent, is the combination and arrangement of the ornamental figures herein represented; the whole forming an ornamental design for a grate-frame.

JAMES L. JACKSON.

No. 510.—*Design for Parlor Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of top and front stove-plates, such as herein described and represented in the annexed drawings.

N. S. VEDDER

No. 511.—*Design for a Cooking Stove.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms, represented in the accompanying drawings, forming together an ornamental design for a cooking stove.

ELIHU SMITH.

No. 512.—*Design for Forks, Spoons, &c.*

We do not claim the outline of the spoon, fork, ladle, &c.; but what we do claim, and desire to secure by letters patent, is the design and configuration of the ornaments for spoons, forks, ladles, knives, sugar-tongs, &c., above described and set forth in the accompanying drawings.

ROBT. TAYLOR.
ROBERT DICKSON LAURIE.

No. 513.—*Design for a Cooking Range.*

We claim the design, consisting of the combination of the wheat sheaf, running vine, and enclosing fillet or bead, as placed on each of the oven or fireplace or chamber doors; and we also claim the ornamental design on either of the plates, A, B, R, S, as described.

BENJAMIN WARDWELL.
EPHRAIM R. BARSTOW.

No. 514.—*Design for a Cast-iron Cradle.*

What I claim as my invention, and desire to secure by letters patent, is the design and configuration of the ornaments upon the body, A, A, fig. 1, and upon the sectional parts represented by figs. 2 and 4, combined, as in the drawing hereunto annexed, to form an ornamental iron cradle.

P. M. HUTTON.

No. 515.—*Design for a Cooking Stove.*

What we claim therein as new, and for which we desire to secure letters patent, is the above-described ornamental design and configuration of the plates, as represented.

JAMES WAGER.
VOLNEY RICHMOND.
HARVEY SMITH.

No. 516.—*Design for a Cooking Stove.*

I claim as new, and of my production, the general ornamental design and configuration as exhibited in the drawings, and especially claim the design of each of the fireplace doors, and that of the oven doors.

JOSEPH PRATT.

No. 517.—*Design for a Pump Curb.*

What we claim as our invention, and desire to secure by letters patent, is the combination and arrangement of ornamental forms, carvings, and configurations, as represented in the annexed drawing, (fig. 1,) making an ornamental design for the curb of a chain pump.

JOHN W. WHEELER.
O. B. LATHAM.

No. 518.—*Design for Stove Plates.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the bead-work, mouldings, and ornamental configurations, herein-above described and represented in the drawings, for the side-plate of a cooking stove.

WILLIAM M. SNOW.

No. 519.—*Design for a Cook Stove.*

What I claim as new, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove plates, such as herein described and represented in the annexed drawing.

N. S. VEDDER.

No. 520.—*Design for a Parlor Stove.*

What I claim as my invention, and desire to secure by letters patent, is the design and configuration of the several plates, and of the feet, and also of the ornaments, *a*, *b*, *c*, *d*, *e*, *h*, *f*, *g*, and *m*, separately, as herein shown and described.

WASHBURN RACE.

No. 521.—*Design for a Pedestal and Column.*

What I claim, and desire to secure by letters patent, is the ornamental design on the pedestal, consisting of the combination of the grapes, leaves, scrolls, and face, in alto or basso rilievo, as shown; and also the ornaments for the base, shaft, and capital of the column, herein described and shown in fig. 2 of the accompanying drawing.

THOS. LAW.

No. 522.—*Design for a Parlor Stove.*

What I claim as my invention or production, and desire to secure by letters patent, is the ornamental design of the top plate, A, the bed plate, B, the grate plate, C, the door frame, D, the foot, E, and the column base, F, of the stove called "the Radiator," as fully set forth and described in this specification and the annexed drawings.

S. H. SAILOR.

No. 523.—*Design for a Cannon Stove.*

What I claim as my invention or production, and desire to secure by letters patent, is the new and ornamental design upon the bed-plate, A,

the lower part, B, of the body of the stove, the grate plate, C, the octagon frame, D, the top plate, H, and the leg, E, of the stove called "the Octagon Cannon," combined, arranged, and having the configuration set forth and fully described in this specification and the annexed drawings.

S. H. SAILOR.

No. 524.—*Design for a Stove.*

What I claim as my invention or production, and desire to secure by letters patent, is the ornamental design upon the front ends and feet of the stove, as fully described in this specification and the accompanying drawings.

S. H. SAILOR.

No. 525.—*Design for Stove Plates.*

What I claim as my invention or production, and desire to secure by letters patent, is the ornamental design of the oven doors, A, the cleaning door, C, the feeding door, D, the ash-hole door, E, and the configuration and arrangement of the mouldings and ornaments of the frames, B and F, as set forth and described in this specification and the annexed drawings.

S. H. SAILOR.

No. 526.—*Design for a Franklin Stove.*

I claim as new, and of my production, the said ornamental design, substantially as exhibited in the drawings, and above explained.

JOSEPH PRATT.

No. 527.—*Design for a Parlor Grate.*

I claim as new, and of my production, the design and configuration of the ornaments of the front plate and mantel or top plate of the fire-place, the hearth, the fender plate, and the blower, as represented in the drawings, and as above described; the whole forming an ornamental design for a parlor plate.

JOSEPH PRATT.

No. 528.—*Design for a Parlor Stove.*

What I claim as my production, and desire to have secured to me by letters patent, is the new design, consisting of the ornamental configurations and raised figures herein-above described and represented in the drawings, for a parlor stove.

DUTEE ARNOLD.

No. 529.—*Design for a Franklin Stove.*

What I claim as my production, and desire to secure by letters patent, is the combination and arrangement of ornamental figures and forms, represented in the accompanying drawings, forming together an ornamental design for a Franklin stove.

SAMUEL F. PRATT.

No. 530.—*Design for Window Blinds.*

What I claim, and desire to secure by letters patent, is the design and configuration given the slats of window blinds, as above described and set forth in the annexed drawings.

NATHAN CHAPIN.

No. 531.—*Design for a Cook Stove.*

What we claim as new, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove, such as herein described and represented in the annexed drawing.

EZRA RIPLEY.
N. S. VEDDER.

No. 532.—*Design for a Box Stove.*

What we claim therein as new, and for which we desire to secure letters patent, is the foregoing configuration of the ornaments upon the plates, forming an ornamental design for a stove, illustrated and represented by the drawings.

JAMES WAGER.
VOLNEY RICHMOND.
HARVEY SMITH.

No. 533.—*Design for Iron Railing.*

What I claim as my invention, and desire to secure letters patent for, is a design for ornamental iron railing, as described in the above specification, and illustrated in the accompanying drawings.

N. T. HORTON.

No. 534.—*Design for a Coal Stove.*

What I claim as my invention, and desire to secure by letters patent, is the ornamental design and configuration of the stove, A, and door, E, and also the ornamental openings, B, B, D, D, F, F, G, G, and H, H, in combination with the different mouldings, as herein shown and described.

GILBERT KNAPP.
ADNAH H. NEAL.

No. 535.—*Design for Stove Plates.*

What we claim as new therein is the embellished panel of the plate of the configuration herein represented and described.

SHERMAN S. JEWETT.
FRANCIS H. ROOT.

No. 536.—*Design for a Cooking Stove.*

What we claim as new therein, and desire to secure by letters patent, is the configuration and arrangement of the several devices, ornamenting

the panels and doors, the same consisting of annular mouldings surrounding the apex of a dished or hollow cone surface, formed of converging fillets, whose outer ends form a scalloped outline, or border, for the panel, as represented and described.

SHERMAN S. JEWETT.
FRANCIS H. ROOT.

No. 537.—*Design for a Hearth Plate.*

What we claim as new, and for which we desire to secure letters patent, is the foregoing design and configuration of the plates, forming an ornamental design for a stove, as illustrated and represented by the drawings.

JAMES WAGER.
VOLNEY RICHMOND.
HARVEY SMITH.

No. 538.—*Design for a Spittoon.*

We claim the design of the shape and configuration of spittoon shown in the drawing.

W. L. PEARSALL.
S. W. PEARSALL.

No. 539.—*Design for a Girandole.*

What I claim as my production, and desire to secure by letters patent, is the arrangement and combination of the foliage, drapery, human figure, and flowers, as set forth in the accompanying drawings, forming an ornamental design for a girandole.

ROBERT E. DIETZ.

EXTENSIONS.

Improvement in Planing Machines.

What I claim of the above-described improvements, and desire to secure by letters patent, are the grooves, or channels, in the face of the plane-stocks, with the arrangement of the cutters corresponding with the grooves, whereby the extra thickness of a plank or board is taken off, or reduced with greater ease and effect; the particular arrangement and construction of the plates, or slides, to which the cutters are fastened; the clamps, with the back plates, for guiding the plank or boards, and keeping them in a straight direction; the cross-slides, with their springs, for supporting the plank in the operation of planing. And I also claim the general combination of the parts of the machine taken as a whole; for, although many of the parts taken individually are not new, yet the machine, as above described, is sufficiently characterized by the arrangements of its respective parts, whether old or new, to distinguish it from others previously constructed for the same purpose.

BRS. LANGDON.

Improvement in Planing Machines.

What I claim of the above-described improvements as my invention, and desire to secure by letters patent, is the slide, with its seat, or chucks, for holding the shingle and giving it its proper taper; the manner of securing it in its bed by means of the clamps, and carrying it before the face of the plane; and also the general combination of the different parts, by the union and arrangement of which the aforesaid results are produced in the manner above described.

B. LANGDON.

Improvement in the construction of Gafts of Sail Vessels.

What I claim as my invention, and desire to secure by letters patent, is the application of a saddle in the swallow-tail of the gaft of said vessel, constructed and operating in the manner set forth.

JOHN BROWN.

DISCLAIMERS.

Improvement in the construction of Violins, &c.

Your petitioner, therefore, hereby disclaims so much and such parts of his said claim, in said specification set forth, as is or are intended to claim as something first invented by him, or to secure to him or his representatives the exclusive right to use or vend the brace-bar, or supporter, aforesaid, for the purposes, or any of the purposes, in the said specification indicated.

WM. B. TILTON.

Improvement in Apparatus for Dyeing.

Your petitioner, therefore, hereby enters his disclaimer to that part of the claim in the aforementioned specification, whereby is claimed any particular apparatus for dyeing with liquid dyeing material by stopping off or excluding the same from certain portions of the cloth, according to the design, while it has free access to the other parts of the cloth, independently of the vertical frames, A, B, as a part of said apparatus; meaning, however, still to claim the mode of applying said principle by means of the apparatus, with the end frames, A, B, as specified in said letters patent, which disclaimer is to operate to the extent of the interest in said letters patent vested in your petitioner, who has paid ten dollars into the treasury of the United States, agreeably to the requirements of the act of Congress in that case made and provided.

JOHN HOLT.

ADDITIONAL IMPROVEMENTS.

No. 100.—*Improvement in Machine for making Horse-shoe Nails.*

I now claim as an improvement, additional to the first-named invention, such a combination under a different arrangement, or, in other words, I claim a new *arrangement* of the parts of such combination, by which I am enabled to operate them by a continuous circular motion of the sustaining frame of the cams around one axis, instead of a reciprocating rectilinear motion, such as is described in the specification of my said patent; my new arrangement enabling me to operate with much greater rapidity and advantage than by that before exhibited. My said new arrangement consists in arranging the several cams on radial and horizontal shafts in a rotating frame, E, in combination with arranging the working surface of the former, F, on a circular arc, to conform to the sweep of the wheel, and with a variation only sufficient to form that side of the nail which bears directly against it; the whole being substantially as represented in the drawings which make part of this my specification.

MARSHALL BURNETT.

No. 101.—*Improvement in the mode of cooling the hot Mashes of Distillers.*

Now what I claim as my additional invention, and desire to add to my former patent, granted January 20, 1852, is forcing cold air into the distillery mash through the hollow shaft, arms, and rake agitators, as above described, or by forcing it by a pipe, or pipes, into the bottom, or near it, of any common mashing machine, or tub.

FRED'K SEITZ.

No. 102.—*Improvement in Heddles of Weaver's Harness.*

Having thus described my improvement, what I claim as my invention, and desire to have added to my patent, is casting eyes of harness, or heddles, upon single or multiplied strands of worsted, silk, cotton, thread, or other material, in the manner and for the purpose herein set forth.

JACOB SENNEFF.

No. 103.—*Improvement in Hot Air Furnaces.*

My present improvement, therefore, and what I claim, consists in the above-described arrangement of the pipes, B, I, in combination with that of the arched pipes, F^2, C^1, G^1, and ash chambers, D^1, L^1, B^1, H^1, by which arrangement the products of combustion are divided after passing from the chamber of combustion, and made to flow through the several pipes and ash chambers, substantially as stated.

This arrangement is made to secure a shorter and stronger draught, with the same amount of radiating surface, and is designed to be used when the fire-pot is lined with soap stone.

GEO. S. G. SPENCE.

VII.

EXAMINERS' REPORTS.

SIR: In accordance with your request, I have the honor to submit a report of the number of cases received and acted upon, at the desk under my charge, during the year 1852.

These cases, and the action thereon, are, as usual, classed as follows:

Number of cases on hand January 1, 1852	1
Number of cases passed for issue during the year	165
Number of rejections, either formal or final	328
Whole number of actions on cases during the year	1,010
Number of cases on hand January 1, 1853	15

I also, in pursuance of your instructions, report the following epitome of the more noticeable inventions which have been examined by me during the years 1851 and '52, premising, in accordance with a conviction generally felt in this Office, that this meagre and imperfect sketch is but a poor substitute for that which ought to be a Patent Office Report, namely: a succinct and clear digest of every patent, accompanied, whenever necessary, with drawings prepared by some officer, or officers, of sufficient skill, who would be enabled to devote their whole time to this duty. The French Patent Office has for many years afforded an example, in this respect, worth imitation, not only by our own, but by other National Patent Offices; and the eagerness with which its published Brevets d'Invention are consulted by all who do business with or for the Patent Office, affords some idea of the immense demand that would accompany a similar American publication. Its importance as a guide to the trodden paths of invention, and as a continuous record of French ingenuity, cannot be overrated; and it may be safely said that a similar publication emanating from our own Office, and enriched by descriptions of American invention, which is prolific and original to a degree unknown in countries where labor is more plenty and where antiquity has more reverence, would be more sought after and more valued in our own country, and would afford to other civilized communities a knowledge of certain classes of machines and processes hitherto entirely unknown to them.

A different stage of civilization, different accidents of soil or climate, and different social features, must inevitably, in each different country, attract the spirit of invention in different channels. In countries where labor is cheap, luxury diffuse, and commerce has no existence,

invention will find its channels either in science or in those arts which conduce to luxury and refinement.

In those nations, under similar circumstances in other respects, but where commerce holds its place and takes a rank first in actual importance if not first in the estimation of its votaries, or of those who, looking at it through the eye of time-honored prejudice, regard business as vulgar, merchants as but hucksters on a large scale, and manufacturers as mean of spirit, sacrificing to gain all that ennobles or elevates human nature, experience proves that invention takes a wider, a more utilitarian and practical, and a more generally useful sphere.

It is, however, only in countries like our own, with vast territory, unbounded affluence of raw material, great energies devoted to the search after wealth and progress, where men are always stirring, with minds unbiassed by the slightest reverence for what is old, and where men's hands procure more by their daily labor than in any country that the sun ever shone upon, that invention assumes the true, practical, homely character of administering to the wants of all, however humble or lowly; and it is in such a country that ideas entirely novel are most often carried into practical operation.

As a natural result of such a state of affairs, and of the principle—more than once alluded to by me in other reports—that invention, like all other marketable articles, supplies the demand, there are in this country certain classes of machines and processes almost unknown in others; and it is a description of these that is wanted, not only by our own inventors, but by the world.

No country, for instance, possesses machines for working lumber in such perfection as our own; no country makes nails, and spikes, and screws, as we do; no country can compete with us in cheap, and at the same time useful, agricultural instruments. The rivers of no nation are graced by such efficient and beautiful steamboats as those which float upon our own eastern waters. The sea is furrowed by no ships which are equal in speed and beauty to our own. Our railroads are cheaper than those of any other portion of the globe, yet they are still durable, and render efficient service. Our bridges almost realize the fancy of the architect who would have modelled in size after the arch of the rainbow, and yet, with their enormous span, they cost but a tithe of those employed in other countries; and who is there who travels through our land who can be blind to the thousand and one comforts of the humble homes which are due solely to the ingenuity of their own countrymen? Who made for them their cheap stoves, furnaces, and cooking apparatus? Who afforded them furniture as comfortable as the most costly, and as low in price as the rudest? Who stopped the wintry air from every cranny of their dwellings? Who measured for them their time? Who gave them cheap publications? Who furnished them with cheap transport of the produce of their farms? Who enabled them to till thousands of acres, and secure their harvest with an amount of labor formerly only capable of working a garden? It was American inventors who have performed this task, and it is time that their deeds should be known.

In making these statements I do not mean to endorse the somewhat too current opinion that we succeed in all that we attempt, or that we essay and do whatever is done by others; and I do mean to acknowledge that we are far behind some of our contemporaries in many arts of taste and luxury, in many beauties of high finish, and in much of that solid and costly species of construction that is meant to endure for ages; but while thus admitting, I assert that the character of our inventions, whether in strict science or in the operative arts, is eminently practical, original, adapted to our own wants, and well suited, if known, to advance the happiness and elevate the social position of the middle and lower classes of other nations.

These general considerations are in themselves of no small importance, when considering the propriety of publishing suitable descriptions of American patents as they are issued; but the true practical end of the publication, for those most interested—namely, inventors themselves—is that it will furnish to those now engaged in plans or experiments, a guide to that which has been before done; warning them away from ideas already carried out, and now the property of others; placing before them records showing where experiment has failed, and what remains unattempted; and serving as a sort of dictionary of ingenious mechanical ideas on every art, which may be used in new combinations in diverse arts, and produce new and useful effects.

But while recommending strongly, and in accordance with views held for many years, this Annual Report, it seems to me proper to state my belief that any attempt at a systematic digest of American invention, from the commencement of the century up to the present day, would be likely to prove a signal failure,—that it would only rake up and uncover many crudities, useful indeed in their time, but now decayed, forgotten, and covered with a vigorous and useful growth of other contrivances, serving the same purpose in a more efficient manner.

Such a digest would afford pleasure to those who look at old inventions, as they do at other antiquities, and value all the more highly every article which is covered with the rust of ages, and is so rude and cumbersome as never to have been fit for modern use. It would gratify the curiosity of those who grope always in search of something which shall be identical with the last wonder, but ever find that some slight difference or some unexpected change meets their gaze, destroying all identity between the old and the new, and showing good reason for the disuse of the one and the general favor which is accorded to the other.

If such a digest be attempted, it should go no further back than the date of our present patent law; and if there be any question as to dispensing either with the digest or with the annual publication of patents, it seems to me easy to prove that the former is the one which should be abandoned.

The discussions on these subjects have at last reached the ears of those high in authority, and it is to be hoped that they will now vigorously follow up their somewhat tardy suggestions, and that Congress will see fit to authorize such a publication as may be creditable to the country and supply the want so long felt by those most deeply interested.

It seems well further to mention, before commencing my epitome, that during the last two years invention appears to have followed much in the ordinary channels. We have examined no striking novelties of principle, although we have been called upon to consider much that is useful and novel, either in detail or in new application of well understood laws. No sudden demand appears to have brought

many minds to reflect and invent upon the same subject, with the exception of that arising from the notice by the General Post Office that they were about making a new lock contract.

This notice brought in a flood of applications for patents in pad-locks: some ingenious, but impracticable; others new and useful; and others that had neither novelty, ingenuity, nor utility to recommend them. With this exception, the applications have borne their usual numerical relation to each other, no special branch occupying more than its ordinary space; and, in my notices of the machines patented under such applications during the last two years, I shall, in a great measure, follow the arrangement adopted in previous reports.

METALLURGY.

In the diversified class of *metallurgy*, there have been granted during the last year one hundred and fifteen patents, and among them may be noticed the following:

First. A novel form of reverberating furnace, which is designed to dispense with the labor usually expended in stirring and balling materials exposed to the action of the fire in this species of furnace. A grate, fire chamber, ash pit, &c., are, with the fire bridge, constructed of brick in the ordinary manner; and at the usual distance therefrom is built a chimney and horizontal passage leading into the same, also in the ordinary way.

The body of the furnace, the roof, and working bottom are omitted; and their place is supplied by a cylinder of cast-iron lined with fire-brick, and free to revolve upon metallic rollers.

This cylinder has an area about equal to that of the ordinary working chamber, is provided with a door fitted like a man hole or a hatch, and has revolution imparted to it by means of a cog wheel or a belt.

The materials, broken pig for instance, are introduced through the door, which is then closed; motion is now communicated to the horizontal cylinder, and each portion of its periphery in turn becomes the bottom, while the contents are rolled, or turned over and over, and continually exposed to the flame which passes through the cylinder on its way from the grate to the chimney.

It is obvious that every portion of the surface of each fragment will be exposed to the action of the flame, and that the mass, when melted, will be continually stirred or agitated as if acted upon by the ordinary rabble. I am not informed as to the fact of this furnace having been practically tested, but see few difficulties in the way of its successful operation, and these of such a character as may be easily remedied.

Another furnace of the same class, and having in view the saving of the same kind of labor, has been patented by another inventor, favorably known as a practical metallurgist.

The bottom of his furnace is a cast-iron table, circular in its contour, covered with brick, and revolving on a vertical axis under the ordinary fire brick roof of the reverberating furnace. Through the ordinary working door projects into the furnace and over the revolving bottom a rabble connected at its outer end to a slide, actuated by machinery which gives to the rabble a reciprocating motion. This slide runs upon a guide whose angle to the side of the furnace may be changed by the operator, and the rabble is thus forced to stir over every portion of the working bottom.

Ingenious arrangements for cooling the cast-iron plate and for packing it at its junction with the brick work are involved in the patent and form a part of the invention.

One of the most important inventions of the two years past is to be found described in a patent for the "foundry apparatus," which was granted to an inventor who has already obtained patents for machinery of somewhat similar character, and has long been experimenting on the practical minutiæ of apparatus which will accomplish for the founder that which other labor-saving machines have heretofore accomplished for other operatives. The first duty performed by the improved machine is the tempering of the sand, which is afterwards sifted and deposited in measured quantities in a flask; parting sand is then applied in the proper locality, and a pattern is forced into the flask. The machine then removes the pattern and delivers the flask in such position that an attendant may remove it from the machine and supply its place with an empty one. The measuring of the quantity of sand, and the use of a flask of a peculiar internal section depending upon the contour of the pattern, are found to be matters of vital importance to the successful action of the machine.

The inventor shapes the interior of the flask in such manner that there shall be the greatest depths or thicknesses of sand in the direction of the greatest compression caused by the forcing in of the pattern, and thus secures an equally hard face over the whole moulded surface.

The same patent includes a description of an improved core spindle, formed by casting or otherwise, making a long iron bar, whose section is a cross, and then wrapping the same from end to end with wire, which thus takes the form of a helix. This spindle is then coated with loam by means of a machine noticed in one of my previous reports, and, it is obvious, will serve as the nucleus of a core which will be more pervious to the air and less apt to blow than those ordinarily employed.

A method of connecting several flasks to a single sprue, contained in a separate flask or iron case, is also described and claimed.

The inventor rightly judges that his machine is chiefly, if not exclusively, applicable to small castings, and more especially to pipe of less than three inches diameter. Samples of its performances in the latter class of castings may be seen at the Patent Office, and are more perfect than any made by hand that have come under my inspection. It appears to me that the successful action of the machine cannot be doubted, and that its introduction will materially cheapen a most extensive branch of manufacture, and one which has hitherto received no aid from labor-saving machinery.

In the same branch of art has been patented an improvement in moulding pipe boxes, or hubs for wheels, which consists in turning off a small portion of the outer surface of the pattern, and supplying its place by a thin smooth piece of metal, whose interior is cylindrical, and whose outer periphery is a frustrum of an acute cone, or the interior surface may be parallel to the exterior. The inventor terms this piece a shield. In moulding, it is slipped over the pattern, which is rammed up, as usual, in a flask with a single parting. When the cope is lifted from the drag, it carries with it the shield, and leaves the rest of the pattern in the drag. The shield is now easily withdrawn, and perfect facility is afforded for lifting the remainder of the pattern from the solid cylinder of sand, which has been rammed into its interior, and constitutes the core.

Improvements have been patented in the manufacture of cast and wrought iron Venetian blinds. The improvement consists in a certain arrangement of the slats and cross pieces in the flask, and in casting the uprights upon them, attaching the whole together in such a manner that the finished article is not warped or twisted as it would be when the whole periphery is cast at the same time around wrought iron slats.

An improved method of lifting the ordinary trip hammer deserves notice, as by means of it any different degree of blow within the range of the lifting cams can be attained with a facility almost equal to that afforded by the steam hammer. In this contrivance the cam, instead of acting directly upon a lifting leg, acts upon the end of a lever, vibrating in a vertical plane, which embraces that leg. This lever is provided with a sort of toggle catch, which grasps the leg firmly whenever the lever is raised, but has no hold thereon when the lever is falling. A wedge enables the attendant to regulate the point to which this lever shall fall. The cams in their revolution strike it sooner or later, according to the distance it has been permitted to drop; and the instant that the lever commences to rise, it clasps and holds the leg, forcing the hammer up a distance proportioned to its own ascent only.

A simple improvement in anvils bids fair to obviate an important practical difficulty in their construction. This difficulty has its origin in the heat retained for a long time in the immense mass of metal behind, or rather below, the centre of the steel face in the process of hardening, which heat prevents the rapid cooling of the steel face, and generally leaves a soft spot near its centre. By forming the body of the anvil with a cavity of some size extending from its bottom nearly to its face, a portion of the metal at the centre is dispensed with, and facility for the introduction of a stream of cold water into the centre of the mass, and almost upon the bottom of the face, is afforded during the process of hardening. The centre of the mass is therefore cooled almost as rapidly as its exterior, and a sound and equally hard face is, in consequence, a matter of easy attainment.

Improvements in the gold-beating machine alluded to in my former report have also been patented. While these changes render the machine more complicated, they at the same time increase its efficiency; and the apparatus may somewhat, in the words of its French originator, be now said to have been promoted from its situation as an apprentice and taken its rank, not merely as a journeyman, but as a finished master workman. This machine, by means of a single cam acting through mechanism somewhat similar to the link motion of a steam-engine, gives many various ranges of motion to the mould, and has also a very beautiful contrivance for reversing the mould at the end of each definite number of strokes, so that the face lately acted upon by the hammer then rests on the anvil, and in turn takes its former position, and thus until the beating is completed. Several of these machines have been in actual use, and will, if reports can be trusted, much cheapen the manufacture of gold leaf.

The usual number of patents in apparatus for moving blinds and shutters without opening the sash has been granted. These inventions have, however, been patented as new ways of producing the old result, and do not appear to have materially cheapened the apparatus, nor do they perform in a much better or more certain manner the result which was

accomplished by their predecessors. The whole class has, however, called attention to the subject, and has imparted to northern dwellings a comfort which can only be appreciated by those who inhabit an inclement climate.

An improvement in file machines, presenting an easy method of giving different amounts of feed to the carriage which supports the blank at certain times firmly on its bed, while at others it gives it free motion to adapt itself to the chisel, has also been patented.

Machines of this class have long occupied the attention of the inventor, and have lately come into actual use; good coarse files made by one lately patented being in the possession of this Office. It does not appear, however, that any of them have, in the manufacture of *fine* files, been able to compete with that exquisite sense of touch which is the unfailing guide of the file cutter, and which, in many instances in this branch of manufacture, puts the blind workman on even a better footing than his comrade who has full possession of his sight.

Many of these machines have apparatus which actually set the chisel by feeling. Complication, however, must result from such a basis of action, and the present successful machines perhaps owe their efficiency in no small degree to the simplicity of movement which disregards inequalities in the texture of the blank, and, while it may spoil some files, is yet unfailing in its own power to produce, and does produce, a good article whenever a blank approaching to perfection is submitted to its action.

A very ingenious machine for separating blanks from a heated bar, bending them into shape, welding their ends together, and thus completing a link, and finally forming each new link inside of that previously formed, so that a junction is made, and a chain is progressively completed automatically, has been invented and patented.

This machine, like that of somewhat similar character described in my last report, is too complicated to be intelligibly described without drawings. It is moreover not improbable that many of the motions which act admirably in the model will fail entirely in the working machine, and that patient and persevering experiment will be required ere the whole contrivance assumes a thoroughly practical shape.

Among the many improvements in machinery for threading wood-screws. has been patented one whose cutter is somewhat like the fusee of a watch, with the difference that the grooves are in three sections, parallel to its axis, counterparts of the threads of the screw to be cut, and that these grooves are deeply notched or serrated, so as to form a series of cutters. This cutter has swift revolution on its axis, and its periphery revolves in contact with a blank, properly supported and presented to it; the blank also, revolving in the same direction as the cutter, and having a slight motion in the direction of the axes of the cutter, is gradually pressed against its periphery, so as first to mark, then to deepen, and finally to finish, its thread.

These are the main characteristics of the machine, which is provided with many other ingenious contrivances, subordinate, indeed, to the general principle, but essential to its prompt and correct action. The rapidity with which this machine performs its work, and the accuracy and beauty of the screws made by it, are equally wonderful. I do not precisely define its speed, nor the number of small screws that it will turn out per

hour; but I am credibly informed and believe that its introduction into use will make it quite as profitable for the manufacturer to sell the smaller as it now is for him to dispose of medium sized screws.

Good nuts, that shall at the same time be cheap, and must of necessity be machine-made, have long been a desideratum, and several inventors have during the last two years produced machines which finish and turn out nuts much cheaper and better than any that are manufactured by hand. These machines are similar in many points, and in noticing them I shall confine myself to a description of one which will serve as a type of the whole; it is likewise the machine which appears to me most perfect in its organization, and the only one of whose performance I have seen large specimens.

A heated iron bar, about the width and thickness of the intended nut, is advanced over a die-box of the exact shape of the periphery of the nut to be made. A die then descends, severs a blank from the bar, and forces it into the die-box. This die is bored out precisely to the same size as the aperture required in the nut, and, as it carries the blank along, forces it, still enclosed in the box, against a cylindrical punch, which punches out the hole, carrying the disk it severs, and finally entering, itself, into the aperture in the die.

This die, with the nut now punched out, and upon the punch in front of it, still advances until it brings the nut in contact with the face of another die, which, like itself, fills the die-box, and commences to move in the same direction as the first die is travelling, but with a less velocity.

The nut is therefore submitted to powerful pressure between these two dies while still on the punch, and all cracks incident to the cutting or punching of it are thoroughly welded up, while the exterior of the nut is forced so strongly into the moulded faces of the dies that, when discharged from the machine, it is nearly equal in smoothness to a nut that has been planed.

Actual experiment has proved that the compression is an essential part of the operation, and that nuts merely severed and punched are not only rough in appearance, but are so filled with cracks as to be unable to withstand the strain to which they must be subjected.

In an improved process for making axes, the workman cuts from a bar as wide as the narrowest part of the axe, and half its thickness; below the pole, a blank twice as long as the distance from the inside of the steel pole to the inside of the edge. This blank is, by appropriate machinery, first flattened and consequently widened at the points which are to constitute the sides of the eye, and finally at those points forged into two half eyes, and, as far as the outside is concerned, into precisely the shape of the sides of the finished axe.

By means of a species of shears, this blank is now cut nearly in two at its centre, the line of the cut being perpendicular to the length of the blank, and the cut being made from the surface which is to form the outside of the axe. The two halves are now doubled on each other, heated, and welded each to each. The edge is then inserted, the steeling at the pole welded on, and a finisher completes the instrument.

Those concerned in the trade will appreciate the simplicity of the new method, and the easy manner in which it overcomes the difficulties incident to the old process.

A machine which forms perfectly the thimbles, so termed, used in large quantities in the rigging of vessels, has been patented. These thimbles are metallic rings, or short cylinders, whose outsides are grooved, and whose insides are convex to the same extent that the exterior is concave. In the machinery for making them, two shafts are so arranged as to revolve at the same time and in the same direction, and have a common axis. They are also so fitted that, while revolving, they can be made to approach or recede from each other. The contiguous ends of these shafts are each provided with a forming disk, whose diameter is least upon that side of it which is at the end of the shaft, and gradually increases in a concave curve to the other side, which is of a diameter equal to the greatest inside diameter of the thimble to be formed. Each disk exactly fills one half of a finished thimble, and when their adjacent sides are, by the motion above ascribed to the shafts, brought in contact, they entirely fill a finished thimble. A hammer, whose face is an exact counterpart of about one-quarter of the outside of the thimble, is arranged in such manner as to strike repeated blows upon a piece of iron sufficiently heated, and thrust in between it and the disks above cited.

In the working of the machine a lever is moved which brings the disks in contact. A piece of iron, in length equal to the circumference of the thimble to be made, is then introduced between the disks and the hammer. The disks then revolve, and the hammer forces the iron into the groove, and at the same time bends it into a circular form.

As the disks revolve, new surfaces are brought under the action of the hammer, and a thimble is finally formed, closely enclosing the two disks. These are then separated by the action of the lever, and, as they revolve on horizontal shafts, the finished thimble drops down between them.

The thimbles formed by this machine are not only cheaper, but better finished, smoother, and more regularly shaped, than those made by hand.

In another machine, emanating from the same inventor, the forging of iron into a certain class of shapes, is performed with expedition and certainty. In this machine a roller is mounted upon a carriage, in such a manner that a large portion of its periphery projects outwards, free from the carriage.

Two such carriages, each with a roller, are located opposite to each other, and are capable of being moved by machinery back and forth through a certain distance; each roller being opposite to the other, and located between its own and the other carriage. These carriages are, by means of guides, forced to move in curved lines of any given shape, and these guides can, while the machine is in motion, be forced to approach or recede from each other.

An iron rod properly heated is, while the carriages are in motion, placed in a check or tongs capable of revolution on a centre in such manner that the rod passes between the two carriages and their rollers. The carriages are now caused to approach, and as they approach they reciprocate, and their rollers touch the rod; the latter commence to revolve and draw out the iron. The rod is also revolved continuously or through a given arc, and then stopped and moved again. By a continuation of these motions, figures of revolution, generated by various curves or figures of polygonal cross section, and regularly irregular longitudinal section, are forged out with great speed and precision.

An automatic machine for performing, on a large scale, the well known metallurgic operation of spinning up cups, platters, and such like articles, from a flat disk in a lathe, is also worthy of notice. In this machine large copper kettles, known in the shops as brass batteries, and usually shaped by repeated blows of a small hand hammer, are formed with great rapidity, and with a beauty and finish never attained by the hand-made article. A species of burnisher, sometimes provided with a friction roller, is forced, by means of curved slots acting in connexion with screws and guides, to travel in tolerably close contact with the exterior of a revolving conical mandril formed of cast-iron. The flat sheet of metal is clamped upon the apex of this conical-former, revolves with it, and is gradually, by the action of the burnisher, forced to conform exactly to its shape. Several formers, each deviating more from a disk, and approaching more nearly to the form of the finished kettle, are used before the operation is completed, in order to bring the metal gradually, and by successive stages, into its new shape, and avoid all straining that might be injurious to the finished article.

This contrivance is now in use. Its productions will speak for themselves, and will, on account of their superior beauty, have the preference over the old article, even if the inventor should not reduce the price to that extent which the labor-saving qualities of his machine would fully warrant.

The lock exhibited by Mr. Hobbs at the World's Fair, which, in connexion with the lock-picking achievement of the same gentleman, created so great sensation in this country and in England, was patented in its most approved form in 1851; its great feature of security having, however, been invented by, and patented to, the same inventor several years since. This lock is so intricate and complex, that it is perfectly impossible, without drawings, to give any good idea of its minor characteristics or of the mechanical arrangements which are absolutely necessary to its action.

As the feature upon which its unpickability (if I may so coin the word) depends seems but little known and less understood, I will endeavor to describe it: In an ordinary tumbler lock and bolt, which is a sliding piece of metal which has projecting from it a pin, this pin, when the lock is on the door, usually projects horizontally towards the face of the lock. Between the bolt and this same face lie one or more thin metal plates which slide up and down vertically, but cannot move horizontally. One edge of each of these tumblers abuts directly against the pin above named when the bolt is shot. Now, it is clear that, to move the bolt back, one must either break the pin or move the tumblers out of the way; but these are so long that they cannot be moved up sufficiently far to let the pin pass below them, nor down far enough to let the pin pass above them; the top or the bottom of each tumbler, in the one case or the other, striking the lock-rim, or some firm stops, which prevents its further motion. Each tumbler has, therefore, cut in it a long, nearly horizontal, slit of the precise width of the pin, and if by any means each tumbler can be moved so that its slit comes opposite the pin, then will the pin enter all the slits at once, when the bolt is pushed back, and may be unlocked. If any one tumbler is lifted up too far, or not far enough, it will bar the passage of the pin, and the lock cannot be opened. The right key is so shaped that, when turned, its bits perform the duty of lifting

these tumblers. When a person skilled in the art, for so it may be termed, attempts to pick such a lock, he first, by some means, (a sharp-pointed crooked wire, for instance, introduced through the key-hole,) shoves the bolt back until the pin bears forcibly against the faces of the tumblers. By means of another wire, he then shoves up or moves each tumbler separately until the sense of feeling tells him that the notch therein is opposite the pin. An increased facility of motion in the tumbler is one certain guide of this point being reached; or if the tumblers be weak and the pressure on the bolt strong, a click will be heard, and the tumbler may remain resting precisely at the proper point. As the proper position of each tumbler is ascertained, it is carefully measured and noted down. When all the positions are discovered, each tumbler is lifted and held at the right height, and the bolt is moved, the pin enters the slits and the lock flies open. This operation as described may seem easy, and it is so to those who, to a delicate touch and mechanical dexterity, add perfect knowledge not only of the principles of locks, but also of the construction of the precise kind of lock they intend to pick. Those who undertake to pick a lock without these requisites will find their task not only difficult, but absolutely unaccomplishable. Many ingenious attempts have been made by the locksmiths to obviate these defects, to render their locks and the doors to which they are attached impenetrable, withstanding the explosive force of powder, the battering of the sledge, the pressure of the screw, or the persevering ingenuity and practical skill of the lock-picker.

Either side, in its turn, has had the mastery; and as in the history of the defence and attack of fortified places, either the defender or the attacker has at times been certain of maintaining his own, or equally sure that he can conquer the strong-hold of his opposer, so at some periods have those who have the care of valuables placed perfect security in their doors and locks, and at others dreaded the attempt of some experienced burglar, to whom neither bolt, nor bar, nor metal door presented insurmountable obstacles, and whose mechanical skill was certain to obtain the prize he coveted.

The lock, whose great feature I am now essaying to describe, was the first that, to my knowledge, presented a certain barrier to the pick-lock, however skilful; and doors that I will hereafter notice are the first which will completely withstand either drill or sledge. This lock is powder-proof, and may be loaded through the key-hole and fired until the burglar is tired of his fruitless work, or fears that the report of his explosions will bring to view his experiments more witnesses than he desires.

In it the pin on the bolt does not abut against the tumblers, but against other sliding pieces which cannot be reached through the key-hole, having between it and them strong steel partitions. These pieces may be termed secondary tumblers, and are furnished with slits like the tumblers first named in this section. These secondary tumblers are connected with the true tumblers, through the agency of slender springs, in such manner that the true tumblers will raise the secondary just as they themselves are lifted, when no obstacle obstructs the movement of the secondary tumblers. Now if the lock be locked, and the proper key applied and turned, it first lifts the true tumblers to the proper height; these, while being raised, lift the secondaries by the springs

until their slits are at the proper height, when the pin enters, and the bolt is retracted by the further turning of the key. If the lock be locked, and an attempt is made to pick it, the bolt is first forcibly shoved back until its pin strikes the edges of the secondary tumblers; its pressure upon these prevents the light springs from moving them, and the burglar may move the true tumblers up and down, amusing himself as long as he desires, without altering at all the position of the secondary tumblers, or obtaining any indication as to the locality in which they must be placed before the bolt can be moved. The partitions above named prevent any direct application of force to the secondary tumblers, and unless the former can be blown or drilled away, which many years' test has proved impossible, the lock stands impervious to any instrument except the proper key.

Another lock is so constructed that when the key-hole is open no access can be had to the tumblers. When the key, which is merely a series of bits without a pipe, is introduced, a knob is turned, which revolves a disk inside the lock which covers the key hole, and as it revolves further, the key-hole remaining shut, uncovers the passage to the tumbler. A cam on the spindle of the disk then lifts the bits and carries them in contact with, and finally lifts, the tumblers. The bolt may now be withdrawn, and a further turning of the knob repeats these operations in reverse direction and order, finally leaving the bits under the now open key-hole in such a situation that they may be withdrawn. It appears to me that this lock cannot be picked, and that its construction is such as to bring into play the doctrine of chances, which Bramah and Chubb have both claimed, fallaciously, as being the true exponent of the difficulties of opening their locks by other means than the true key.

An improvement in the tumblers, or rather the manner of supporting the tumblers of locks, has been patented. In ordinary tumbler locks, each tumbler moves in a certain determined plane and no other, and must be moved by a pick or key to a fixed and certain point, neither beyond it, nor short of it, before the bolt can be moved.

In the present lock each tumbler is free to swing, and can be moved in many planes, but must be moved precisely to the right spot, and in a certain plane, before the bolt can be operated. A lock picker must therefore, by repeated trials, find the proper plane of motion of each tumbler, and, by some instrument, hold each in that plane, before he can proceed to pick the lock in the ordinary manner. It is evident that longer time and increased skill will be required to pick this lock, when contrasted with the ordinary tumbler-lock.

A very curious, novel, and it appears to me, unpickable lock has also been patented. The key-bit of this lock is composed of a series of closely packed cylindrical disks of different sizes. The key-hole is a small cylindrical cavity closed at the bottom, and when open has no connexion with the tumblers or any part of the interior of the lock. The key bit is attached to the handle by a spring connexion, and when the operator introduces them and commences to turn the key, the first operation of the lock is to separate the bit from the handle; as he turns, the former is carried in the cylindrical opening away from the handle; a solid metal block occupies the place of the cylinder; the key-hole is entirely closed; the bit moves on and lifts the tumblers, and, by a continuation of the turning motion, the bolt is finally retracted. A reverse motion of the handle shoots the bolt, drops the tumblers, carries the key-bit beneath the handle, reattaches it thereto, and, when the latter is withdrawn, the key aperture is again in its place and exposed.

Powder enough to fill the cylinder is all that can be introduced into the lock, and its explosion therein damages it no more than it would a pistol barrel of the same size.

This latter lock has attracted much attention. It is simple in its details, has no long trains of motions depending on each other, is not liable to get out of order, and has, when locked and unlocked by those unacquainted with its operation, been productive of no little mirth. It, as I have attempted to describe, fairly steals the bit away from the handle, and leaves the latter only in the grasp of the astonished experimenter, who, as he turns, finds the lock unlocked, but the key proper gone, and every aperture into the lock completely closed. Until he is undeceived, he is apt to imagine that the whole affair is some juggler's apparatus, constructed for his mystification, and not for legitimate use as a door fastener.

Either of the three locks thus noticed, when placed on doors which have also been patented, and will now be described as intelligibly as is in my power, appears to me to afford perfect security against all known methods employed by burglars.

The door first patented is constructed as follows, namely: by supporting, at some fixed distance apart, and attaching to each other, two plates of sheet iron, with a rim between them, which, with the plates, completely enclose a space and form a sort of iron box. Into this space No. 3, or white pig, is poured when melted, which fills the space, encloses the bolts which connect the sheets, and enters apertures left in either of them. The whole forms a door in which the sheets firmly support and prevent the breaking of the thoroughly chilled and hardened interior, while it in turn forms a complete stopper to all drills and cutting tools which may, by burglars, be made to perforate the outer sheet.

In another door, invented to meet the same requisites, and to present a bar to that class of ingenious operators whose acquisitiveness has generally contrived ways to circumvent the utmost ingenuity of the lawful dealing workman, pig-iron of the same character is cast around a wrought-iron gauze or net-work. This net-work is made of the size of the intended door, with meshes about one and-a half inch square, and is constructed of bars of small round iron. All attack by drilling is prevented by the chilled cast-iron, and, when the door is assailed by a heavy sledge, this iron breaks into small pieces, each of the size of a mesh, the fracture being along the centre line of the iron rods, and each fragment being firmly held in place by the groove formed by its junction with the bars which surround it. The door, by repeated blows, becomes pliable, yielding, and is bulged in here and there, but the strongest man has not yet been able to make any absolute break therein.

In the sub class of nail machines, one has been patented in which the distinctive characteristics consist in cutting a wedge-shaped blank from a heated rod whose width is nearly equal to the length of the nail; this blank being carried by the cutter against an anvil in such a manner that the pressure is made upon the parallel faces of the blank, so that the shape is given to the nail partly by the cutting and partly by the pressure or moulding. The machine, therefore, makes a nail partaking of the

distinctive characteristics of both the wrought and the cast manufactured article; and while in cheapness it compares with the latter, it is said that in quality it fully equals the former. The arrangement of the machine is simple and compact; and a nail is cut, moulded, and headed at each stroke of the cutter, both advancing and receding.

A very ingenious machine for making horse-shoe or other wrought nails has also been patented. In this machine there is arranged in the interior of a revolving ring, and projecting towards its axis, a series of gripers, or pincers, each of which, when the machine is in full operation, grasps firmly a blank in all the different stages of progress between the rough rod and the finished nail. This ring revolves on its own axis, having an interrupted rotary motion always in the same direction, and the gripers between each rest of the ring, each revolve through a quadrant on their own axes, which are radii of the ring. Inside of the ring, and having axes coincident with it, are two rings carrying each a corresponding set of dies—one for every blank. These dies are arranged at different distances from the axes of their respective rings, the greatest difference being the length of a finished nail; and those attached to each ring are divided into two complete series,—the one of narrow face being forgers, and the other much wider acting as finishers. The radial distance of these dies from their common centre is so graduated that each in succession acts upon a portion of the blank nearer to the point, the head thereof being held in a griper. When the griper ring is stationary these series of dies approach each other, and each die gives a blow to the blank presented to it. The last griper in the series then drops a finished nail, and the first is provided with a new blank. The griper wheel, or ring, commences to move, each griper makes a partial revolution on its own axis, and while so doing is advanced the distance between two dies, presenting its blank, turned a quadrant on its axis to the secondary pair of dies, which again approach, as does the whole series, and act on the nail nearer its point than before. These motions are continually repeated, and the nail is forged out as if by the pane of a hammer, or by one with a narrow face, and then finished as if by blows with one of a comparatively wide face. The machine is very compact and elegant in appearance, and its motions are obtained with no great complexity of machinery.

An improvement has been made in feeders of nail-plate to the usual nail-cutting machine. The apparatus is simpler than many that have been contrived, and may overcome the practical difficulties which have hitherto attended these machines. Its chief characteristic is in giving to the nail-plate an interrupted but complete rotary motion in the same direction, instead of the partially rotating motion in opposite directions, which has hitherto been employed. It is obvious that fewer mechanical devices, or a more simple train of mechanism, will produce the new motion, and that its actual effects, as far as the proper presentation of the plate is concerned, are substantially the same as those produced by the old machines.

An improvement in the adjustable sliding wrench merits notice, as by means of it much time may be saved when operating in succession on bolt-heads or nuts of varying size. The parts in this contrivance are so arranged that by presssing a spring attached to a dog or latch, the moving jaw may be slid and clamped pretty nearly at the precise point wanted. The usual screw and nut arrangement then comes into play, and the precise adjustment of the distance between the jaws is thereby effected. With the ordinary arrangement, when desiring to increase or decrease the distance between the jaws an inch, it is necessary to turn the screw as many times as the pitch of its thread is contained in an inch. With the new arrangement, the spring is pressed, and the jaw is slid within a short distance on either side of its desired situation, and a portion of a turn of the screw, either back or forwards, attains the precise adjustment required.

There has also been allotted to me for examination an ingenious machine, which does not perform any metallurgical operation, but which has been examined by me, as nearly allied to many of the machines used in the manufacture of nails or pins. This machine sorts pins from a confused mass, arranges them in certain order, and finally sticks them into a fillet of paper. This fillet is long, and in width only a little greater than the length of a pin; one end of it is delivered to the machine, which, in addition to the duties above-mentioned, crimps this fillet, holds it in position for the reception of the pins, and finally rolls it up in coils whose periphery is nearly cylindrical, and from one of the heads of which project the heads of the pins. This coil forms in effect a pin-cushion, sustains and packs the pins quite as well as the ordinary method of papering, and has the further advantage that it presents to the user the heads only of the pins, while it enables him to withdraw them with more ease than if put up in the ordinary manner. The machinery is comparatively simple, and is interesting, as showing how great an amount of ingenuity may be profitably expended in improving one single branch of the manufacture of such a very simple article as a pin.

STEAM AND GAS ENGINES.

With this machine, my notice of the patents under the class of metallurgy closes, and I proceed to some slight descriptions of the more interesting of those examined under the class of *steam and gas engines*. In this class, 27 patents have been granted during the present year; 21 were granted in 1851; and those noticed are, as in the other classes, drawn from the records of either year.

Among these may be described an arrangement of the flues or tubes in steam boilers. In it the flame enters a flat horizontal flue, and passes thence down through tubes into another flue, directly below the upper one, and from thence to the stack. Each of these tubes is surrounded by water, and contains within it, and concentric to it, another tube filled with water, which is in connexion with the water space above the crown sheet of the upper flue, and the water space below the bottom of the lower flue. The spaces through which the products of combustion pass from one flat flue to the other, are annular. A great amount of surface is thus secured in a comparatively small boiler.

An ingenious and strictly practical improvement in float water-gauges has been patented. In this arrangement a chamber—usually a tube of large bore, and vertical in position—is connected by branch pipes to both the steam and water spaces of the boiler, said branches being respectively some distance above and below the usual water level. This metallic tube is closed at top, and its bottom, below the lower branch connexion, is firmly cemented to a glass tube, extending far below the water level,

and closed at its lower end. The upper tube has within it a float, from which descends an index-rod into the glass attachment. This index, owing to the absence of circulation in the glass tube, is always moving in water comparatively clear, which being also, by virtue of its position, comparatively cool and unchanging in its temperature, has no tendency to corrode or deposit upon the glass, or to fracture the same through sudden changes of temperature. The index, therefore, is always visible, and the chances of disruption of the apparatus are much lessened in comparison with the ordinary glass gauge.

An ingenious improvement in water and steam gauges, which enables the height of the water to be indicated at any distance above the boiler, while the same apparatus at the same time indicates the pressure of steam, has also been protected by a patent. To accomplish this object, a long syphon-shaped pipe of glass at its bend, and some distance below the same, is attached by one leg to the water space near the bottom of the boiler; and by the other leg to a pipe proceeding from the steam chamber, and bending slightly downwards, until it meets the syphon leg. Both legs are filled with water nearly to the bend, which, with a few inches of pipe on each side thereof, contains air. As the water falls in the boiler, the water in the first-named leg being freed from a certain portion of pressure which is due to the height of the water in the boiler, and irrespective of the pressure of the steam, falls with it, and the water in the other leg rises, the nearly horizontal piece of connecting-pipe before-mentioned being kept full by the condensation of the steam.

The difference in actual height of a mean point between the upper surfaces of the two columns of water always affords a correct indication of the height of water in the boiler. Now suppose the water level in the boiler to remain unchanged, but the pressure of steam to increase, each column of water in the syphon legs will then rise equally and compress the air between their upper surfaces, while their mean height remains unchanged. The actual length of the column of air will diminish, and its whole length from water to water, in each column, estimated by a scale, will indicate the pressure to which the steam in the boiler has arrived. Another gauge for water level only is so contrived that this level may be exhibited at any point above or away from the boiler. This gauge, like the former, depends for its action upon the variable effective length of the two legs of a syphon, one of whose ends is connected to the boiler below the water level, and the other is attached to a short, nearly horizontal, pipe connected with the steam space, and filled constantly by the condensation of steam therein. As the water rises the effective length of the first-named leg is of course decreased, while that of the other remains constant. Just below the bend of the syphon a reservoir of mercury is introduced into the tube, in such manner that the surface thereof is in contact with the water in the parts of the tube, both above and below it, and prevents the passage of water from one part to the other. This mercury, therefore, as pressure is varied on one part of its surface, and is constant on the rest, rises and falls in the rising part of the syphon above it, as it would in an ordinary barometer, and its surface in the tube correctly indicates at all times the height of water, and is in no wise effected by the pressure of steam in the boiler.

Both of these gauges have been applied in practice, and the latter in several instances. They both work as well as their theory would indicate. The former indicates correctly the height of water, but requires that the engineer should observe two surfaces, and take their mean. Its indication of the pressure is not so reliable as the distance between the two surfaces of water in either leg of the syphon, and varies not only in proper proportion to the pressure, but to the temperature also, and is further affected by the absorption of the air by heat. The inventor has, I am informed, made changes which obviate the difficulty which arises from the absorption, and has materially improved not only the efficacy but the compactness of the apparatus. In the last-described gauge the water level in the boiler is indicated by the position of the mercurial surface only, and can be read at a glance. It is said to be perfectly accurate in its indications, and has been employed at a level of twenty feet above the boiler, and there tested by comparison with gauge-cocks and glass gauge-tubes directly attached to the boiler.

The importance of either of these instruments appears to me obvious, as they are the only indicators, excepting the common float with a rod attached, which indicate above the level of the boiler; they are the only contrivances which give to the officers or engineers of a steamer a check upon the firemen, or stokers, without the necessity of visiting the fire-room. They may be located in the spar-deck of steam-ships, or on the hurricane decks, or in the pilot's-house of river boats.

Another instrument of the same class, which may appropriately be termed an outside float, consists of a cylindrical or other shaped reservoir, attached to the boiler by means of two spirally coiled or worm pipes. The space inside the reservoir connects, through the bore of the upper worm, with the steam space, and through the interior of the inner worm with the water in the boiler. These worms act as springs, and support the chamber at a height due to its own weight and that of the quantity of water it contains. The water level in the chamber will be the same as the water level in the boiler, as there is free connexion between the two. As the water falls in the boiler it will fall in the chamber, which will then contain a smaller quantity, and be reduced in weight. The springs will now lift the chamber precisely as its weight decreases, or if its weight be increased, by pumping up the boiler, will permit it to descend. The variations in the level of the chamber thus indicate inversely the fluctuations of the water level in the boiler; and if an index be properly applied, it will, in connexion with a dial, exhibit the precise water level at any given time.

An attachment to puppet valves has been patented, which derives its motion from the engine, and revolves, through a small angle, each valve while down on its seat and held there by the pressure of the steam. The valve spindle is, of necessity, free to turn in the lifter; and the apparatus appears to obviate a difficulty long acknowledged in the use of this species of valve, which, it is well known, are not steam-tight when hot, if ground into their seats when cool.

A valve motion, capable of producing almost infinitely varied movements and stoppages of the valves of engines, has been patented, and deserves notice. Upon an ordinary eccentric, but outside of the collar, in the direction of the length of the shaft, are cut cog-teeth. This collar is provided with the ordinary eccentric rod, which, in this instance, is hollow; and on that rod is carried a small shaft, whose axis is parallel to the main shaft. The former shaft is free to revolve, and carries a small cog-wheel, whose teeth are in gear with those before described.

This shaft also supports an eccentric, provided with a collar and rod; the latter passing through the hollow in the main eccentric rod, and carrying the hook which takes in the pin of the rock-shaft arm. Now it is clear that the first eccentric will give to its rod its usual motion, and will also, by means of the cogs, revolve the secondary shaft, which, in its turn, moves its own eccentric and rod. This latter rod, therefore, gives off a compound or duplex motion, dependent upon the varying throws of the two eccentrics, and their relative position at any given time. A change of the relative diameters of the two cog-wheels will enable a competent mechanic so to modify the differential or the additional motion of the two eccentrics, as communicated to the single secondary eccentric rod, that the latter may move almost as if actuated by a cam of any desired form, while, at the same time, none of the jars incident to that contrivance are imposed upon the machine.

In the vertical engine, with piston rod protruding below it, which is in common use for driving propellers, an improvement has been made by so shaping and arranging the pillars which support the cylinder above the bed-plate that they constitute the air-pumps and the condenser, thus effecting a material saving in space, while the enlargement of the pillars, to adapt them to their new use, adds to the firmness of the engine.

In the same engine is exhibited a neat arrangement for actuating the cut-off slide of one of the cylinders, the valve chests being set back to back, by a connexion from the slide-valve cup of the other engine; and the inventors have also so arranged a supplementary sliding valve in the side of the valve itself, that the engineer can, by means of it, work his engine with full steam throughout the stroke, without altering in any way the expansion gear.

An ingenious arrangement of the marine steam-engine has been patented by an inventor well known for his discoveries in this special field.

In this engine the piston rod takes hold of a cross-head lying in the plane passing through the crank; from the four ends of this cross head, if the cylinder be vertical and beneath the shaft, depend straps, which take hold of, and move up and down, a ring which surrounds the cylinder. This ring is governed in its motion by guides, and has surrounding it another ring, connected by two pivots, lying in a vertical plane, passing through the shaft. To points 90 degrees from these pivots on the outer ring are attached the two ends of a connecting rod, which rises on each side of the cylinder, and each of whose parts is bent toward the other, until they meet and are united, forming the stub end, which receives the brass which encircles the crank pin. This rod, as it is caused to rise and fall, oscillates with its ring upon the pivots, and at each oscillation passes into the split cross-head formerly named.

When the piston is at the bottom of the cylinder, the cross head almost touches the stuffing box, and the stub end, with the crank pin therein, is nearly in contact with the upper side of the cross-head. The engine, therefore, takes up no more room than the oscillator with a long stuffing box, and is free from the trunnion, which is the only objectionable feature in the latter engine.

The air engine, which is now, through the medium of the periodical publications of the day, receiving so large a share of public attention, was patented by the inventor in 1851. This engine, which at the present time is in the course of the most magnificent experiment on record, does

not depend for its novelty upon any point new in itself alone, but upon the combination of features which have hitherto been tried in various forms, and under various arrangements and combinations, but have as yet failed in meeting the requisites of regular, continuous, and efficient service. The subject is one which has for many years occupied the attention of the present patentee and of others, who have lost their time, expended their talents, and impoverished their fortunes, in the pursuit of that desideratum which is even at the present period not fully attained.

References to the published experiments of Stirling and others will indicate the vast amount of ingenuity and mechanical skill that has been applied to this subject, and will prove pretty conclusively that the theory of the engine is, since the discovery of the regenerator, no uncertain one, and that practical difficulties are all that remain to be surmounted.

Drawings and descriptions of the arrangement and construction of this engine have been so widely diffused that a reiteration of the latter without the aid of the former would amount to supererogation; but I will, for the benefit of those who may not have perused these accounts, notice briefly the points of principle upon which the engine depends for its action.

Air, when heated about 480 degrees of Fahrenheit's thermometer, has its elastic force doubled: if, therefore, air, at the pressure of the atmosphere, be enclosed and heated to that extent, it will exert a pressure upon the vessel in which it is enclosed of about thirty pounds per square inch, or would, if permitted to expand, fill at its initial pressure a vessel of double the size that it occupied before it was heated. Further, if hot air be permitted to pass through a series of metallic sieves, it will give to the first sieve a portion of its heat; to the next, a less portion; and this in succession until it leaves the last sieve and enters into the open air. Each sieve in the series will, therefore, be elevated to a temperature a little below that of the sieve which precedes it; and the last sieve in the series, if their number and area be properly adjusted to the temperature and volume of the hot air, will remain at a temperature elevated only a few degrees above that of the external air. If a current of unheated atmospheric air be now passed through the series of sieves thus heated in the reverse direction, it will, from the first sieve, take up a certain portion of heat; from the next, more; and so through the series, until it leaves the last raised to a temperature nearly as high as that of the charge of air which preceded it in the reverse direction. A small quantity of heat derived from some combustible will supply the deficiency, and the charge will thus be heated by caloric chiefly derived from the former charge, and left behind it, as it were, in the regenerators, on its progress to the open air. Any person may try this experiment by procuring a small quantity of fine wire gauze, cutting it up into pieces of an inch square, or thereabout, and piling upon each other some twenty thicknesses. Let the pile be now enclosed in a case or frame, and apply the whole to the lips in such manner that the issuing breath may pass through the series. After breathing a few times through the pile, the operator will discover, especially on a cold day, that the air which enters his lungs is nearly as warm as that which has left them, and he will have a forcible illustration of the manner in which heat is alternately stored and given out in the so-termed caloric engine, and will be able to appreciate the nature and duties of that part of the apparatus termed the regenerator.

In the engine as applied to a ship, two cylinders of the same length,

each closed at one end, are placed vertically with their open ends toward each other, the transverse section of one of these cylinder is about double that of the other, and each is provided with a piston, each piston being connected to the other in such manner that as one moves so moves the other, in the same direction and at the same speed. The bottom of the lower and larger cylinder is exposed to a fire; the top of the upper is provided with valves which are free to open downwards, and a pipe makes a free communication between them; the regenerator is located in this pipe. If the apparatus be made air-tight, the pistons placed at half-stroke, and heat applied, the air will begin to expand. As it expands, it presses with equal force per square inch on each piston; but as the lower piston has the greater area, it will overcome the other and rise, having, beside, capacity for lifting a certain weight; and this is the power of the engine. As the pistons move upwards, the air from the upper passes through the pipe, through the regenerator, and enters the lower cylinder, where it receives heat from the heated bottom and is expanded. When the pistons arrive at the top of the stroke, a valve in the pipe is opened to the outer air, the weight of the pistons causes them to descend, the heated air passes from the lower cylinder through the regenerator, heating it, and through the valve into the air; while cold air enters the upper cylinder through the valves in its top. When the pistons arrive at the bottom of their stroke the valve to the air is shut, the air in the bottom of the large cylinder commences to expand, the pistons begin to rise, the charge of air which has entered the upper cylinder passes through the pipe, through the regenerator, and takes up the heat in it, then enters the lower cylinder, where it receives its last and sufficient addition of heat from the heated bottom. A succession of such alternations of the pistons giving off power on the up-stroke, and performing nothing on the down-stroke, is the working of the engine.

In the caloric ship four sets of cylinders are employed, eight in all, and the power derived from each set is communicated, by means of straps, lever beams, and connecting rods, to a single crank upon the main paddle shaft.

The ship has, at the time of writing, made two trial trips, of some twenty miles each, and has attained a moderate speed. A trip continued over many miles, and for many days successively, will, if successful, induce universal belief in the capabilities of the apparatus, and will verify the sanguine predictions of the inventor and owners, who will, in any event, be entitled to praise—the one for ingenuity, perseverance, and mechanical skill; the others, for faith in a proved theory, and for a confidence in ultimate success, which has involved immense outlay in that which is as yet an experiment.

NAVIGATION.

In the department of *navigation* some patents have been granted during the past year; these embrace among them all the usual subdivisions, and, as in other classes, there has been no particular prominence in any one branch, no special subject which appears to have attracted more than ordinary attention. Paddle wheels and propellers of various kinds have, as usual, occupied the greatest share of the time devoted by me to this class, and have also, as usual, served as the basis of a multitude of rejections. This subject has been so thoroughly explored and so completely

thought over, digested, and invented upon, that those unacquainted with its history are continually reinventing some old contrivance; and it is surprising that we are so well provided with plans for paddle-wheels and propellers of all species, while we are so little acquainted with the theory of the action of these contrivances, and can so unsatisfactorily account for the immense loss of power consequent upon their employment.

In this sub-class I intend to notice only one invention, which was patented by a French inventor, whose object was partially to remove the resistance to the progress of the vessel under sail only, which is occasioned by the ordinary screw propeller. This plan has no relation to those which permit of alteration of the pitch or admit of the propellers being hoisted out of water, and is somewhat different from any hitherto essayed. The wings of this propeller are arranged in pairs, and are each of no greater width than the dead wood of the vessel in which the propeller is located. The first pair, if there be six wings, is attached to a hollow shaft; the second pair is fastened to another hollow shaft, concentric with and inside of the first-named one; and the third pair is secured to a solid shaft, also concentric to the first and located within the second hollow shaft; each pair lies a little behind the former in the direction of the length of the vessel, and their shafts are fitted with gearing and clamps, or their equivalents, in such a manner that the various pairs of propellers can be made to alter their angular distance with respect to each other, or be clamped at any specified relative position. This gearing is within the vessel, and by means of it the various blades are, when the propeller is to be used, spread around the whole periphery of a circle, so that each acts in turn and in the same position as in an ordinary propeller, where the wings have no motion with respect to each other. When, however, the propeller is no longer to be used, and sail is to be employed, then, by means of the gearing, the blades are revolved so as to fold the one behind the other, like the leaves of a shut fan, and the whole set are turned so that they lie in the line of, and are covered by, the dead wood, thus offering little or no resistance to the progress of the vessel. The engine is connected to the outer shaft in such a manner that it drives the whole of the shafts, without altering their angular position with respect to each other; the motion to produce this latter result being entirely independent of the former.

A method of fitting canal boats to be used for the conveyance of coal, &c., appears to present features of utility, and will probably lead to a material saving in the discharge of cargoes of that article. Beams are secured along the inside of the boat's ceiling for its whole length, from stem to stern, forming a species of continuous bracket round the interior of the vessel, at a distance of some two or three feet from the bottom. Along the bottom are laid rails, upon which a small car may be moved, and immediately over the car's top, from beam to beam, crosswise of the boat, are laid planks, which form the cargo deck, on which the coal, &c., are loaded.

In the process of unloading, one plank at a time is lifted up by crowbars, and the cargo runs by degrees into the car underneath. This car, when full, is run along the track until free of the floor and then hoisted out as a bucket and emptied, replaced, run back, and filled again. All shovelling of the coal is saved by this contrivance; and it will probably be

adopted in boats which, after their passage through canals, discharge their coal for further transport into the holds of sea-going vessels.

An important improvement in ships' blocks consists in a new method of making them, without the use of a cutting engine capable of producing irregular forms, and yet sufficiently near to the shape which many years' use has so fully sanctioned. Two rings of wood are turned up in any ordinary lathe; out of each of these rings a strip, passing through the centre, is cut, leaving two portions of a ring, which, when brought together on their chords, form a sort of ellipse. Between their chords is inserted edgewise a strip of metal, which carries the pin-socket, and at its upper end is so forged as to constitute one-half the strap. Bolts attach firmly to each other, and to the metallic strip, the two portions of rings above described; and each compound forms one side of the shell of a block. The block is cheap, light, and strong, and promises to be at least equal in durability to the one now in ordinary use.

Another simple block has been invented. In its construction two flat disks, with grooved peripheries, are turned in an ordinary lathe. The sheave is placed between them, and its pin is at the centre of the disks which constitute the cheeks. Hoops of round iron are now forced over the cheeks into the grooves; these hoops enclose at the lower end of the block, between them and their respective disks, a small piece of sheet metal, which extends from disk to disk, separating them at an appropriate distance. On the upper parts of the hoops is forged a small eye, through which passes a bolt parallel to the axis of the sheave. This bolt carries between the eyes a sleeve or collar, whose length is just the required distance between the cheeks; and on it is forged an eye or hook, by which the block may be attached where required. It is evident that the hoops serve the purpose of the usual strap, while they at the same time prevent the cheeking or splitting of the cheeks, and guard their edges from chafing.

A very simple improvement in ships' davits has been patented: it consists in fitting their feet with a simple and secure species of joint, which permits of their being lowered and stowed against the bulwarks, while at the same time they can be replaced with ease and certainty, and without any liability to mistake or loss of time from fitting disconnected parts. By this arrangement all risk of breaking the davits is avoided.

A harpoon, which forces the point deeper and deeper into the whale as he draws the boat after him, has been invented and patented. In this contrivance the flukes are hinged, and so arranged that they can be latched to the point, or can slide away from it. The whale line is forked or split, and each part thereof is rove through a pulley or sheave attached to the flukes, and is thence led and attached to the socket or staff which is firmly fixed to the point.

When the harpoon is thrown and enters the whale, and strain is brought upon the line, the flukes spread out and take firm hold in the blubber, detaching themselves by such motion from the point. The pulleys, or sheaves they carry, are now fixed in the whale, and strain upon the line passing through them forces the shank and its point to slide between them, penetrating deeply into the whale. These harpoons have not yet, it is believed, been employed in actual service; but the simplicity of their construction, and the apparent certainty of their action, warrant the conclusion that a single practical trial will establish their utility, and bring them into general use.

CIVIL ENGINEERING; FIRE-ARMS; MISCELLANEOUS.

The classes of *civil engineering* and *fire-arms*, which have for some time past been under my charge, were, upon the appointment of additional examiners, transferred to one of my colleagues. In his report will be found notices of the inventions in these classes, as also in that of *general miscellany*, which was transferred at the same time.

In these classes, therefore, but few cases have been acted upon by me, and, as my report has already spread to a somewhat unusual length, mention will be made of two cases only: the one, a simple, but novel idea, which requires practice only to ascertain its merits; the other, a machine whose completion has demanded lengthened experiment, sound knowledge of physical principles, and no small share of tact and practical skill. The former is a plan for making a species of artificial conglomerate for paving the carriage ways of crowded cities. Fragments of some species of stone not easily affected by heat are packed into an iron or sand mould; they are then joined each to each, and the interstices between them are filled by running melted iron into the mould. It appears to me that this plan may remedy the slipperiness of iron or stone paving blocks, which is now a constant source of annoyance, and that its cost will be little, if any, greater than that of square stones. The unequal wear of the two materials will keep the surface continually rough; and experience will determine whether the stone is so deteriorated by the heat as to become worthless, or whether its strength is so unimpaired that the whole mass will constitute a useful and lasting pavement.

The other invention is the ice machine, which has, during the year 1851, received so much notice in the public prints. In its action common air is compressed by a powerful pump, and the heat it gives off during compression is taken up by jets of water. This air passes thence into a receiver, where it is thoroughly separated from the water, and from the receiver enters a cylinder provided with a piston, in which it expands gradually. Its expansive force is utilized by the agency of the piston, whose rod is connected with that of the compressing pump in such manner that the dilation of one portion of the air aids in compressing another portion just entered into the machine. As the air expands it cools or abstracts caloric from a supply of uncongealable fluid which surrounds the dilation cylinder, and also enters the same in a jet, and finally escapes into the outer air. This cold fluid then circulates around the pans containing water to be frozen, extracts the heat therefrom, and, when heated, returns again to be cooled in the dilation cylinder. The water is supplied gradually to the pans and is frozen, as it were, in strata from the bottom upwards.

An experimental machine, on a large scale, has been constructed and thoroughly tested. Bottles of sherry have been frozen therein, and blocks of ice, the size of a cubic foot, produced where the thermometer in the open air indicated eighty-odd degrees.

Those interested are firmly convinced that a ton of coal, expended in driving a steam engine to communicate power to the machine, will produce at least a ton of ice as an average product; and their recorded experiments and calculations, when submitted to the examination of scien-

tific men, have induced the latter fully to endorse their statements and confirm their expectations.

With this description closes my report for the year, which is respectfully submitted by your obedient servant,

HENRY B. RENWICK, *Examiner.*

Hon. S. H. Hodges, *Commissioner of Patents.*

Sir: In compliance with your instructions, I have the honor to submit the following report of the business transacted at my desk during the year 1852:

The number of applications received at my desk during the year is	409
The number of applications on hand at the close of the year 1851 was	45
Making, in all, new applications to be acted on in 1852	454
Deduct from this sum applications transferred to other examiners	11
Leaves applications to be disposed of at my desk	443
Of these there were remaining at the close of the year	79
Which makes the whole number of new applications acted on in 1852	364

Besides the above actions, there has been, with the increase of applications, a corresponding increase of patent attorneys; and, as a natural consequence of this, arguments for claims for reconsiderations of old rejected cases, and for and on all the matters that may be involved in legal and patent business. These circumstances, greatly enhanced by the growing importance of American patents, as compared with patents granted in other countries, have, as it were, by reaction, excited a new energy in all the patent attorneys and inventors to get claims of even the smallest points of invention, and have, by these means, greatly multiplied the amount of correspondence on returned cases, as compared with like cases in former years. There is, at the present time, scarcely a case rejected that does not come up for additional correspondence, modified, and presented anew, changing, in one way or another, the points claimed, so as to make it the subject of some two or more extra actions on the part of the Office. This increase of correspondence, technically called the *current business*, as it now exists, will be better understood from an example: The number of decisions on new applications during the year is 364; but the number of decisions on new and returned applications, in which written decisions were made, is 900. If we add to this 75 to 100 verbal hearings, that may occupy, according to the rules of the Office, one-eighteenth of all the time of the examiner during the hours of business, we shall find, as an average of the work done, more than three distinct laborious actions on every application made for a patent at my desk. The statement here given as the result of my own actions has nothing peculiar in it as applied to my case. It is, in the main, the experience of all the examiners. If it should happen, however, that any one acts on more cases this year than usual, it shows, as a matter of certainty, that he is to be involved next year in a proportionably increased

amount of actions on returned applications. Every application that comes before the Office must and will have, sooner or later, a thorough and laborious examination, provided the inventor thinks he can in any way get a patent; and he will prolong correspondence till he has exhausted the subject, or till he is referred to the remedy of appeal. It is, therefore, time and labor saved to make the investigation thorough at first; and then the other examinations will be comparatively light and easy.

From what has been now stated, it is clear that the number of decisions made at my desk is equal to three a day throughout the year, or equal to one every two hours.

Besides the increase of the current business of this Office relating to pending applications growing out of causes named, there has arisen, from the same causes, a corresponding increase of business from the efforts made to have patents (about to expire) extended. It is not uncommon for an extension case to occupy the examiner from *five* to *twenty* days, involving an amount of testimony varying from 300 to 3,000 pages. In some cases the Commissioner has admitted a hearing with oral arguments; but generally with written arguments. In some cases the whole labor has been thrown upon the examiner, and in others he has only shared it with the Commissioner; but in all cases the examiner's time is occupied. There has been examined, at my desk, one application for extension during the year. This increase of current business in the Patent Office must, as a matter of course, continue to diminish the number of new cases that a given examiner can take up in a given time. There is a very perceptible difference within the last three or four years in the ease or difficulty with which I could dispose of cases. In the year 1849, I was enabled, with less experience in the rules of practice than I now have, to act on 569 new applications with greater ease to myself than to act on 364 in 1852. Although some of the differences in the cases referred to may possibly arise from the character of the cases being more simple and easy to act on, yet the chief cause of the difference is, that more cases are now discussed and litigated than formerly. Parties are often willing to take worthless claims, knowing them to be such, for the benefit of a mere semblance of a protection; nor is this mania for American patents to be wondered at, when we take into consideration the fact that a patent, if it is worth anything, when properly managed is worth, and can easily be sold for, from ten to fifty thousand dollars. These remarks only apply to patents of minor or ordinary value. They do not include such as the telegraph, the planing machine, and the India rubber patents, which are worth millions each. A few cases of the first kind will better illustrate my meaning:

A man obtained a patent for a slight improvement in straw-cutters, took a model of his machine through the western States, and, after a tour of eight months, returned with forty thousand dollars in cash, or its equivalent. Another inventor obtained an extension of a patent for a machine to thresh and clean grain, and sold it, in the course of about fifteen months, for sixty thousand dollars. A third obtained a patent for a printer's ink, and refused fifty thousand dollars, and finally sold it for about sixty thousand. These are ordinary cases of minor invention, or at least embracing no very considerable inventive powers, and of which hundreds go out from the Patent Office every year. Experience shows that the most profitable patents are those which contain very little real invention, and are to a superficial observer of little value. These by multiplication

cause numbers to make up for the smallness of the profit in the individual case. The protection in manufacture of the article in one particular way, even without any invention from which to derive advantage, is enough to secure in many cases a little fortune, provided it only have the semblance of invention and be sanctioned by the name of a patent. It can then be sold for money, and the inventor, with cash in hand, escapes all after responsibility. It is the resistance of such claims as these on the part of the Patent Office (which may form the basis of a fraudulent transaction) that constitutes no small part of the current business on cases rejected and returned for reconsideration. This branch of the current business of the Office will increase rather than diminish; so that it will constantly require a greater and greater force to dispose of the same number of cases, unless the method of litigating claims be so modified as to cut short the correspondence, which is hardly to be expected.

There is another subject which I desire to present to your notice before entering upon the details of the report. It is the necessity of providing the chemical laboratory and apparatus, for which the late Commissioner asked an appropriation of $800 in his last Annual Report. It was thought by him that an express appropriation by Congress was necessary for the purpose; but I am happy to learn that you construe the 14th section of the act approved March 3, 1837, relative to the Commissioner's powers in using the Patent fund, differently from the construction of your predecessor.

I therefore take the liberty to state, somewhat in detail, the necessity, the provision by law, and the manner in which it has been partly carried out.

It is required, as set forth in the 6th section of the act of 1836, that every applicant for a chemical patent shall accompany his application with "*specimens of ingredients, and of the composition of matter, sufficient in quantity for the purpose of experiment.*" But no provision was ever made to carry out the designs of the act, by furnishing a suitable place for a laboratory, or apparatus, or tests to experiment with; for the want of which patents have been granted that would have been refused, and others have been refused that would probably have been granted, if the Office had possessed the means of deciding by the *experimentum crucis.*

At the time of my appointment as principal examiner, in 1848, I took charge of the chemical applications; and as I was not provided with any means by the Office, and was unwilling to allow that cases requiring to be verified by experiment should be allowed to escape untested, I went to the expense of more than $500, to procure such apparatus and fixtures at my own residence as would enable me to test such cases as required it. It is but justice to say that I have rendered the Patent Office essential service by means of this apparatus, by correcting mistakes and errors of various kinds. But in doing the Office this service, I have been obliged to encounter difficulties. I was compelled to remove the specimens to private apartments away from the Patent Office, incurring the danger of misplacing and loss; and was, moreover, compelled to perform all of my experiments mornings and evenings, when I needed the time for exercise and relaxation. I now feel that my health has been considerably affected by the number of extra hours I felt myself obligated to give to the laboratory, in order fully to discharge my duties to the Office. The experiments are often indispensable, and the want of room, which has been hitherto a prominent objection, cannot be so any longer; and I

trust, therefore, that you will feel warranted in making the appropriation of the amount named in the recommendation to Congress by your predecessor, for apparatus and materials for furnishing a laboratory, which I propose to occupy also in part for my other duties in the Office. I do not ask any compensation for the extra expenses of somewhat more than $500, and for the extra hours that I have devoted to the business of the Office at my laboratory, but that I may be relieved from the necessity o doing it any longer.

Method of Reporting.—There has been hitherto but one method of drawing up the examiners' reports, as annually made to the Commissioner, namely: that of giving partial descriptions of what the examiner regards as the most interesting and important inventions, commenting at the same time upon their peculiarities or excellencies. This method of reporting was commenced in 1839–'40, and, with the exception of 1851, has been continued up to the present time.

As a bill is now before Congress looking to an improved method of reporting patented inventions, I propose to report the chemical patents—few of which admit of drawings or model—by a general description or definition of each case, so far as it can be done, and leave out commenting, except so far as to explain the invention. The other classes will be reported as hitherto.

Subjects of Examination.—The classes examined by me are mainly embraced in chemistry and agriculture. A few, being the returned applications of household furniture, (a class acted on by me three years ago,) have been also examined by me during the year; but these will require no further notice from me.

The whole number of applications at my desk passed for issue is—

Chemistry	48
Household furniture	5
Harvesters	7
Ploughs	25
Cultivators	14
Seed-planters	26
Rakes	3
Threshers and separators of grain	8
Hulling and smut machines	10
Winnowers	3
Corn-shellers	4
Straw-cutters	3
Beehives	2
Miscellaneous of agriculture	9
	167
The whole number of rejections during the same time is	256

It will be perceived, by comparing the number of chemical applications the past year with that of former years, that this class of inventions is increasing faster, proportionally, than most other classes. The fact that these applications are generally not represented by either model or drawings, renders them the most difficult and laborious applications before the Office. In all cases an examiner, if he does his duty, must know all

that has been done on the subject examined. But in this case there is no representation to guide the eye in the class he is examining, and he must get the naked facts by reading or experiment, and generally by both. Not unfrequently is he called upon to verify alleged or assumed facts by laborious and sometimes difficult experiments. I have occasionally been compelled to read more than a hundred foreign patents to decide a single application, and in other cases to continue series of experiments for several weeks in succession to decide a single point. On both of these accounts, I most earnestly ask to be relieved of a part of my agricultural applications, that I may be enabled to give that attention to the chemical applications which their rapidly-increasing numbers and importance demand.

CHEMICAL PATENTS.

1. *Concentrated Beer Material*—consisting of the solidifiable matters of malted liquors, cautiously reduced to the solid state, to render them portable for re-solution, as needed.

2. *Gas Meter and Regulator*—designed to regulate the quantity burnt in a large establishment. It is designed to be used as an extra meter to be attached to a hotel or factory, &c., to prove or correct the Company's meter, and also to control and regulate the pressure at the burners. The amount of gas passing a given opening of the stop-cock, and at a given pressure, being first learned by experiment, the clock-work is wound up, and the meter set at work.

3, 4, and 5. *Gas Regulator.*—Three patents have been granted for three several modifications of this instrument. The instrument consists of an enlarged chamber in the service pipe, where it enters the consumer's building, and is generally placed near the Gas Company's meter. Each of the modified regulators is designed merely to equalize the size of the flame, while the number of burners is varied. This enlarged chamber in the pipe has a valve, which controls the amount of gas going to the burners, and thus divides the chamber into two compartments—one being on the side towards the street main, and the other on the side towards the burners. The valve is at one end of a small scale beam or lever, and counterpoised at the other by an inverted cup in a vessel of mercury. It is easily seen that if we vary the pressure on the external surface of the inverted cup or on the internal surface, we increase or diminish the opening of the valve, and thus admit more or less gas. In the first of these devices patented, the internal part of the inverted cup communicates with the side or compartment of the chamber towards the burners; in the second, it communicates with that towards the street main; and in the third, the construction is such that it communicates with both at the same time, and thus modifies and controls the amount of gas received through the valve in three several ways.

6. *Gas Meter.*—This is a slight modification of the ordinary wet meter. The design of the improvement is to preserve a continuous level of the liquid in the vessel. This is accomplished by having a separate chamber in the lower part of the meter, to receive the overflow from the main body of the meter, and this chamber is connected with the external air by a syphon which discharges the liquid outside.

7 *Explosive Compound for blasting Rocks;* which is a mixture of five parts by weight of chlorate of potash, two parts of red sulphuret of arsenic. and one part of ferrocyanuret of potassium.

8. *Bag-Screen Receiver for the manufacture of Zinc White.*—The gist of the invention consists in the combination of the bag screen with a blowing apparatus. The effect of the screen, which covers the whole chamber, is to prevent a rush of air to any one part of the bag, and thus prevent the filling up of its meshes, and also the escape of any considerable amount of the fine powder through the screen.

9. *Construction of Ink Canisters.*—Several of these vessels are arranged in a row, nearly in contact, and connected by syphon tubes, to be charged and discharged without disturbing the sediment, and at the same time aerate the liquid.

10. *Manufacturing Carbonate of Strontia or of Baryta, &c.*—The invention consists in the reduction of the sulphate of baryta, by heat and carbon, to the sulphuret of barium, and decomposing this in turn, after dissolving it in water, by a current of carbonic acid, and employing the sulphur liberated in the manufacture of sulphur or sulphuric acid.

11. *Manufacture of Paraffine Oil by distilling Bituminous Coal at a low heat—too low to be profitable for gas-making.*—In this process the retort is only at a very low red heat, and the products, received into a worm kept at 55° Fahrenheit, are a small quantity of gas and a large quantity of paraffine oil. The liquid product is purified by sulphuric acid and soda in succession, and then washed with water and neutralized by chalk, and finally settled.

12. *Manufacture of Candle Wick.*—This consists of several twisted strands, each composed of two or more yarns, so twisted together that, as they burn away, the tendency of each separate strand is to untwist and burn loose.

13. *Parti-coloring Yarn.*—This is a reissue. The invention was patented in June, 1850, and is confined to the construction of the dipping reel.

14. *Mash Tun.*—The invention consists in having the mash tun closed in on every side by a thin film of water, in place of wood, metal, or any other substance.

15. *Construction of Mash Tun.—Additional letters patent*—consisting of a device for forcing air to the bottom of the mash tun to cool the mash. The air is forced through the steam pipes which constitute the agitating rakes. They are made hollow, in the first instance, for heating the mash with steam; afterwards air is forced through the same pipes to cool the same liquid.

16. *Apparatus for cooling Wort.*—Consisting of a low cubical box, or case, containing a shallow metal pan, having parallel, narrow, and deep recesses extending to the bottom of the case, for receiving the wort, which wort enters the shallow pan and recesses on one side of the apparatus, and, after passing through the whole series of segments of shallow pans and recesses, passes out on the side opposite to that at which it entered; while at the same time a current of cold water enters the case on that side at which the wort is discharged, and, passing in the opposite direction, is discharged on that side where the wort entered. The wort and the cooling liquid are separated from each other in the case by a thin sheet of metal; and while the water is warmed, the wort is cooled to the proper temperature.

17. *Cement of Lime, Rosin, and Water.*—Made by mixing in half a bushel of pulverized slacked lime one-fifth of a bushel of powdered

rosin, with water sufficient to make the whole into a stiff mortar or paste, for a water-proof cement.

18. *Factitious Oil.*—Consisting in a mixture of spirits of turpentine, 9 gallons; benzole, 1 gallon; carbonate of potash, 6 ounces; glycerine, 2 pounds; and to every gallon of this mixture add 19 gallons of whale oil; designed for lubricating purposes.

19. *Condensing Apparatus for an Alcohol Still.*—This device consists of a two-storied worm tub, and a valve opening between them, to control the heated water and keep it in the upper tub till the temperature reaches a certain point, when the heat will bend a spring and open the valve, and allow cold water to ascend through the same.

20. *An arrangement to work two Stills with one Condenser.*—The invention is confined to minor points, that need not be described.

21. *Retorts for Chemical Furnaces.*—This apparatus cannot be easily described without a drawing. It consists of a long range or bed of retorts and a specific arrangement of flues from other furnaces.

22. *Treating Gutta Percha preparatory to Vulcanizing it.*—The material, properly cleansed and prepared, is heated to 285° or to 430° Fahrenheit. The inventor disclaims vulcanizing except when in combination with the preliminary treatment.

23. *India Rubber Cotton Bat Cloth.*—The invention is mainly confined to specific mechanical devices for making a rubber or percha bat texture pervious to air, but nearly impervious to water, by covering the pressure rollers with an elastic thickness of felt, flannel, or its equivalent, or running the felt over the rollers in the form of an endless apron, that receives the bat spread over its surface, and the plastic prepared gum to be forced into the pores of the bat, by means of the elastic bed of flannel or felt underneath it. When this compound bat has been run through the rollers, it becomes a porous, nearly water-proof, but not air-proof, texture, very valuable for many purposes.

24. *Process of preparing Oakum.*—The inventor treats junk with water at a temperature of 75° to 100° Fahrenheit, and containing one to three per cent. of any mineral acid, for half an hour or an hour. The inventor generally uses sulphuric acid. By these means the fibres are more easily separated from each other, and the labor of picking very much facilitated.

25. *Construction of a Soap-boiling Apparatus.*—Consisting in the agitating pins extending down to near the bottom of the kettle, and rotating by machinery, in combination with steam-heating tubes projecting vertically through the soap from the bottom jacket, and serving to heat the same, while the pins perform the agitation. It is this arrangement of heating-tubes and agitators that is claimed.

26. *Process of preparing Archil.*—This is a coloring matter from the lichen rocellus, obtained by treating it in a particular manner by means of urine, ammonia, and clear saturated lime-water, in the manner set forth in the specification.

27. *Factitious Marble.*—The invention consists in mixing with a cement of earthy matters, as plaster of Paris, flock of colored fibrous matter, as silk, wool, cotton, &c., so that the fibres shall indicate veins, giving it a veined or marbled appearance. The composition used in this case is a mixture of rosin, 4 parts; wax, 1 part; glue, 6 parts; alum, 4 parts.

28. *Sugar Manufacturing Apparatus.*—The invention is chiefly confined to minor points, in the construction of the evaporator, that could not be described without a sketch.

29. *Sugar Evaporating Apparatus.*—The principal feature in the invention is confined to the device for removing the froth. It consists in what is called a *scumming wheel,* which, by a peculiar arrangement of the floats, carries away the scum as fast as it makes.

30. *Sugar Evaporating Apparatus.*—This is the product of the same inventor as that last described or referred to, and embraces two prominent features. The apparatus consists of a long range of evaporators, with the fire at one extremity and the chimney at the other—the flue running from end to end. One of the two features here referred to is a peculiarly constructed wire-gauze wing, arranged to vibrate on a hinge joint in the last evaporator next to the fire, so as to prevent forming bubbles, and moved by machinery. The other feature referred to is found in the evaporator nearest the chimney, and consists of an arrangement of a floating buoy stop-cock for self-supply of cane juice, and a trough arranged across the evaporator to receive the scum that is floated towards it by the current created in the liquid.

31. *Process of manufacturing Soda Ash.*—This consists in the making of the "*black balls*" by means of sulphate of soda and carbon, without using lime, in the reverberatory furnace, and then decomposing the aqueous solution of the product by forcing carbonic acid through the same, boiling to dryness, and exposing the resulting mono-hydrated carbonate of soda to an atmosphere of carbonic acid, by which it is converted to the bicarbonate of soda, retaining the same amount of water of crystallization as it had of constitution in the first instance, so that there is the same amount of water in the evaporated product as is necessary to convert this salt into the bicarbonate of soda.

32. *Benzole Compound Burning Fluid.*—This is the material that has been often noticed in the newspapers of the day, under the name of the *Benzole light.*

The invention consists in mixing two measures of alcohol and one measure of benzole, and adding about one measure of water, which, on the mixture being made, is violently agitated; and while the particles are thus mechanically separated from each other, sponges, placed in a suitable vessel, are charged with the mixture; and air being then forced through the sponges and out at the burner jet, will carry along enough of the vapors of the combustible compound to take fire and burn with a bright flame on the application of a lighted taper.

33. *Soap Compound.*—Consisting of the ordinary ingredients of soap, in which are mixed kaolin and ammonia, or carbonate of ammonia; the gist of the invention being confined to the use of the ammonia held to the compound by means of the attraction of the kaolin, as pointed out by Liebig in his work on Organic Chemistry, as reported to the British Association for the Advancement of Science.

34. *Process of working Gas Retorts.*—Consisting in charging coal-gas retorts, at the time the coal-gas begins to deteriorate, with the condensed overflow of gas tar, or other similar matters, as asphaltum, bitumen, or oleaginous matter, which will resupply the coked coal therein with the needed bituminous matter, as contained originally in the coal with which the retorts were first charged.

35. *Packing Butter in a weak solution of Iodide of Potassium.*—The article is put into tin canisters and surrounded with a film of solution of the salt in water in the proportion of a drachm to the half-pint of water.

36. *Reducing Gold Mineral by a certain Flux, and stirring the same with an iron rake.*—The inventor fluxes gold quartz with silicious, calcareous, and aluminous materials; the metal falls to the bottom by gravity; the flux and metal are drawn off by themselves. When the metal does not deposite well, it is stirred with iron rakes, and to these the metal adheres.

37. *Mixing Paints in a Watery Solution.*—This device consists in mixing paints with a watery solution of sulphate of zinc, the inventor alleging that the paint so prepared spreads better under the brush, and dries harder, and can be laid on thinner, so as to cover a much greater surface.

38. *Preserving India Rubber in the liquid state.*—This is effected by allowing the juice to flow from the tree into a vessel partly filled with a pure solution of common salt.

39. *Process of manufacturing Sulphuric Acid.*—The inventor concentrates the acid in leaden vessels, and below the boiling point of the strong acid. Besides this the inventor uses a very long condensing pipe, some eighty feet in length, to condense the gases, and finally discharges its contents into the discharge cistern, where an agitator aids in absorbing most of the gases.

40. *Composition Enamel free from Tin and Lead.*—The invention consists in the use of a glass having neither lead nor tin in its composition, but containing a certain amount of lime, or its sulphate, namely: of the glass, one part; lime, or sulphate, one-fourth; common salt, one-eighth. Now thoroughly pulverize and grind together with sufficient water to make it into a cream consistence, and paint it on the ware with a brush, and afterwards expose it to the heat in the enameler's oven, or furnace, in the usual way.

41. *Coating Iron with Copper.*—The metal is first cleaned in the ordinary manner with dilute sulphuric acid, and with some of the acid on it left exposed a few days, to let it corrode and rust, in order to form a rough surface; it is then brushed over with solution of sal ammoniac and immersed in a bath of zinc; then into a bath of copper, and held there till it ceases hissing; then withdrawn and cooled to a cherry red, when it is found coated with copper. If we want a thicker coat, it is then dipped again in the sal ammoniac while at a cherry-red heat, and then in the zinc, and in the copper, as before, till the thickness of copper is attained.

42. *Gas Retort and Condensing Tubes cooled by Air.*—This invention can only be given approximately, except with the aid of a drawing. It consists of a vertical cylindrical retort, nearly filled with shelves, for holding liquefiable gas making materials, all communicating with a central passage to the lower chamber and exit-pipe; which last, on leaving the retort, makes several turns, and is enveloped in a larger pipe, connected at one extremity with the chimney draught, so as to draw through the said larger pipe a current of cool air, and thus cool the condensing apparatus of the gas generator.

43. *Bottle Stopper.*—This invention is substantially a combination of the puppet valve with an ordinary decanter top—the stem of the valve being guided in a little frame, and capable of a reciprocating motion of a confined range—so that, when this valve apparatus, enclosed in a tube, is slipped, with a close fitting, into the mouth of an upright decanter, the valve rests on the mouth and closes it. But when the decanter is turned down, as in the act of pouring, the valve slides out to the extent of its range and the liquid flows. When the vessel is set upright the valve drops back into its seat and closes the mouth.

44. *Bottle Stopper.*—This is a modification of the one last described, but differs from it in having its valve of the form of the old-fashioned tin coffee-pot lid, and sliding out and in on a fixed stem, and so loosely as to admit of a wabbling motion. It is used in the same manner as that previously described.

45. *Process for preparing a Paint Materidl*—which consists in treating 100 pounds of serpentine rock with 25 pounds of sulphuric acid, 25 pounds water, and 10 pounds of prussiate of potash, dissolved in 40 pounds of water; decant the sulphate of magnesia produced, and wash out the soluble parts. The blue pulpy matter left is the product used for a paint.

46. *Furnace Slag Ware.*—This invention is confined to tempering and working the slags of iron and other furnaces, softening, reheating, and otherwise purifying and treating the materials.

47. *Process of preparing Chromate of Soda.*—This consists in treating the chrome iron-ore with its own weight of common salt, in a reverberatory furnace, (or for chromate of potash, treating the ore with a like proportion of muriate of potash,) at a high heat for ten hours, and supplying the same with a jet of steam, &c.

48. *Process of generating Illuminating Gas from wood and rosin mixed.*—The gas from wood, in part of the apparatus, passes through condensing pipes, and then into another part of the same generating apparatus, containing the rosin gas generator, where the mixed gases meet and are purified by passing over fragments of heated iron in the same vessel.

AGRICULTURAL PATENTS.

It will be perceived, simply by inspecting the tabular statement of the number of patents granted in this class, that seed planters and harvesters of grain and grass take the lead. They embrace nearly one-half of the patents granted in this class.

Speaking of this class as a whole, there has been concentrated no unusual force of inventive powers upon it, except, perhaps, in the range of harvesters. Much activity and talent have been devoted to this class of machines, and it is fast increasing at the present time.

Harvesters.—27 patents.

1. The most important improvement presented in this class of machines during the year is in part disposing of the grain after it has been cut. A patent was granted to William Watson, and Watson and Renwick, in 1851, for a machine to bind cut grain automatically; but the owners preferred improving this machine to building it for sale, and the invention now to be noticed is the improvement on that of 1851. It

includes a complete harvester of grain, which performs its entire work automatically; the machine being constructed in the form of a rectangle, being twice as long from side to side as from front to rear. One side, or one half of the machine is occupied by the cutting, and the other by the binding mechanism.

As the machine is moved forward, broad-side foremost, the cutting part being on the end towards the standing grain, the standing grain in the swath to be cut is severed by the cutters, and falls back upon the endless apron platform, where it is carried along horizontally towards the binding part, and it is delivered to, or between, a pair of parallel inclined ascending endless aprons, which carry the grain up to the top of the binding apparatus and deliver it into the oblong crib, supplied with detent rakes and arms, which let down into the encircling and compressing arms just grain enough to make a bundle, and which compressing arms hold the grain firmly while the cord, previously thrown across the crib-space by the automatic movement, is carried down by the descending grain, and is then drawn by the machinery, and lastly tied into a knot, and the end cut off. The side of the crib opens, and the sheaf falls out upon the ground. The crib again closes instantly, and the succeeding sheaf is prepared and delivered in the same manner. The movements of the binding and tying apparatus are chiefly performed by cams or eccentrics working upon shafts.

2. *Grain Harvester*.—A patent was granted for the device of projecting rivet-heads on the under-side of the cutters, and a corresponding space in the cutter-bar beneath; the design being to clear the passage of the cutters and prevent clogging.

3. *Rake to a Grain Harvester*.—This is a very ingenious machine for raking and disposing in bundles, and depositing the same upon the ground. It consists mainly in a crane so constructed as to rotate a quarter of a circle, in which quadrant movement it rakes across the platform and deposites its contents in the rear, by turning a quarter of a circle on its axis; the crane contains within itself a gimmal joint, the moving part of which consists of a rock shaft or a stirrup, the arms of which move in a vertical plane to the extent of a quarter of a circle. The rear one is connected with, and worked by, the crank of the driving wheel, while the arm extending towards the van, together with an elbow and arm extending from the top of the crane, controls the raking apparatus. All the raking part of the machine hangs upon the crane and turns with it. The operation of this machine presents a beautiful piece of workmanship. The crane which stands on one side of the platform turns itself around by the forward movement of the machine, bringing its arms over the platform, when, as it were, by a certain signal, one hand extends itself to the farthest side of the platform, and pulls to its fellow all the grain contained thereon, and, as soon as it has been drawn near the crane, the latter wheels around a quarter of a circle with the grain in its arms, and deposites its load in the rear, and returns for another charge.

4. *Potato Harvesters*.—Three patents for machines to dig potatoes have been granted. The first of these consists of an axle and a pair of wheels, drawn by a pair of horses, and around said axle, which moves with the wheels, a drum or cylinder is arranged, and armed with rows of radial teeth, while immediately behind and beneath, and in the same curve with the periphery of the said radial teeth on said drum, is arranged a fixed rake, which has the ends of its curved teeth at the lowest part of the machine, while its rear part and head extend upward and backward in the curve of the said drum to the highest part of the machine.

Operation.—As the machine is drawn forward astride the row of potatoes to be dug, the rake teeth of the fixed rake run into, or under, the hills of potatoes, while the radial teeth on the drum sweep backward along the potatoes towards the curved teeth, and as the dirt falls out the potatoes are carried rearward and upward between the drum teeth and the curved rake head, and when at the top of the drum they roll off into the cart body.

5. *A second machine* of this character has also been patented, substituting for the radial teeth on the drum a series of stiff brushes, and for the upper portion of the curved rake head, in the rear of the drum, an endless belt of open work slats, or their equivalent, for the purpose of allowing the dirt to fall out, and to carry up the potatoes and deliver them into the cart body.

Ploughs.—Fifteen patents granted.

Cultivators.—Four patents.

Seed Planters.—Twenty six patents, constituting one of the largest divisions of the class of agricultural implements. It is a class of machines longer known than harvesters, and the range of invention much more confined. The devices are almost necessarily confined to the mode of distributing seed; and, in most cases, they are either by a reciprocating valve covering and uncovering the seed discharge aperture, or, secondly, a seed roller, having cup-shaped cavities on its periphery to receive the seed from the bottom of the hopper, and discharging the same as the roller rotates. These I shall call, for the sake of distinction—the former, seed planters of the first order; and the latter, seed planters of the second order.

Few of these present any feature of invention worthy of note; and, although many of them may constitute good machines, the novelty is generally very small, and the complicated structure requires a sketch in most cases to comprehend the devices.

6. *A Seed Planter* of the first order was patented, in which the novelty consisted in arming each extremity of the reciprocating valve-slide with a spring, to avoid any shock which might arise from striking against fixed stops.

7. *A Seed Planter* was patented, the device of which consisted of a valve of the first order, in which the novelty was confined to the construction of the valve, made up of two pieces put together face to face, so as to have the holes in each directly opposite. But one piece sliding horizontally and longitudinally upon the other, the holes, not coinciding, will be partially or entirely closed, so as to deliver less or more seed, or none at all.

I have mentioned these rather to show the character of the inventions in seed planters—how small they are—than for any other purpose. They are a fair representation of the twenty-four others that have not been particularly named.

Horse Rakes.—Three patents.—One of these may be noticed.

8. *Horse Rake*.—This invention consists in making the axletree of a two-wheeled carriage the head of the rake, the teeth curving backward

and downward till they reach the ground, or near it. The same axletree is also hinged to the platform, and thills before it; and on its under and rear side a small hook or staple projects; and from this a strap, or belt, or link, extends forward to the whiffletree, by means of which the draught of the horses keeps the rake teeth close to the ground, except when released by the attendant who has control of it.

Threshers and Separators.—Eight patents.

9. *Threshing and Straw Separating Machines.*—Of the eight patents granted under this division, the following will be noticed for peculiarities of the devices rather than for the amount of invention involved. The first of these embraces three features of invention. First. The construction of the longitudinal bars or slats in the carrying part of the straw-separator. Second. The intervention of the fine screen between the threshing and winnowing parts of the machine, with the design of separating the fine matters before the grain is winnowed. Third. The construction of the *jumping rollers* and their supports. The last of these devices embraces the peculiarity designed to be noticed here. The jumping rollers, and the inclined planes on which they move with a reciprocating action, with the four rollers on their several short planes, one at each of the four corners of a shaking riddle or straw-carrier, constitute a new mode of sustaining and moving a shaking apparatus in grain-cleaning. A patent was granted for the device in general in 1851. The present patent is for a modification of the inclined planes.

10. *Hollow Cylindrical Straw-Carrier.*—A patent has been granted for the use of an inclined hollow cylinder as a straw-carrier, constructed without an axle or radial arms, and supported on friction rollers bearing against its periphery. The whole surface of the cylinder is full of holes, to allow the grain to fall through the cylinder, from end to end, without obstruction.

11. *Upright Cylindrical Thresher and Winnower.*—That is, the thresher in its wire gauze concave, and the straw-carrying cylinder that removes the threshed straw, are all vertical. The grain is fed in at the periphery of the threshing cylinder, where the perforate hopper allows the already shelled wheat to fall down through the threshing part into the winnowing part below.

Hullers and Smut Machines.—Ten patents.—There are few inventions in this division that call for my special notice.

12. *A Smut Machine* has been patented, consisting of a vertical cylindrical concave, containing a cylinder of spiral elevating beaters. The grain is fed in at or near the bottom, and carried upward by the said spiral beaters, arranged in spiral lines on the axle, and extending out radially, each one being a flattened or blade-formed arm; and the grain is discharged into, or through, an opening in the side of the upper part of the concave, where, passing through an inclined trough, it meets the fan blast, and is thoroughly cleaned of smut and dirt.

13. *Water Smut Machine.*—This invention is a washing, scrubbing, and drying machine for grain infected with smut. The form of the machine is that of a rectangle—an elevated frame work, in which are arranged longitudinally, and one over the other, three long troughs; the two upper ones having each a double bottom. The lower one, through which a stream of water passes, receives the grain to be cleaned, and agitates it by the mutual friction of the kernels, as it is moved along from end to end. It is next taken, when it reaches the farthest end of the lower trough, by an endless belt of cups, having bottoms perforated to allow the escape of water, directly to the third or upper trough, where it is carried along from one end to the other over a bottom heated by a jacket of waste steam, supplied from the second or middle trough. When the grain arrives at the farthest end of the third or upper trough, it falls to the corresponding end of the middle trough; and, after being carried through that with a continuous agitation, it falls into the receptacle, washed, dried, and fit for grinding.

Winnowing Machines.—Three patents.

14. *A Grain Winnower and Weigher* was patented, and the noticeable device is the weighing apparatus. The invention is chiefly confined to the construction of the weighing apparatus on ways, and the balancing knife edge, so arranged that when the measure of grain is filled up to the required weight, the balance tips, and throws the grain weighed upon the inclined ways, and it immediately starts off on the railroad track to the depot, while its place is supplied by another, and so on.

Corn Shellers.—Four patents.

15. One of these shellers presents a somewhat novel feature. It is this: that the ears and cobs are allowed to accumulate in the machine sufficiently to act in the mass as an elastic bed against the spiral shelling projections. The other features of the sheller present nothing worthy of special remark.

Straw Cutters.—Three patents.

16. One of *these machines* is worthy of a passing notice, from the manner in which the cuts are given. It consists in the application of the tappet-wheel stroke to the cutting blade, which causes it to produce a chop cut, in combination with a shear cut, so that the machine will cut wet as well as dry straw.

Beehives.—Two patents.—One of these hives presents what appears to be a very excellent invention, but it would be useless to attempt a description without a sketch.

Miscellaneous of Agriculture.—Nine patents.

17. *Ox Yoke.*—The device claimed is the use of a pair of rods, and a pair of chains working on pulleys, and imbedded within the yoke. Said chains and rods are connected with the sliding sectional pieces that hold the bows. The operation of the devices is, that when either one of the bows is moved from or towards the central part of the yoke, the other bow is moved equally, and so enables the animals to work at different, but always equal, distances from each other.

18. *Neck Yoke for Horses.*—This yoke is made in the ordinary form of neck yokes for spans of horses, but has the rods at the ends (into each of which is fitted a ring of the ordinary kind) controlled by spiral springs, one at each end, allowing the rods to slide out and in, to a certain extent, and in the same manner as the rod plays in the ordinary spring balance; so that any sudden movement of one horse would not jerk his mate, in consequence of the yielding action of the spring.

19. *Metallic Tube Scythe Snath*—designed for both lightness and strength. It also embraces the device of a longitudinal rib on the snath, fitting into a corresponding groove on the inner face of the nib-rings.

There are several of these grooves, so as to admit of setting the nib by rotation, backward or forward.

Respectfully submitted:

L. D. GALE, *Examiner*.

Hon. S. H. Hodges,
Commissioner of Patents.

U. S. Patent Office,
January 1, 1853.

Sir: I have the honor to submit the following report of the progress and the present condition of the business intrusted to my charge during the past year.

The classes of inventions referred to me for examination are the following:

Class 8.—Mathematical, philosophical, and optical instruments.
Class 12.—Lever and screw power, &c
Class 15.—Stone, clay, and glass manufactures.
Class 16.—Leather, &c.
Class 17.—Household furniture, &c.
Class 21.—Wearing apparel.
And of Class 1.—Churns and implements for working butter.

The whole number of applications which have been referred to me for examination during the year is 419.

Of this number there have been included in—

Class 8	81
Class 12	30
Class 15	45
Class 16	68
Class 17	137
Class 21	26
Class 1.—Churns, &c.	32

Of the above 419 cases, there have been—

Reissues	2
Additional improvement	4
Extension	1
Appeal	1

The number of cases remaining unexamined at my desk at the beginning of the year was 18; at the close of the year, 70. The whole number which has fallen to my lot for examination within the year is, therefore, 437.

It will be perceived that I have received a smaller number of cases than my colleagues; but, on the other hand, they are distributed through seven of the twenty-three classes in the Office, and the subjects included in several of these classes are, besides, very heterogeneous in their nature. This, of necessity, greatly increases the labor of examination.

I subjoin notices of some of the inventions which have been patented within the year.

MATHEMATICAL, PHILOSOPHICAL, AND OPTICAL INSTRUMENTS.

Electricity and Electro Magnetism.—The application of these agents to useful purposes in the arts has become so extensive, that applications for patents for improvements in this branch have already become quite numerous, and appear to be increasing. Among the patents which have been granted within the year is one for an

Electric Whaling Apparatus.—A patent has been granted for the application of powerful electric discharges in the capture of whales or other large sea animals, the object of which is to paralyze the animal, so as to deprive him of the power of motion, and speedily destroy life. The whaling boat is supplied with a very powerful magneto-electric machine, constructed with large permanent magnets, and rapidly revolving armatures, surrounded with coils, the construction being in principle like that of the revolving armature machines used for medical purposes. One pole of this machine is connected by a thick wire with the copper sheathing on the bottom of the boat, thus establishing a large surface connexion of that pole with the water of the sea. The other pole of the machine is connected with the harpoon by means of a gilded copper wire, covered with an insulating India-rubber coating. After the machine has been put in motion, the harpoon is thrown, and the instant it strikes the animal, the discharges of the machine take place in rapid succession from the harpoon head, through his body, returning, through the sea and the copper sheathing of the boat, to the other pole of the machine. Serious doubts were entertained, on the examination of this case, of the practicability of increasing the power of these electric shocks to a sufficient degree to overpower animals so large as the whale; yet we are informed that the experiments already made upon whales have been successful.

Telegraphs.—There has been comparatively a dearth of inventions under this head brought before the Office during the year, and there has been but a single improvement in the electric telegraph proper passed for issue by me, the patent for which goes out on the 4th of the present month. A patent has been granted for a very simple and beautiful modification of the House printing telegraph, which will be noticed by my colleague, Mr. Baldwin, the case having been examined by him as an old case, left by his predecessor in office. The telegraphic register to which I have alluded consists of the common Morse register, to which is applied an extra electro-magnet, with an armature, operating a lever and pawl, which acts upon a ratchet-wheel, that continually winds up the main spring for driving the clock-work of the register. The extra electro-magnet is operated upon by the same current that actuates the electro-magnet of the pen-lever. A like arrangement has been before used, for continually winding up a clock by an electro-magnet, the circuit of which was broken and closed at every swing of the pendulum.* In this case, a provision is made for arresting the action of the winding electro-magnet and lever, by means of a cross connexion, which is formed as soon as the spring is wound up to a certain point. The electric current then takes the cross connexion, instead of going around through the coil of the winding magnet, and over-winding is thereby prevented. As allied to the subject of electric telegraphs may also be noticed the two following:

Striking Bells by Electro-Magnetism.—The subject of a patent granted under this head is an improvement by which the alarm circuit

used in the system of electro-magnetic fire-alarms now being introduced into some of our large cities, is enabled, without the use of local batteries, to call into operation a force sufficient to unlock and set in action the heavy mechanism for striking the alarm bells. The main detent which locks the striking machinery is lifted by the action of a falling weight at the end of a lever. This is held up in a nearly vertical, but slightly inclined position, by a secondary detent connected with the movable armature of an electro-magnet, placed in the alarm circuit. When a galvanic current is passed, the electro-magnet attracts the armature with sufficient force to move the secondary detent, which lets the before-mentioned weighted lever drop, and this in its turn lifts the main detent. The machinery thus unlocked is set in motion, and a revolving cam lifts the weighted lever again to its nearly upright position, where it is caught and held as before by the secondary detent, if the latter has, in the mean time, been released from the attraction of the electro-magnet by the cessation of the current. As soon as the machinery has moved far enough to give one stroke of the bell, its motion is again arrested by the main detent. But so long as the alarm circuit is kept closed, so as to keep up the current, and leave the secondary detent subject to the continued action of the electro-magnet, the weighted lever will continue to fall back at every revolution of the cam, and thus keep the machinery unlocked and in action.

A full description and engraving of this machine, and of the whole system of the municipal electric telegraph, as established in Boston, may be seen in the thirteenth volume of the second series of the American Journal of Science and Arts.

Electro-Magnetic Fire Alarms.—A patent has been granted for an electro-magnetic apparatus for giving notice of fire or burglars. It consists of two galvanic circuits, which may be both operated by one battery, with electro-magnets and mechanism so arranged that the breaking of one of these circuits may cause the revolution of a signal wheel, operated by clock-work, which closes and breaks the other circuit so as to communicate signals to any desired point. The wire forming the former of these two circuits is led around through all the exposed parts of the building, and is so arranged that its continuity will be broken by any attempt at breaking open doors or windows, and in parts exposed to fire it is divided and bound together by a combustible cord, the burning of which will cause it to part and give an alarm by the interruption of the current in the same way.

Improvements in the Points of Lightning Rods.—Two patents have been granted for improvements both having for their object such a construction of the point as shall cause it to be left tolerably well pointed even after it has been partially melted by an electric discharge. The principle in both is the use of metals or metallic alloys of different degrees of fusibility; the most fusible forming the upper end or outer surface of the point. In one of these points the device consists in completely covering or coating the inner or main point with a pointed metallic sheath of a more fusible metal or alloy; and this again with another still more fusible; and this, if desired, with still another. In case of a stroke of lightning sufficiently powerful to melt the point, as not unfrequently happens, from its small mass and the great heat produced where the fluid passes from the air to the conductor, the external sheath is to

act as a protector to the point of more infusible alloy within, by absorbing the heat as it melts off, leaving the latter sufficiently perfect still to act as a point.

The other plan is a modification in which the unequally fusible metals or alloys, instead of being formed as a succession of sheaths, are made solid, and connected one above another by oblique joints or faces, the inclination being towards the square or angular corner of the rod, so that when one section is removed the one next below will be left with a sharp point on that corner. We are not informed about the success of these contrivances in practice. Trial only can test their usefulness; and it would seem that the only practicable way of instituting the experiment will be to point them to the clouds and wait patiently for the bolt to come.

Improvements in Galvanic Batteries.—Only one improvement of this kind has been patented within the year, and this is for a modification of the old voltaic pile, designed more particularly for medical purposes. The metallic plates of the battery are perforated, and are separated by short metallic studs, which, while they leave a small space between the plates, form a metallic contact. The arrangement is suspended in a kind of light frame or bail, so that it can be at once immersed in any suitable exciting solution until the cards which form the porous element are saturated with the liquid, when the battery is withdrawn and is ready for use.

Instruments for purposes of Geometrical Measurement.—The only instrument of this class which has been patented is what the inventor terms a centre-square for finding the centre of a circle, designed for the use of mechanics. The general principle upon which the instrument is based is well known to geometricians, viz: that if two tangents (or straight lines touching the circumference of a circle) be extended until they intersect each other, a straight line bisecting the angle between them will pass through the centre of the circle. The instrument consists of two arms, placed together at right angles to each other, in the manner of a carpenter's square, but of equal thickness, and having their surfaces "flush;" upon the upper surface of which arms a straight ruler is fixed at its end in such manner as to have one of its edges at the inner angular point of the arms, and that edge extending midway between them, or bisecting the angle between them. This ruler can be braced firmly by a bar running across between the extreme ends of the arms. If the mechanic wishes to find the centre of a circular wheel he places the instrument upon it, with the two arms both resting against its circumference, in which position the edge of the ruler will run across its centre. A straight line is marked in this position, and the instrument is applied again to another part of the circumference, so as to mark in the same manner another line intersecting the first. The point of intersection is of course the centre of the wheel. The whole is the work of a moment.

Improvements in Time-Pieces.—Notwithstanding the great amount of attention that has been bestowed upon this elegant class of machines for many ages past, and the high degree of perfection to which they have been brought, invention is still busy upon them, and every year brings before the Office a greater or less number of inventions of this class. During the year several patents having been granted. One of these is for a new spring-balance for time-keepers. The ordinary chronometer or

watch-balance, it is well known, plays on points at the ends of its axis, and its motions or vibrations are governed by the tension of a coiled spring, which in watches is called the hair-spring. This balance, which has been called the most beautiful invention in mechanics, has, of late years, to a considerable extent, taken the place of a pendulum in larger time-pieces; and in such cases the points of the axis of the balance have been made to rest upon friction wheels to reduce their friction. In the present instance, however, the points and the spiral-spring are thrown aside, and a long, straight, thin, and narrow steel spring is made to perform the office of both. The spring is secured to the clock-frame at both ends and strained tight, and the balance itself, consisting, in this instance, simply of a straight bar, loaded with a ball at each end, is suspended at or near the middle of the spring; the spring passing through the middle of the bar at right angles. The spring is thus made to serve the double purpose of a frictionless suspension for the balance and a governor of its motions.

The force of torsion, as it is called—that is, the force with which a twisted wire or thread of glass tends to untwist itself—has been used before in certain instruments for philosophical purposes, as in some magnetic instruments where the magnetic bar is suspended at the lower end of the wire; and, when used for such purposes in this manner, the force of torsion of the wire has been measured by removing the magnet, putting a given weight in its place, and counting the number of vibrations it accomplishes in a given time; and such an arrangement as this has even been applied to a time-piece. But in the present arrangement, where the flat spring is secured at both ends, and strained tight, so that the time piece can be moved about like a watch, the governing force of the balance is not derived from the simple torsion of the spring, but is also due in part to, and can be varied by, the force with which the spring is strained. The exact adjustments for time are made either by an adjustable slot, through which the spring passes near its end, or by a screw adjustment of the balls, or both.

Alarm Time-Pieces for Lighting Lamps.—A hollow cylinder of sufficient size to contain a small lamp and the fixtures for lighting it is placed in a vertical position in a space cut for it in the lower part of the front of the case of the time-piece. It is mounted so as to turn freely on its own axis upon pins fixed in the case at the top and bottom of the cylinder. Part of the side and top of this cylinder, to the extent of almost one-half the circumference, are cut away, leaving that side entirely open. The lamp supplied with spirit is slipped into a groove prepared for its reception in the bottom of the cylinder, the wick being eccentric to the cylinder, so that it may have a sweeping motion when the latter turns. An extinguisher is placed upon the wick to prevent evaporation of the spirit, and a match secured in an elastic support on the lamp top, which holds it in position for lighting the lamp when ignited. The rubber for igniting the match is fixed, being attached in a horizontal position, within the cylinder, to the fixed pin about which the cylinder turns at its upper end. When prepared for letting off, the cylinder is set with its open side turned to the interior of the case, and is held there by a hooked pawl. In this position the lamp and all the fixtures are concealed from view by the closed side of the cylinder, which projects in front and seems to form part of the case itself. When the machinery of the alarm is set in operation, it disengages the hooked pawl from the cylinder, and the latter is

thrown round through half a revolution by a spring. This brings the open side of the cylinder to the front, and presents the lamp to the open air; the movement at the same time causing both the match and the extinguisher to strike the fixed rubber, igniting the one, and throwing the other from the wick.

Registers or Counting Machines.—Patents have been granted for some machines of this class. One of these is an omnibus register, the object of which is to register the fare according to the weight of the passenger. Many registers have been contrived for registering the fares in omnibuses, and for other similar purposes, particularly in France, by means of a slight movement given to the step of the omnibus by the weight of the passenger as he mounts to enter the vehicle; the movement of the step being communicated to mechanism, showing, by an index, a register of the number of passengers. In the present case the step is made to rest upon springs so stiff as to yield but a little to the weight of a man, and its motion, which will vary with the weight of the person, is communicated to a ratchet wheel by means of a pawl; the length of the teeth of the ratchet wheel, the strength of the springs, and the arrangement of the pawls being so accommodated, that a person between certain limits of weight will cause the ratchet wheel to advance one tooth and register a single fare, while a heavier person will cause it to advance two teeth and register a double fare.

Pressure Gauges.—Steam gauges, if specially designed for that purpose, are examined in the class of steam engines; but gauges of pneumatic pressure for general purposes are referred to me under the class of mathematical and philosophical instruments. An instrument of this kind has been patented, which consists simply of a metallic tube, much flattened, and then bent into a curve, which may amount to nearly a whole circle or more, one of the flattened sides forming the concave, the other the convex side of the curve. The interior of this tube is made to communicate with the confined fluid whose pressure is to be measured. This pressure tends to force the flattened sides of the tube apart to a greater distance from each other; and, upon a principle of action not easily explained in words, this produces a partial straightening of the bent tube or diminution of its curvature, so that, one extremity of the tube being fixed to the frame-work of the instrument, the other receives a sensible motion, which, being multiplied and communicated to an index, furnishes a measure of the pressure. If the interior of the tube be made a vacuum the instrument will become a barometer, if suitably graduated and compensated for changes of temperature.

LEVER, SCREW, AND OTHER MECHANICAL POWER, AS APPLIED TO PRESSING, WEIGHING, AND RAISING AND MOVING WEIGHTS.

Machines of this class are so ancient and so universally used, that we might well expect to find the field of invention in this direction almost entirely preoccupied. Accordingly very few inventions of this class come before the Office possessing any interest or novelty. Yet there are enough to show that invention is actively at work wherever it can find occasion for its exercise. Several patents have been granted within the year for improvements in machines for

Weighing.—One of these is a platform scale of that description which acts by means of a system of levers operating upon a vertical connecting

rod which communicates motion by rack and pinion, or otherwise, to a pendulum. The deflection of the pendulum from the perpendicular position in which it naturally hangs, will afford a measure of the weight placed on the platform, the weight being marked upon a dial furnished with an index, attached to or geared with the axis of the pendulum. The present machine is contrived for rapid weighing and for *self-registering* of the weights. For both these objects, and especially the last, it was necessary to provide against the liability of the pendulum to swinging, when the weight is placed on the platform, beyond the point at which it would settle, and thus registering more than the true weight. One means employed or proposed by the patentee for effecting this is the use of an extra platform on each side of the weighing platform, the extra platform resting by knife edges with one side upon the side of the weighing platform, and the other side upon the ground. When a carriage is drawn upon the platform it will be seen that as it mounts upon the extra platform and advances over it from that side which rests upon the ground to that which rests upon the middle or weighing platform, its weight is transferred in a gradual manner to the latter until it rests entirely upon it. By this means the pendulum, instead of rising with a sudden swing, carrying it beyond the point of equilibrium, as it would do if the weight came upon the platform in a single jolt, rises gradually with the gradually increasing force and stops at the point of equilibrium, leaving a correct register of the weight by means of registering apparatus suitably connected with it.

The pendulum is not relied on always to measure the whole weight of the article or vehicle weighed, but only its excess over a certain constant weight, sufficient to balance a poise, which is placed upon a weighing beam, or steel yard, that forms part of the train of levers. A second register, which counts the number of weighings, will then account for this constant weight, and the first-mentioned register for the excesses of weight indicated by the pendulum.

Presses.—Among the machines which have been patented under this head may be mentioned one for pressing, flattening, and shaping plug tobacco, and another for forming cigars. These machines, particularly the last, have but a distant alliance to presses as a class, but, under the past practice of the Office, machines for performing most of the mechanical operations upon tobacco have been examined in the same class with those for pressing it. The first-mentioned machine was contrived with the view of obviating the difficulty which, the patentee states, arises in pressing tobacco by machinery from the pistons and moulds in which the plug is pressed becoming clogged with the gummy matter of the tobacco, and also from the plug expanding again when released from the mould. It consists of a revolving mould-wheel, a mould-bottom, and pistons; two pistons being applied to push the plug from its rectangular hopper into the mould, a second to press the plug, and a third to push the plug from the mould, through the disk, in between two endless aprons, each of which slides over a fixed surface, which serves to preserve the compression of the plug for a certain length of time, until, being pushed on by succeeding plugs, it is discharged from between the endless aprons. The mould-wheel turns, so as to present the plug in succession to each of the pistons. To this arrangement are applied certain contrivances for keeping the mould-bottom and the pressing piston clean: the former

being made a revolving disk, cleaned by a fixed scraper and oiled by an elastic roller; and the latter being made as four separate pistons, revolving on an axis, which is mounted on a reciprocating slide, or cross-head; so that, by a quarter revolution of the axis at every eighth pressing, a new piston may be brought into play, after having been cleaned and oiled during the preceding three quarter revolutions.

The machine for forming cigars consists of mechanism so contrived as to take the tobacco in the leaf, cut it up in two directions, by the successive actions of two cutters, or cutting pistons, and roll it between four rollers, which stop their motion and open to receive each portion as it is delivered from the second cutting piston, and which close and renew their motion each time as that piston retreats, and which, when a sufficient quantity of tobacco has been introduced to form the cigar, roll on the paper wrapper, one corner of the paper wrapper being introduced by the attendant between one of the rollers and the cigar. This last-mentioned roller is made a little smaller than the others, and is also smooth, while they are fluted. The fluted rollers draw the paper in with their own velocity, and thus cause it to draw under the smaller and slower moving smooth roller, so as to wind it tight.

STONE AND CLAY MANUFACTURES, INCLUDING MACHINES FOR POTTERY, GLASS-MAKING, BRICK-MAKING, DRESSING AND PREPARING STONE, CEMENTS, AND OTHER BUILDING MATERIALS.

Machines for dressing Stone.—Owing to the refractory nature of the material, and the rapidity with which it wears away the edge of all cutting tools of steel, however well tempered, it has been found a very difficult matter to cut stone by machinery with any advantage. The subject has, however, received much attention for some years past, and frequent applications have been, and still are, made for patents for machines for this purpose, designed to supersede, in a great measure, manual labor in the operation. In one of these machines, for which a patent has been granted, the cutting chisel, instead of being made to act upon the stone by a blow, is operated by a very short crank, or eccentric, and connecting rod. In the positive reciprocating motion thus given to the chisel, it is brought to bear upon the stone just at the end of its stroke, and, by the intense pressure it is capable of exerting at that point, chips it away as fast as the stone, mounted upon a sliding carriage, is carried beneath it, by a gradual feed motion. A series of such cutters is extended across the face of the stone so as to cut the whole width at once; the eccentrics for operating the several cutters being upon a single shaft, and so arranged as to act alternately or in succession.

Machines for drilling Stone.—Several of these machines have been patented within the year. In one of them the drill stock, upon the momentum of which the blow depends, works between the grooved circumferences of two pairs of wheels, which, revolving in opposite directions, carry the drill stock first one way, to give the blow, and then back again. The drill-stock lies between the two wheels of each pair, in the manner of a bar of iron between the rollers of a rolling-mill, but only one pair grasps or binds it at a time; a part of the circumference of the wheels of each pair being slightly reduced in such manner that, while one pair is binding the drill-stock, and giving it motion, the other pair

leaves it free play, only acting as a guide. The draw, as it may be termed, or binding part of the first pair, which gives the advance motion to the drill, is a trifle shorter than that of the other, or second pair, in order to secure the release of the drill-stock just before the drill is ready to strike the stone. With this precaution, it will be seen that the two pairs of wheels alone will command both the blow of the drill and its progressive advance as the material is cut away. But they are also made at the same time to do the turning of the drill.. This is done simply by placing the two wheels of the second pair a very little oblique to the direction of the drill stock, by which means they impart to it a slight screw motion. To prevent the inconvenience of a rapid return-motion of the drill, the wheels of the second pair are of smaller diameter than those of the first.

In another of these machines the drill stock works through the hollow piston-rod of a small steam engine, the piston-rod being made to extend through packing boxes in both ends of the steam-cylinder, and the fly-wheel, crank, and connecting rod of the engine being located on one side, so as not to interfere with the range of the drill-stock. The cross-head of the piston-rod is furnished with a peculiar clamping apparatus, by which the drill stock is clamped to it until just after the middle of the stroke of the piston, where the velocity is at its maximum, when, by the action of a fixed cam, it is unclamped, and continues to move on freely, with its full velocity, until it strikes the stone, before the piston-rod itself, which is controlled by the crank motion, has reached the end of its stroke. But when the latter reaches the end of its stroke the clamping is renewed by the letting off of a spring, and the drill stock is drawn back by the return of the piston, and advanced again, till it comes to the point where it is unclamped as before. This clamping apparatus is so arranged as, at the same time, to rotate the drill-stock by its action. It will be seen that in this, as in the last-described machine, the progressive advance of the drill up to its work takes care of itself.

Sawing Stone.—Under this head I notice a saw for sawing stone, which consists of two steel plates riveted together, with a plate of lead between them. The idea of the inventor is that the sand shall lodge in the space between the steel plates and imbed itself in the lead, the latter always wearing away, so as to leave the former projecting beyond or below it.

Brick Machines.—On account of the great labor of moulding and pressing bricks by hand, and the great difficulty of doing it well by machinery, a very large amount of ingenuity and skill has been expended upon the invention and improvement of brick machines both here and in Great Britain and France. Every year brings into this Office many applications for patents for these machines, and a number have been patented during the year now past. They do not, however, generally, in their leading features, present anything to distinguish them from some of the numerous machines before patented or in use. The improvements have been chiefly in the subordinate features, and it would be difficult to give a clear idea of them without the aid of drawings.

Brick Kilns.—A patent has been granted for an arrangement of kilns, or ovens, for burning brick, in which eight kilns (more or less) are placed together, in a rectangular form, four by two, and are so connected with each other, and with the external air, and with the chimneys, as to form

in effect a circle. The several passages and flues are provided with dampers, by means of which a draught from the external air may be admitted into any one of the eight kilns, and from that through one or more adjacent kilns to any other, and from that to the chimney. By this means the putting up the sun-dried brick into the kiln to be burnt, the burning of the brick, and the removal of burnt brick, may all be going on simultaneously and perpetually; and also the heating up of the brick at the commencement of the burning, and the first part of the burning, may be accomplished by waste heat, derived from the kiln in which the burning is being completed. For instance: while the cold brick is being removed from No. 2, the already burnt but hot brick may be cooling down in No. 3, the completion of the burning going on in No. 4, the partial burning going on in No. 5 by the waste heat of No. 4, the first heating up of the unburnt brick going on in No. 6 by the waste heat of No. 5, and the laying up of a fresh supply of unburnt brick advancing in No. 7. The draught in this case will of course be directed into No. 4, thence in succession to Nos. 5 and 6, and thence to the chimney; and it may be either admitted to the fires of No. 4 directly from the air, or be made first to traverse the hot bricks of No. 3, so as to save their heat, and aid in cooling them down. When the burning of No. 4 is complete, its fires are extinguished, and fires are lighted in No. 5; No. 7 is included in the line of draught; No. 3, now cold, excluded, and the work continues as before.

Glass Manufacture.

Glass Lenses for Signal Lights.—The large glass lenses used in light-houses, for the purpose of throwing the rays of light in parallel lines, and rendering them visible at a great distance, are made upon the well known plan of Fresnel, of concentric rings, first ground and polished, and then connected together. A patent has been granted for producing a lens of the same description in a single piece by pressing in metallic moulds and subsequent fire polishing; the patentee having discovered, as he says, and as appears to be shown by the performance of a large lens deposited in the Office, that by this means he can produce, at a very cheap rate, a lens of sufficiently good polish, and sufficiently perfect optical form, for the purpose intended. It will readily be seen by the optician, that if the perfection of form can be carried to a certain point, great pains and expense laid out to carry it to a very high degree of precision would be nearly thrown away on account of the diameter of the source of light.

Frosting Glass.—In 1851 a patent was granted for frosting the surface of glass plates, by placing the plate flat in the bottom of a box made to rock like a cradle, and then covering it with sand and pebbles and water. The rocking motion caused the sand and pebbles to slide over the glass by their gravity from one side to the other, and thus produce the fine abrasion of the surface that imparts the frosted appearance. During the year past a patent has been granted for a modification of this arrangement, which consists in giving to the box in which the plate of glass is laid a very quick and short vibratory motion on horizontal ways, so that the glass is made to move beneath the sand, the inertia of the latter preventing it from moving with the glass.

LEATHER, INCLUDING TANNING AND DRESSING, MANUFACTURE OF BOOTS, SHOES, SADDLERY, HARNESS, &C.

Tanning.—Invention is pretty active in this important department of the arts, and many applications for patents are made every year, and during the past year two patents have been granted. The particular object that seems to receive most attention from inventors, is the plumping or raising of the hide by means of certain chemical substances or compounds, which promote or accelerate the union of the tannin with the hide. The applications under this head are, as a class, the most perplexing to your examiner of any that come before him for examination. This effect of raising the hide appears to be a very general property of the acids and salts, and it becomes therefore sometimes a very nice question to determine how far the substitution of one for another, or the compounding of one with another, may be patentable or unpatentable. It evidently will not do to regard them, generally, as equivalents; for each particular acid, or salt, aside from the general property in question, has its own specific action, more or less injurious or beneficial, upon the texture of the skin; and these acids and salts also possess the general property in unequal degrees. There is, therefore, full scope for invention in selecting, under the guidance of carefully conducted and accurate comparative experiments, such acids or salts as will produce the required result in the quickest and most perfect manner, with the least injury to the quality of the leather; and he who makes a real improvement in this way, is unquestionably entitled to a patent for it. But, on the other hand, it must be evident that these acids and salts might be combined in new forms and proportions, *ad libitum*, without any real invention or improvement being made.

The complete separation of this class of cases from the really meritorious is quite beyond the power of the Office with its present limited means of experimental investigation; and, under these circumstances, your examiner has recommended the grant of patents for new compositions when there appeared evidence of a good result, and no positive grounds of belief that the case was no more than one of obvious substitution of mere equivalents.

Sulphate of Potash.—A patent has been granted for the use of sulphate of potash in strong tanning solutions of terra japonica, or other sources of tannin. Besides the tests to which this salt has been put in practical tanning, the inventor states that it has responded very favorably to a new test which he has proposed as generally applicable to all solutions, and which, if well founded, appears, from its simplicity, and the readiness with which it gives its indications, to promise an important addition to the means of investigation. Not being authorized by the inventor, I am not at liberty to describe this test. The sulphate is commonly used with a proportion of alum in the solution.

Borax.—A patent has been granted for the use of borax, in combination with nitre and alum, in solutions of tannin, more particularly strong solutions of terra japonica.

Polishing Leather.—A machine for this purpose has been patented, in which the polishing tools are attached to an endless band passing over two wheels upon the same level. The tool is drawn over the leather while traversing the lower half of the endless band; the pressure of the tool upon the leather being maintained by horizontal ways, beneath

which pass projections from the tool. The leather rests upon an adjustable spring bed.

BOOTS AND SHOES.

Implements for Lasting Boots.—Two of these have been patented. The first consists of the following elements: first, a standard, or post, resting vertically upon the sole of the shoe; second, a screw, swivelled in the top of the post, and rising vertically therefrom, and terminating at the top in a handle, or thumb piece, by which it is turned; third, a cross-head, with a female screw cut through it, by which it plays up and down upon the before-mentioned male screw; fourth, hooked claws, which are hinged at their upper ends to the cross head, and at their lower ends lay hold of the edges of the upper leather of the shoe; fifth, an inclined slot at about the middle of the length of each claw; the slots of both claws playing upon a round pin, which is inserted into the side of the above-mentioned post. The action of the slots and pin, in combination with that of the screw, is such as to draw the upper-leather upward and inward at the same time.

The second implement consists in part of a pair of pincers, with very long jaws, terminating at their extremities in claws, which lay hold of the ends of the upper-leather; the pincers being held with their handles upward and opened. To the insides of the jaws are hinged, at suitable points between the claws and the centre pin of the pincers, two bars, which converge as they descend, till they meet at their lower ends, and are there hinged to a step that rests upon the sole of the shoe. As the claws are brought towards each other by closing the pincers, they are, at the same time, thrown upward by the action of the hinged bars.

HOUSEHOLD FURNITURE, MACHINES AND IMPLEMENTS FOR DOMESTIC PURPOSES, INCLUDING WASHING MACHINES, BREAD AND CRACKER MACHINES, FEATHER DRESSING, ETC.

Chairs—Improvement for preventing wear of Carpets.—We have had chairs made with the hind legs retreating so as to interdict the occupant from the luxury of leaning back in his chair; but the patentee, with a more accommodating spirit, has provided the legs with ball and socket joints and flat steps at their lower ends.

Railway Car Seats.—In one of these the back reverses by means of reversing arms, hinged to the middle of the elbows of the seat in the common way; but it has a secondary back, of equal width, connected to it, by means of hinged bars, in such manner that the secondary back, when in that position in which the two backs lie flat upon each other, back to back, can hinge upon either side of the main back, and so be turned up and made to rest upon the upper side of the latter, whichever side is uppermost. The connexion between the main and secondary back is made by one pair of bars hinged to one side of the main back and to the opposite side of the secondary one, and another pair hinged in like manner to the remaining sides of the two backs. The general principle of this mode of connexion is not new, being found in certain toys; but, so far as has come to the knowledge of your examiner, there has been no application of it which it was thought could be considered an equivalent. In another car seat, the back is made to change from one

side to the other upon reversing arms, as usual; but, instead of being firmly attached to those arms, it is made to hinge upon their extremities, and to rest, by means of suitable pins or knobs at its corners, in notches made in the frame of the seat; and the elevation and the inclination of the back can be varied by changing it from one notch to another.

A third car seat has two planks, suitably padded, hinged to each other and to a common support at their edges, but connected with each other by means of suitable bracing, to be presently described, in such manner as to maintain a certain angle with each other; then, by tipping them over one way or the other upon the hinged support, either may be brought into a horizontal position, the other serving as a back; the sitter, of course, facing opposite ways in the two cases. The manner in which the inclination of the back and seat to each other is made adjustable is this: From the hinge joint at each end of the seat issues a straight cylindrical rod, bisecting the angle between the seat and back. Upon this rod is a slider, which can move along the rod and be fastened at any point by a clamp screw. To this slider are hinged two bars, the other ends of which are hinged to the back and seat, forming with them—*i. e.*, with their cross section—a four-sided equilateral parallelogram or lozenge, of which the rod above mentioned is a diagonal. Increasing or diminishing the length of this diagonal by means of the slider, causes an alteration in the magnitude of the angle of inclination of the back to the seat, and the arms above mentioned serve at the same time as elbows to the chair.

In a fourth seat the back is made in two parts, which can swing horizontally round the ends of the seat, and be joined together on either side of it; or they may be turned on opposite sides to each other, so as to form what is called a *tête-à-tête*.

Washing Machines.—Applications for patents under this head are numerous, considering the large amount of ingenuity that has already been expended. One of the machines which have been patented during the year consists of a vertical plunger, in combination with a mass of floating balls, through which the plunger is forced with the clothes attached to it.

Machine for Scouring Knives and Forks.—Two cylindrical brushes, touching and slightly entering or "mashing" into each other, revolve together in the same direction (as to the adjacent sides, viz: downward) with equal velocity. The knife is introduced between them, and the small extent of the surface of contact in this arrangement is favorable to a perfect action of the bristles upon every part of the surface of the article, while the brushes can be constantly replenished with the scouring material by taking it up from a trough beneath them.

Cheese Cutter.—From the centre of a circular base board rises a metallic spindle, having a groove in one side, and pointed at the top. Upon the base board is placed a second circular board, which turns about the spindle as a centre. Upon this the cheese is placed, being penetrated through its centre by the spindle. The knife is applied, with its point in the groove of the spindle, and is forced down into the cheese, guided by the groove, till it comes to a little mortice cut through the spindle, into which the point then takes, and which then may serve as a fulcrum to complete the cut. By rotating the cheese, a second cut can be made at any desired angle with the first.

WEARING APPAREL, ARTICLES FOR THE TOILET, INCLUDING INSTRUMENTS FOR MANUFACTURE.

Umbrella.—A patent has been granted for an umbrella, in which the aim has been to dispense with the braces commonly used to distend the ribs, by the use of what may be considered a sort of substitute for ribs and braces both. This consists of ribs, as I will term them, connected by hinge joints, or, as in the model and drawings deposited in the Office, by springs, to the staff, a short distance below its upper end. The covering is attached only to the extreme ends of the ribs, and to a part at its centre, which, by a screw, can be moved to a greater or less distance above the point where the ribs are connected to the staff. On commencing thus to screw the centre of the cover upward, the cover begins to act upon the extremities of the ribs, which causes them to spread outward, and continuing the motion they will spread to the full span of the cover. This construction, of course, gives the cover a pointed top.

Machine for forming Metallic Button Backs.—This machine, by means of a system of cams and levers, takes the metallic blank, or circular disk of which the button back is to be formed, from the bottom of a pile of such disks in a vertical tube, in the manner of a coining machine, punches a slit through its centre for the reception of the eye, bends it up into the convex form required, takes the wire from a reel, cuts off a piece of suitable length, bends it into an eye, inserts the ends of this through the slit, clinches them down, and, by pressure suitably applied, fastens the eye firmly in its place.

Respectfully submitted:

J. H. LANE, *Examiner*.

Hon. S. H. Hodges,
Commissioner of Patents.

United States Patent Office,
January 1, 1853.

Sir: In compliance with your request, I have the honor to submit the following report of the condition of the business of my desk for the past year, together with a brief notice of a few of the inventions embraced in the classes under my charge.

The duties of an examiner have become almost professional, and his labors are necessarily arduous. Whatever the qualifications of a new incumbent, he cannot avoid embarrassment from the want of experience; and, for my own part, I yet feel scarcely less diffidence in my ability to discharge with credit to the Office the duties of my desk than I did at the moment I was appointed the successor of Dr Charles G. Page.

The sterling integrity, varied accomplishments, and long experience of Dr. Page, gave a peculiar value to his services as an examiner of patents, and my daily labors in the Office have served to convince me of the accuracy of his research, and the propriety of his decisions.

Owing to the increase of the examining corps in May, 1851, and the new division of classes that ensued, several applications, out of my classes, were examined by me.

Four classes are apportioned to me for examination, namely.

Class V. *Calorifics* embracing *Light, Heat*, and *Ventilation*, and comprising lamps and gas-burners, fireplaces, stoves, cooking and drying apparatus, and preparation of fuel; ventilation of houses, ships, and land-carriages.

Class XVIII. *Arts, Polite, Fine*, and *Ornamental*, including music, painting, sculpture, engraving, books, printing and binding, and jewelry.

Class XX. *Medicine, Surgery*, and *Dentistry*.

Class XXIII. *Designs*.

The whole number of examinations during the year was 796, of which 223 were patented, including 106 designs; and 249 were rejected, including 20 designs.

The new applications referred to me during the year were 402, including 126 designs, of which 54 cases remain unexamined at this date.

Under Class V the applications have been numerous, without exhibiting any marked progress in invention.

There is yet much to be accomplished in perfecting artificial light; and it is to be regretted that inventors should be so generally satisfied with attempts on their part to render the use of dangerous materials popular, rather than occupy themselves with the search after something that could be used to supply this want, without endangering the safety of all who participate in its consumption.

The desire to render the use of highly combustible fluids less dangerous than they can be when burned in lamps of the ordinary construction, has given rise to a few improvements, for which patents have been granted. Thus far, however, nothing has been presented which can render these compounds entirely safe; while the frequent and dreadful accidents almost daily recorded from their general use should prompt the public to the utmost care, if not to banish them from all dwellings, as movable lights, and especially when burned in lamps of fragile materials.

In one of the patents granted for a camphene lamp, the prominent feature of the improvement consists in surrounding the wick tube with a separate chamber, to be filled with water; so that, if the lamp should fall, the water in the chamber will be thrown out, and extinguish the lamp. This may afford additional security against one class of accidents.

In another, the invention consists in providing a separate chamber, to receive any fluid, that else might overflow from the expansion by heat of the volume of liquid in the fountain, and thus produce explosion.

An improvement in a railroad lamp was patented, for the protection afforded to a common glass reflector against the injurious effects of heat from the lamp. A body of water is kept in contact with the back of the reflector, which is thus prevented from becoming heated to a degree that will injure its brilliancy.

A patent was granted for a gas-burner, in which the improvement professes to provide against the variation of the flame from unequal pressure, or, in other words, that will give a steady, uniform jet of gas, although the pressure at the trunk may be irregular, and fluctuate from any cause.

Few patents have been granted for stoves, although the applications have been numerous. Patents have been granted for various improvements in cooking-stoves, cooking-ranges, grates, and chimney-caps.

Several patents have also been granted for improvements in hot-air furnaces for warming buildings, in which the chief aim has been to

augment the radiating surface, without materially increasing the size of the furnace, or the cost of construction.

A patent was granted for an improvement in the thermostat, which consists of the adaptation of clock-work, or other motive power, to render its action more immediate and effective, under very slight changes of temperature.

An improvement in the blow-pipe was patented, which promises to be useful to the dentist and jeweller over the common instrument.

It can be used with gas or made to receive its supply of air for the common lamp from a bellows, and is so arranged that, while held in one hand, the flame can be directed upon any point desired by a movement of the thumb of the same hand.

Under Class XVIII the applications have been numerous.

Several patents have been granted for improvements in musical instruments.

A patent was granted for an improvement in tuning pegs for guitars, &c. The improvement consists in making the part of the wooden peg which is fitted to, and turns in, the handle of the instrument, of much greater diameter than the part on which the string is wound.

An alleged improvement in the violin was patented, in which the old form of violin is departed from; in the new instrument, the sides are straight, and the back is concave.

Patents were granted for various improvements in the piano-forte, involving the action, the keys, the bridge, and the sound-board.

In one instrument the sound-board is in the form of a hollow cylinder, having its end secured between two disks or heads; the cap, turning block, strings, and all parts of the instrument, are suitably arranged around it to produce the sound.

The aim of our manufacturers has been to improve the tone and structure of their instruments without at the same time enhancing their price; and it is to be hoped that these efforts may tend to increase the facilities for musical education in our country.

The manufacture of the piano alone has become an important branch of the industry of our large cities.

In the absence of any reliable returns, it is probably safe to estimate the number of pianos made in the United States in the year 1852 at nine thousand, at the aggregate value of $2,100,000; and that their fabrication gave employment to nineteen hundred hands, at the aggregate wages of $72,000 per month.

A patent was granted for a printing telegraph that, whether considered as an ingenious combination of mechanical movements, for the harmony of its operation, or for the importance of the result attained, is by far the most interesting invention that has come under my examination.

It is not practicable to give an intelligible description of this machine without drawings, and I shall, therefore, merely remark that it consists of a composing machine, a printing machine, a pneumatic apparatus, and an electric circuit, which enables the operator at one station to print in ordinary typography at the other.

In transmitting a message the machine is put in motion, and a signal is given that calls the attention of the operator at the receiving station. The operator at the transmitting station takes a seat, at what resembles the key-board of a piano, and strikes the keys in rapid succession that

Class V. *Calorifics* embracing *Light*, *Heat*, and *Ventilation*, and comprising lamps and gas-burners, fireplaces, stoves, cooking and drying apparatus, and preparation of fuel; ventilation of houses, ships, and land-carriages.

Class XVIII. *Arts*, *Polite*, *Fine*, and *Ornamental*, including music, painting, sculpture, engraving, books, printing and binding, and jewelry.

Class XX. *Medicine*, *Surgery*, and *Dentistry*.

Class XXIII. *Designs*.

The whole number of examinations during the year was 796, of which 223 were patented, including 106 designs; and 249 were rejected, including 20 designs.

The new applications referred to me during the year were 402, including 126 designs, of which 54 cases remain unexamined at this date.

Under Class V the applications have been numerous, without exhibiting any marked progress in invention.

There is yet much to be accomplished in perfecting artificial light; and it is to be regretted that inventors should be so generally satisfied with attempts on their part to render the use of dangerous materials popular, rather than occupy themselves with the search after something that could be used to supply this want, without endangering the safety of all who participate in its consumption.

The desire to render the use of highly combustible fluids less dangerous than they can be when burned in lamps of the ordinary construction, has given rise to a few improvements, for which patents have been granted. Thus far, however, nothing has been presented which can render these compounds entirely safe; while the frequent and dreadful accidents almost daily recorded from their general use should prompt the public to the utmost care, if not to banish them from all dwellings, as movable lights, and especially when burned in lamps of fragile materials.

In one of the patents granted for a camphene lamp, the prominent feature of the improvement consists in surrounding the wick tube with a separate chamber, to be filled with water; so that, if the lamp should fall, the water in the chamber will be thrown out, and extinguish the lamp. This may afford additional security against one class of accidents.

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connect with the letters he desires to use, and also punctuates as he prints. At the receiving station the message is printed on a ribbon of paper in bold letters; and when the message is complete, the paper is torn off, and sent to its address.

Several improvements in the printing press have been patented within the past year; and each seems designed to economize its structure, or to accelerate its work.

In one the invention consists in the introduction of conical inking and impression cylinders.

The form is screwed on a revolving disk, either vertical or horizontal in its revolution; the form passes under the inking rollers, and under the printing cylinders to receive the impression, so that one impression is made at each revolution of the form. The conical impression cylinder receives the paper under a clamp hinged to the cylinder, and the clamp is returned at the proper moment to deliver the sheet.

In another press one of the novel features consists in the double use of an air-pump: first, by a puff to press the sheet upon the points for register; and, second, using suction fingers to remove the printed sheet from the press and lay it on the file, or folding table.

A patent was granted for a mechanical typographer, by which, with the necessary practice to acquire a skilful use of the machine, the author can print instead of writing his thoughts.

Under Class XX several patents have been granted.

Three patents were granted for improvements in artificial legs; and in one the model in the Office presents a very near approach to the natural member, both in movement and appearance.

A patent was granted for an ingenious improvement in a pill-making machine. The invention consists in passing the mass between rollers, having hemispherical recesses in each, that match with each other; each roller being surrounded by a thin elastic belt, which is pressed by the mass into the recess, and, when the pressure is relieved by the rotation of the roller, this belt springs out, and thus releases the pill from the mould.

Of the several applications made for patents for medicines during the year not one was granted.

A patent was granted for a galvanic clock, in which the circuit is formed and broken by the movement of the pendulum, which, at the same time, is made to receive equal and constant impulses, while the battery retains sufficient power to raise the armature up to the extent of its motion.

An improvement in the duplex escapement was patented. This invention consists in the substitution of a wheel with three teeth, or ruby pins, in lieu of the common escapement wheel, with fifteen teeth, for which many advantages are claimed besides those accruing from the facility of construction.

Under Class XXIII the applications have been numerous, and a large proportion of them have been patented; while few are marked by any very great artistic excellence.

When we consider the different uses, materials, and modes of manufacture to which design and ornamental decoration may be applied, the wonder is, not that the applications were so many, but that they should have been so few.

The object of the design law would seem to have been to give protection to the pattern produced; but its language is not sufficiently broad to justify such a construction. The Office has, therefore, exercised its utmost liberality in this class of applications, and has granted patents in all cases that possessed sufficient originality, either in the decoration or the configuration of the article produced, to bring it within the spirit of the law.

During the past year there have been three appeals from the decisions at my desk to the circuit court of the United States for the District of Columbia; two of which are still pending, and in the third the decision of the Office was fully sustained.

It would have given me pleasure to have attempted a more extended notice of the business of my desk for the past year, could I have controlled the necessary time; but the calls upon an examiner are so imperative that I am compelled to limit myself to the meagre sketch herewith submitted.

Yours, respectfully,

HENRY BALDWIN, *Examiner.*

Hon. S. H. Hodges,
Commissioner of Patents.

Patent Office,
December 31, 1852.

Sir: In compliance with your request, I have the honor to submit to you the following report of the transactions at this desk, accompanied by a brief notice of some of the inventions that have been patented during the year in the classes alloted to me.

There remained at the close of the year 1851, at this desk, thirty-one cases unacted upon. During the year 1852 three hundred and ninety-two applications were received, which made the aggregate number of cases requiring examination during the year four hundred and twenty-three. Of this number three hundred and sixty-nine were examined; which left, on the 31st of December, 1852, fifty-four new cases unacted upon.

The number of applications passed at this desk for patents was one hundred and thirty-four; the total number of rejections two hundred and ninety-three; although the number of final rejections will not, probably, exceed two hundred.

The manner in which the rejections are recorded has been so often explained in the previous reports of the examiners, that it is needless for me again to go over the ground, as the same system of recording is still preserved.

The number of applications finally rejected, as compared with the patented, will not vary far from three to one. Each year must necessarily increase the ratio of the rejections, as the field of invention in many of the arts is, to a degree, limited; and as they advance towards perfection, their bounds become more and more circumscribed.

Little more can be expected in the present stage of the mechanical arts, even from our best mechanics, than the improvement and perfection of those machines already in existence, by some change in the mechanical

arrangement or combination of the different parts, so that each part will perform with more efficiency and exactness the functions required, and the article to be manufactured produced at less cost, and in a more perfect and highly finished state.

Some of the patents granted this year display great ingenuity and mechanical skill, showing that the inventors were well acquainted with the principles and mode of action, as well as the defects in existing machines, which they could only have acquired by close observation. In many cases these defects have been entirely remedied, and more perfect and simple machines produced.

The classes alloted to this room are embraced under the following heads:

First. Hydraulics and pneumatics.

Second. Machines for manufacturing lumber.

Third. Machines for manufacturing all fibrous and textile fabrics.

HYDRAULICS AND PNEUMATICS.

In this class are included those machines used for raising, measuring, and filtering water, and machines in which water or wind is used as a motor.

There are six subdivisions in this class, in which fifteen patents have been granted.

Water-Wheels.—Of the three patents granted for improvements in water wheels, one was for a turbine. The orifices of discharge from the buckets in this wheel are capable of adjustment for different heads of water without changing the curvature of the buckets. This is effected by attaching to the bucket a sliding plate of the same width and curvature as the bucket; the moving of this plate outward extends the curvature of the bucket and diminishes the orifice of discharge.

Another was for a mode of packing the joint between the wheel and the chamber that conducts the water to the wheel. The cylindrical chamber, at whose ends are placed the wheels, is so constructed that its upper portion is easily removed, so that the packing, which is divided into two parts, can be adjusted on the lower half of the wheel (which is generally submerged) from the inside of the cylinder, while the upper half is adjustable from the exterior.

Five patents have been granted for pumps and machines for raising water: Among these is a rotary pump, in which a flange, wound spirally around the spindle or shaft of the pump, supplies the place of the buckets generally used. A spring valve, passing through the eduction port in one of the heads of the casing, divides the chamber of the pump, and cuts off the communication between the two ports.

An elastic adjustable bucket for a chain-pump was also patented. This bucket is a hollow spheroid or elliptical spindle of vulcanized rubber; to the end of the spheroid are attached curved disks or plates of metal, passing through the bucket; and, also, through the disks is a metallic spindle, on one end of which is a shoulder which bears against one of the plates, on the other a screw is cut to fit the female screw in the opposite disk. By turning this spindle the disks are brought nearer together or carried further apart, which expands or contracts the elastic bucket.

Two patents have also been granted for improvements in water meters.

A patent has been granted for a mode of attaching to the mains of gas or water pipes, small pipes or cocks. Instead of cutting screws in the main, and also on the pipe to be inserted, a straight hole is drilled in the main, and the end of the pipe or cock to be inserted is turned barrel shaped, and with a shoulder. When the pipe so turned is driven into the hole in the main, the surplus material in the swell of the pipe is drawn out, filling all irregularities in the hole in the main, and forming a perfectly tight and strong joint.

A measuring cock was also patented. Its object is to measure semi-fluids—such as tar, &c.—as you draw them from the vessel.

An adjustable spread for the hose-pipes of fire-engines was patented. This spread is simply a triangular plate attached to the nozzle of the pipe, so as to be capable of adjustment to any angle with the pipe. By elevating or depressing this plate, the water, as it issues from the pipe, strikes it at a greater or less angle, thus changing the circular jet into a broad, flat stream.

LUMBER.

In this class, which embraces all machines for manufacturing timber or lumber, in all its diversified forms, for articles of use or of ornament, fifty-nine patents have been granted during the year.

Saw-mills.—Six patents have been granted in this subdivision. One of these mills is so arranged that, by changing the rake, or the forward motion of the saw as it descends, you, at the same time, change the feed of the log. The ways in which the saw-gate runs are hinged at their top ends; the lower end is turned at right-angles, and passes through the fender posts; to this part of the way are attached means of adjustment, and the adjusting apparatus of the ways are connected together, so that, by varying the angle of inclination of one, all are changed at the same time. The feed motion is communicated to the log by a system of levers acted on by the saw gate. The fulcrum of one of these levers is movable, and connected with the movable ways; so that, in changing the inclination of the ways, you, at the same time, vary the feed motion proportionally.

Two patents were granted for improvements in hanging and driving circular saws.

In one of these the saw is placed, in a horizontal position, between two fender posts; a bar or plate, with bevelled edges, is bolted to these posts, and from this the saw is suspended by a short mandrel passing through the saw, which, on the under side, is flush with the saw plate. The saw is driven by four friction pulleys near its periphery; one set acting on the upper surface through slots cut in the suspension plate; the others on the under surface of the saw plate. These pulleys answer a double purpose: that of driving and supporting the saw. The board sawed passes over the suspension plate, while the log passes beneath the saw. The width of the board that can be sawed is only limited by the distance between the friction driving pulleys.

In the other, a short band passes over the pulley, on the saw mandrel, as well as around an adjustable pulley, hung in a gate, whose centre of

vibration is the driving pulley shaft. The pulley, or saw mandrel, (which is also capable of adjustment,) rests upon the driver, with only the band interposed. The action of the driver is to feed in the band between itself and the pulley or saw mandrel, whilst it is held in close contact to both of these pulleys by the adjustable pulleys in the gate.

Four patents have been granted for improvements in barrel machinery. Two of these were for dressing staves. In one, straight planks are used; the plank passes between concentric planes or cutters, revolving at right-angles to the plank; after passing these planes, the plank is fed by an armed or pointed wheel, whose circumference is proportional to the length of the stave. This wheel gives a lateral motion to the saws or cutters forming the curve for the bilge.

The novelty in the other is the self-adjusting bilge cutters, that adapt themselves to any width of stave passing through the machine; these cutters are operated, and their distance apart regulated or changed, by the stave in its passage. This machine cannot be fully understood or described without the aid of drawings.

Another was for using compressing clamps on the head turner, which compresses the boards forming the head in the direction of the width, by which means oval-shaped heads are made, which, when inserted in casks and subjected to the pressure of the hoops, assume a round shape.

A machine for driving or forcing the hoops on the cask was also patented.

Five patents were granted for boring, mortising, and tenoning machines. One was for an expanding bit. The slots in the sliding plate of this bit are inclined, and through these slots pass screws, attaching it to the bit. Both the stationary and movable parts have cutting lips; that on the movable plate is equal to its width. As this plate is moved out, it is lowered by the inclined slots, which allow the lip to cut. This bit cuts a smooth hole, and is less liable to clog than most expanding bits.

A mortising machine was patented which presents some novelty in the mode of regulating the movements of the chisel. The arm actuating the chisel is attached by a sliding wrist to a lever beam. The sliding of this wrist to or from the centre of motion of this lever varies the length of vibration of the chisel.

Five patents have been granted for improvements in fences; most are for cast-iron and wire-fences. In one of them the rails are made of round or square iron, with eyes or loops turned at each end of the bar. The bar inside of the loop is flattened or squared. The posts are of flat bar-iron, with T-shaped mortises. The loop is passed through the upper part of the T, the lower part of which is of the same width as the flat part of the bar inside of the loop. When the rail is pressed down into the lower part of the T, it is prevented, from its square shape, from turning round; neither can it be drawn laterally, on account of the loop at each end.

Shingle Machines.—Seven patents have been granted in this subdivision. In one of these machines the carriage is made double, and the shaving knife placed a short distance forward of the riving-knife. The upper carriage, supporting the bolt, receives a feed-motion, carrying the bolt under the riving-knife. A reciprocating motion is given to the lower carriage equal to the distance between the two sets of knives, and, being connected with the upper carriage, imparts the same motion to it. The

riving-knife only partially severs the shingle from the bolt. After the shingle is riven, the lower carriage moves forward, taking the upper carriage with it, and brings the shingle under the shaving-knives, which descend, shaving the shingle, and releasing it from the bolt.

Another patent was granted for jointing the sides of shingles, in which the shingle to be jointed regulates the distance between the jointing-knives, and holds them firmly in position while passing between them.

Five patents were granted for turning lathes. One was for turning mouldings. The several pieces on which the mouldings are to be turned are clamped between two heads, like the staves of a barrel. These heads revolve on a stationary mandrel. A cutter for turning the interior, and forming one side of the moulding, is suspended from this mandrel, and receives motion corresponding to the pattern to be turned. The other side of the moulding, forming the exterior surface of the barrel, is turned in the usual manner.

In another of these machines, a series of cutters, of the form of the pattern to be turned, are secured to a rotating mandrel. The article to be turned is held in a sliding carriage in such a manner that its axis is parallel to the mandrel, and so that it can be turned, and present any number of sides to the action of the cutters. The carriage receives a reciprocating motion, passing transversely to and under the cutters. A prismatic figure of any number of sides can be produced, the pattern varying longitudinally with the form of the cutters.

Planing Machines.—Twenty patents have this year been granted in this important class of machines. The attention of inventors of these machines has, in a great degree, been directed to the production of machines that will not infringe upon those already patented. How far they have succeeded in producing effective working machines, that can compete with those already patented, time and the public will determine. Of the above number two were reissues, and four for improvement in tonguing and grooving.

One of these tonguing machines is constructed in the following manner: The knives for cutting the sides of the tongue are placed at right angles to each other in the stocks, with their edges converging so as to meet at the base of the groove. Between these knives are placed gouges, or chisels, to remove the material severed by the side knives.

In another of the machines, reciprocating chisels, placed in front of the stationary tonguers and groovers, cut up and remove the surplus material.

Two patents were granted for planing-machines, in which the stock holding the plane-irons receives a reciprocating action. On the forward motion of this stock the board is planed, being held by stationary clamps firmly to the bed of the machine; on the backward motion it is released from the stationary clamps, and a clamp, attached to the stock, clamps the board between the stock and the stationary bed, and carries it back with it.

The other machine differs from the above in clamping the board, on the back motion of the stock, to a reciprocating bed, connected by rods to the plane stock.

Letters patent were granted for a machine in which the pressure-bar mouth-piece in front of the stationary cutters is dispensed with. The reducing cutters in the machine consist of a double series of plane-irons, alternately inclined in opposite directions. The cutting edges of these

irons are inclined to the plane, and also to the longitudinal direction of the board, at an acute angle; so that the surface of the board is cut into shallow longitudinal grooves of uniform depth. These ridges are removed in passing under sets of stationary plane-irons, arranged in the common manner.

In another planing machine, reducing gouge-shaped cutters are placed in front of the line cutters; to these cutters a reciprocating motion transversely to the board is given. A reciprocating motion transversely is also imparted to the plane-irons—they alternating in their action, and, as one is carried in one direction, the next preceding is moving in an opposite direction.

A machine for planing mouldings was also patented. Between the different sets of moulding planes, on the same shaft, are introduced circular saws, to divide the moulding as it is planed.

A machine for manufacturing blind-slats has been patented. In this machine the stiles are bored to receive the tenons of the slats, the rods and slats pricked for the wires, and the tenons turned on both ends of the slat; each operation going on simultaneously. The different parts for several blinds are placed in the machine, and, after being properly adjusted, the several operations above named are performed, without further manipulations from the operator of the machine.

FIBROUS AND TEXTILE MANUFACTURES AND MACHINERY.

In this class, sixty-three patents have been granted this year.

The machinery used in this class of manufacture is generally complicated; and as a description of the machine or invention cannot, in most cases, be understood without reference to the drawings or models, all that I shall attempt will be to communicate the results desired to be effected, without going into a minute description of the machines.

Manufacture of Hats and Felting.—Four patents for machines in this subdivision have been granted.

In one, the bat is hardened on the exhausted cone without being removed; this is effected by placing around the cone a series of conical rollers, to which a shogging and rotary motion is given, in order to interlock and partially felt the fibres as they are blown upon the exhausted cone.

In another of these machines, the hardening process is effected by placing over the "*former*," on which the bat has been deposited, a cone lined with vulcanized rubber, and between the cone and the rubber steam or hot water is admitted; a vibratory motion is given to the cone, which hardens the hat-body.

A machine for planking hats was also patented. The hats are carried between two endless bands to a revolving planking table, and, while passing over this table, are subjected to the action of a vibratory platen.

Two patents have been granted for breaking or hackling hemp and flax. In one of these machines, the flax is hackled by subjecting it to the alternate action of revolving beaters and hackles; the hackles on the end of the machine first acting on the flax are short, and increase in length as they pass to the opposite end of the machine.

Four cordage machines were patented. Two of these were for an improved mode of regulating the speed of the winding-up reel by the tension of the rope, and diminishing its velocity as each successive layer is wound upon it.

Another was for improvement in cans for holding the strands. These cans are corrugated and punctured with holes, for the purpose of preventing the strands from rising, and to allow the air to pass out; while the can is being packed with the strands, a wing is also introduced into the can, to carry the strands around as you revolve the machine, to prevent its twisting and kinking.

Carding.—Three patents have been granted for improvements in machines in this subdivision.

One was for carding colored rovings. The fillets on the cards are placed a short distance apart, forming rings; the doffer is constructed in the same manner. Different colored slivers are fed into the machine; and, after being carded, the doffer, which has an endwise, vibratory motion, takes them from the card mixing them, which forms a variegated roving.

A machine for combing wool was also patented; but as it is described in the English journals, it would be a work of supererogation to describe it here.

Three patents have been granted for improvements in paper machines and paper.

One was for a mode of drying, by passing the paper between a series of perforated trunks, through which warm air is blown; the warm air comes in contact with both sides of the sheet, and then escapes freely.

Another was for sizing the paper, by carrying it through the sizing trough between endless bands.

A patent was also granted for copying paper, made of equal parts of cotton and Manilla hemp. The advantage of this combination, as set forth by the inventors, is that the great contractile and bibulous property of the grass renders it peculiarly well fitted for this purpose.

Sewing Machines.—The conception and improvements in these machines belong exclusively to this country; and we are indebted solely to American ingenuity for their present perfection.

Seven patents have been granted for improvements in these machines.

One was for the introduction of a stop motion, which, when the thread gives out or breaks, stops the feed. Two others were improvements in the feed motion.

In one of these, the position of the lower needle is regulated by the thickness of the cloth, so that they will with certainty pass through the loops alternately formed on each side of the cloth.

In another of these machines, the feed motion is controlled by the length of the stitch. The bars carrying the needles are held against one side of the guides through which they pass by a spring. This guide is sufficiently wide to allow the bar to vibrate the width of the longest stitch required. The turning of this guide varies the length of the stitch. The cloth is drawn forward by a weight; as one needle is withdrawn, the weight carries the needle (with its bar) that is left in the cloth forward, until the bar is arrested by the guide; this gives the length of stitch to the opposite needle.

In another, a revolving hook, in the cavity of which is placed the shuttle, supplies the place of the second needle, or the vibratory shuttle.

Four patents were granted for improvements in knitting machines.

One of these was for a stop motion, similar to that used in spinning frames.

In another, a rotary machine, a patent was granted for giving the cloth-beam a rotary motion, the same as the needles, in order to avoid twisting the fabric.

Spinning Machines.—Seven patents have been granted in this subdivision.

One is for a cop-spinner. This ingenious and complicated machine is said to form a perfect and regular cop. Each layer of yarn is separated by a dividing thread.

An improved method of holding the washers on the spindles by clasps has been patented.

An improvement in twisting tubes for roving machines was also patented.

Letters patent were also granted for an improvement in ring spinners.

A self-acting mule was patented. Great ingenuity and skill is displayed in this machine, in simplifying the complicated machinery that has been generally thought necessary to introduce in order to give the necessary motions to different parts of the machine. A single, long, irregular cam regulates the motion of the spindles, the backing off, and the formation of the cop. If this machine succeeds in practice, it will be really valuable to the manufacturers.

A stop motion to a fulling mill was patented. The knotting or kinking of the cloth, as it enters the guide rollers, arrests the motion of the machine.

Three patents were granted for improvements in the mode of making wadding. One of these was a reissue of an old patent.

In another, the bat passes from the sizing rolls over two endless bands placed one above the other, (in the drying chamber,) thus forming an endless band of batting; one layer of batting after another is deposited on this band, and any required thickness of wadding formed.

In another machine, the two surface-bats are sized separately, and the bat is thickened by other bats placed between the surface bats.

Looms.—Twenty one patents have been granted for improvements in looms.

Three of these were for improvements in the pincers and pile-wires for pile fabrics.

Another was for communicating a positive motion to the shuttle-boxes, pattern-wheel, and jacquard apparatus, by means of a star-wheel, which not only gives motion to the parts, but holds them firmly when required.

Another patent was for improvement in jacquard cards.

A very ingenious loom was patented, embracing several improvements—such as moving the shuttle-boxes, operating the needles by forked marches, and stop motions for arresting the loom when the weft-thread breaks, or when the shuttle is in the wrong box.

A vibratory roller temple was patented. This temple, when the lay beats up, recedes a distance equal to the yielding of the cloth, and, on the backward motion of the lay, follows up the reed with the cloth, and holds the web near the cloth-making point.

I will close this report with a notice of a foreign loom, patented.

This invention consists in a peculiar and ingenious mode of raising the loops of such fabrics as Brussels carpets without the use of pile wires. The mode by which this is done is by partially beating up certain picks of the weft-threads as they are woven into the warps; that is, leaving a space between two of the picks, or shoots of weft, and then throwing in a number of close shoots, and, after that has been done, driving the whole of these successive shoots firmly up on the foundation warps to the previously-formed work, by which means the terry parts of the work, occupying the space between the open picks, will be puckered into loops on the surface of the fabric, and form the raised portion of the warp.

In effecting the above object it is necessary to loosen such portions of the warp as are necessary to form the loops, and also to tighten the ground warps, whilst the lay is beating up the weft, to make fast or secure the loop.

The mechanism by which this is accomplished is too complicated to explain without the aid of drawings.

The importance and general usefulness of the machines embraced in this class are worthy of a more extended notice given to them; but the necessary brevity of these reports will not admit of it.

Respectfully submitted:

F. SOUTHGATE SMITH,
Examiner.

Hon. S. H. Hodges,
Commissioner of Patents.

Sir: In compliance with your request, I have the honor to submit the following report of the business at my desk during the past year:

At the beginning of the year, eight cases remained over from 1851. During the year, 511 new cases were entered, 141 patents were ordered to issue, and 268 rejections were made. Of these actions about 60 were upon cases entered in 1851. At the close of 1852, 179 cases remained unexamined.

By the energy and zeal of my predecessor, Mr. Samuel Cooper, the desk had been entirely cleared at the commencement of the year. Illness, caused by severe labor, compelled a temporary cessation from business before the date of his resignation; while the interval of a month before I entered upon my duties, added to the above-named causes, produced a great accumulation of business. The attempt to decrease the number of cases at once by hasty action, would have ended in no advantage to the Office. I have been content, therefore, to allow this accumulation nominally to increase, while engaged in obtaining some familiarity with a whole class of cases before proceeding to act upon any one of them.

I cannot neglect this opportunity of expressing my thanks to the whole corps of examiners for the aid which they have at all times cheerfully afforded me.

One of the disadvantages of an accumulation of business—an increase of correspondence—has been met by the industry of my assistant, Dr. Daniel Breed, to whose aid, in this respect, I am especially indebted.

As the actions of the preceding year are mostly those of my predecessor, my acquaintance with the individual cases patented has been only incidental; and my duties allowing me but little time for the purpose, but a brief notice of cases can be made.

Civil Engineering and Architecture.—In this class 38 patents have been granted. These may be classified as follows:

Switches	5
Railroads, miscellaneous	7
Hydraulic works	5
Excavating and boring	6
Bridges	5
Architecture, miscellaneous	10
	38

The vast increase of the railroads and other public works of the country within a few years, has proved a great stimulus to inventions falling under this and the following class. The larger part of this increase being in the West, it is worthy of note that the scene of activity is shifted to a new field; hence it is not surprising that inventors are found going over well-trodden ground.

From the nature of the case, the number of patents issued under these classes gives no sort of idea of the amount of time and labor spent by inventors, or of the number of applications made to the Office. Most of the inventions concerning railroads have for their object the increase of safety. The immense and rapid development of railroads in the United States, both as regards the lengths of lines and the extent of country covered by them, the want of capital for substantial construction, and thoroughly organized management when completed, are all causes sufficient to account for the serious accidents which are so frequently recorded. It is true, notwithstanding all this, that there are fewer accidents, in proportion to the number of travellers, by railroads than by any other mode of conveyance; still, when a catastrophe does occur, the amount of damage, the number of persons involved, and the consequent publicity given to the event, all operate to turn universal attention to the contrivance of means for the prevention of similar accidents.

The same thing occurs after each accident, and the result is nearly the same; hence it happens that in this country, as well as abroad, there is a periodical revival of old inventions. When contrivances of this kind come to the Patent Office, the inventor is generally surprised to find that he has been anticipated by a similar, or perhaps identical invention. The result is that a patent, if granted, is not for what the applicant originally intended, but for some minor improvement in a contrivance the main features of which are already well known.

Still, amidst such a large amount of ingenuity, very happy hits are sometimes made, and, for the sake of these, it is not desirable to discourage invention, although, in a large number of cases, the end is disappointment and vexation.

There is an increasing feeling of distrust, on the part of those who have the best means of observing and judging, towards the use of self-regulating safeguards in general, as substitutes for a well organized police. To meet this feeling, contrivance should be directed to the simplification of machinery and improvement in details.

The large scale and costly nature of the objects included in these classes in most cases prevent actual trial on the part of the inventors;

hence, though coming from practical men, such devices are frequently merely speculative. Still the records of the Patent Office for the last few years show some very beautiful inventions, which afford a promise of better things yet to come, and encourage a hope that the economy, comfort, and safety of railroad travel may soon be carried far beyond anything that has yet been accomplished.

During the past year four patents have been granted for improvements in self-acting switches, consisting chiefly in minute details, not explicable without drawings. Another for an improved mode of fastening the point of frogs. An improved wrought-iron railroad chair is made from a plate, rolled with the part intended to be cut and turned to form the lips, thicker than the rest, so that it shall afford greater resistance than in the old form.

An apparatus intended to prevent accidents, is a concave "sound gatherer," placed in front of the engine, and connected by a pipe with an ear-piece close beside the engine driver; in short, a hearing trumpet on a large scale.

An improved form of railroad gate is opened gradually and without percussion; it revolves in a vertical plane, and is returned after the passage of the train, by a spring.

An improved method of arranging the "safety car" on inclined planes has been patented. The car has two wheels on an axle on each side; the axle being allowed to slide sidewise; elevated rails for the inner wheels lift the whole from the main track, and converging, draw the wheels within the line, and, descending more rapidly, the safety car is deposited in a pit under the main track.

Patents have also been granted for improved signals; for a method of ascending inclined planes; and for a simple and convenient spike-drawer.

An improved floating-dock is formed by two cylinders on either side of the vessel; these are raised, as is usual, by pumping out the water contained within them, but the elevation is completed by rotating the cylinders by an appropriate apparatus.

A sort of camel for lighting vessels over bars, &c., is formed of a folding frame, the air chamber of which is made by a sheet of India-rubber, or other water-proof cloth, applied to the upper part of the frame, but open at bottom; air being forced into the cavity, the vessel is raised. The frame is so constructed that no chain or rope is needed to be passed under the vessel. The whole affair may be folded into a small space.

Two improvements in canal locks have been patented: these are intended to economize water and space, but cannot well be explained without drawings.

Another improvement provides the means of bracing cast-iron caissons.

Under the head of excavating and boring machinery, are to be noticed the following:

An improvement on the more common form of dredging machine; another with scraper advancing on the bottom, and capable of being enclosed so as to retain the whole contents until removed to the place of deposite. A submarine auger, the pod being hinged, and so converted into a bucket, brings the material to the surface. An improved borer is rotated by a twisted flat bar passing through a suitable brace in the hole.

An inclined excavating wheel, on the inside of which the horse walks, and thus moves it without the intervention of other machinery.

A patent granted for an exceedingly simple improvement in blasting has already furnished such remarkable results that it has become well known. By this process rocks are blasted under water without any drilling or boring; the charge being merely laid upon the rock. The water in this case furnishes the resistance, and the deeper the better. By this method some of the most dangerous points of reefs in the harbor of New York, and in Hell Gate, have been so reduced as to afford a good draught of water over them.

The improvements in bridges are: a new arrangement of counter bracing; a mode of construction intended to allow the expansion and contraction of iron to take place without injury to the bridge; a wooden tubular suspension bridge; the application of tension-rods forming a suspension bridge with stays instead of cables. The details of these forms cannot be given without drawings.

Under the head of "Architecture," several patents have been granted for improvements in doors, windows, sashes, and gates.

LAND CONVEYANCE.

In this class 50 patents have been granted, as follows:

Car wheels	10
Brakes	11
Railroads, miscellaneous	13
Dumping carts	3
Carriages, miscellaneous	13
	50

The remarks made under the last class were of course intended for this, as far as railroads are concerned. As the description of cases can be but imperfectly made in words, it will be needful only to point out some of the most prominent variations from usual forms.

The Office has hitherto been exceedingly liberal in granting patents for railroad car wheels. Most of them are of cast iron, and, with a view to meet the tendency to fracture consequent upon the unequal or excessive contraction on cooling, various forms have been devised and patented under the declared intention of the Office to grant every encouragement to attain so very desirable an end. A very serious misconstruction has, however, been placed upon the previous action of the Office, and many persons are under the impression that every possible design or form of car wheel is to be patented. Of course no such position was ever taken, nor could it be sustained upon any construction of the Patent law.

About 80 forms of car wheel have been patented in this country; about as many in England. And when we add about as many more to this sum for the various forms to be found scattered through works in different countries, we find that about three hundred forms of car wheel have been proposed; yet the number of applications for patent is, perhaps, greater than ever.

Justice to those who have already obtained patents for forms which answer very well, would require that care should be taken not to patent mere trifling variations, under the bare assertion that the difficulties of the contraction had been more successfully met.

Several of the patents granted during the past year seem to be improvements dictated by the imperfections of known forms.

The brakes patented are, in part, modifications of those already well known. One increases the friction by which the rubbers are brought into action by a number of plates; being a sort of reduplicated friction clutch. Another is operated by steam introduced by a flexible pipe into a cylinder between the wheels; the piston moving downwards, by a wedge shaped head, acts directly upon the bars carrying the rubbers. In another, the brakes can all be rendered inoperative at once by the engine driver.

Other features of these inventions, although meriting notice, cannot be described in the space to which I am limited.

A patent has been granted for a "coupling," which is detached the moment a car is thrown off the track. An improvement in "pneumatic springs" is intended to do away with objections to the piston commonly used.

A contrivance for the prevention of accidents consists in a complete metallic casing for the axles and the wheels, except where they touch the rails.

A new foot-car, a cow-catcher, and several forms of truck, have also been patented. One of the "dumping carts" is also self-loading.

The improvements in carriages present no special novelty. Most of them are for slight modifications.

MILLS.

In this class thirty six patents have been granted, which may be subdivided as follows:

Grinding and crushing ores	8
Horse-powers	5
Miscellaneous flour mills	13
Other mills	5
Governors, change of motion, &c.	5
	36

A novel feature in this class, and one connected with the history of the times, is the number of patents for grinding and pulverizing ores; the object being mainly the minute division of the auriferous quartz rock of California.

The machines patented are generally improvements on known forms of crushing or stamping mills. One is furnished with rotating sectional wheels, with grooved surface; any of the sections may be removed, and the wheel, thus rendered lighter, may be employed for softer material. Another is a revolving cylinder, with balls and armed shaft inside. In another, grinding wheels are fed by an endless screw. In another case, balls are used in grooves, between parallel revolving plates.

There are several varieties of stampers. In one, weights are added above the stamper, so that it may be worn away almost entirely without losing its efficiency.

The improvements in horse-powers are generally in details of construction. One is furnished with a governor, which operates a brake, and thus regulates the motion. Another is so constructed that, by slight adjustments, very different velocities may be obtained.

The improvements in flour mills, and appendages, are mostly introduced to meet some difficulty in the operation of machinery now used. Bran-dusters, a flour-packer, mill-spindles, &c., have been patented; also two improvements in millstone dress—one being for buckwheat, the hull of which is too much pulverized by stones used for other grain.

FIRE ARMS.

In this class seven patents have been granted. A self-primer has been patented, in which the percussion pellet, when driven forward rapidly after leaving the magazine, is caught in its flight and exploded over the tube.

Several improvements in breech-loading and other guns, a cannon primer, a bomb lance, and a fire, or rather water-gun, make up the list.

MISCELLANEOUS.

Under this head ten patents have been granted. Among these are two varieties of rat trap; in one of which the rat is killed and thrown out of the trap, which is then reset.

An improved bait for fishing is arranged to float at varying depths, by means similar to those accomplishing the same end in living fish.

Respectfully submitted:

GEORGE C. SCHAEFFER,
Examiner.

Hon. Silas H. Hodges,
Commissioner of Patents.

VIII.

EARLY AMERICAN INVENTIONS.

The following communication is the only one which has been received during the year, on the subject of early American inventions:

Pawtucket, *July* 19, 1827.

Sir: I herewith present to the Society the *shears* with which the first cold or cut nail was formed in this country, and probably the first ever cut in the world. They were obtained from Mr. Jeremiah Wilkinson, of Cumberland, whom I visited a few months since, in company with Mr. David Wilkinson, for the purpose of obtaining some information relative to the commencement of the *cold* or *cut* nail business in the country. Mr. Wilkinson is eighty-six years of age the present month, and is a very intelligent old gentleman. He informed me that he followed the business of making hand cards in the year 1776, at which time he experienced great difficulty in obtaining tacks for the purpose of nailing on his cards, owing to the hostilities between this country and Great Britain, the consequent high price of English tacks, and the tediousness of the process in making them in this country in the old mode by hammering. These considerations suggested to Mr. Wilkinson the idea of making them cold; and, for the purpose of trying the experiment, he, with these shears, cut from the plate of an old chest lock a number of tacks, which he headed in a smith's vice. Succeeding in this experiment, he, from that time, made all the tacks he required in his business in the same way from sheets of iron. Subsequently he made larger nails—such as shingle and lath nails—from old Spanish hoops, which were headed in a clamp, or tool, confined between the jaws of his vice. I obtained one of the heading tools, which I also present with the shears. The first improvements in the method of cutting and heading the nails were made by one Eleazer Smith, from whom I expect soon some further account of the business, when I will lay it before the Society. Mr. Wilkinson also made, during the revolutionary war, *pins* and darning needles from wire drawn by himself, samples of which I also present; and, although the gentleman's peaceful principles would not permit him to take up arms in the revolutionary struggles of his country, he certainly, by his ingenuity and industry, contributed largely towards its independence.

Respectfully,

SAMUEL GREENE.

Wm. R. Staples, Esq.,
Secretary of the R. I. H. Society.

—

Providence, *November* 5, 1852.

I hereby certify that the above is a true copy of the original letter in the possession of the Rhode Island Historical Society, and is the only one which they received upon the subject.

H. T. BECKWITH,
Secretary R. I. Historical Society.

IX.

GUIDE TO THE PRACTICE

OF

THE PATENT OFFICE.

Sec. I. INFORMATION FURNISHED BY THE OFFICE.

Before proceeding to furnish such information as this department may with propriety, it will be well to explain why it cannot answer some inquiries which are daily addressed to it. Letters are constantly received, in which the writers, after mentioning some discovery which has occurred to them, wish, before expending the time, labor, and money necessary to mature their invention, to learn whether it is really new and capable of being patented, or whether they have been anticipated. It would be gratifying to comply with these requests, and to communicate the desired information, if it were practicable; and it is not for want of inclination that it is not given, but because the appropriate occupations of those employed in the Office will not admit of their undertaking it. Were the supposed discoveries ever so well digested, and even reduced to actual practice, to determine whether they are new and useful—in short, whether they are patentable—requires precisely the same course of examination, of scrutiny into their intrinsic merits, of comparison with previous similar contrivances, indeed all the labor and expense, which an application for a patent would demand. Now, there has not been for years a period when the examiners have been able to keep pace with the applications, and to go through with the labors legitimately imposed upon them. They have not a moment to spare for any gratuitous service. Every hour employed upon it must be at the cost of those who have gained a right to their official exertions, by paying the prescribed fees. Others cannot lay claim to them with any justice until they have paid the same price. Besides this, such an examination could not be instituted, and the result disclosed, without committing the Office in a way that would not be endured in the most ordinary tribunal of law. Even a cursory opinion might embarrass the further consideration and disposal of the case, and should not be asked for, any more than the views of a judge upon a ques-

tion which he might be called to try. If adverse parties should come forward and learn that one had been given, it would be impossible to allay their jealousy, or remove the suspicion their denunciations, if they were defeated, would cast upon the proceeding. When it is borne in mind that, in addition to all this, such inquiries are almost always crude and obscure, without model or drawings to illustrate them, and susceptible of infinite modifications, and that under these modifications may lurk the germ of some important invention, which can only be elucidated and rendered distinct by a long course of examination and discussion, (as often happens in the case of patented inventions,) it is obvious that the only alternative is to uniformly decline answering them. Neither can a response be given to such letters as contain brief and imperfect descriptions of certain improvements, and ask if they have ever been patented. The writers are not aware of the labor involved in undertaking to furnish such information.

A digest of all the patents which have been granted under this government would furnish much of the information sought by these correspondents. Every inventor might then learn for himself how far he had been forestalled in this country. To a considerable extent, he would have the same means of information as the officials of this department. The publications of foreigners, as well as those of our fellow-citizens, histories of inventions, scientific works, periodicals, and the like, are as open to him as to them. Until such a work is authorized by Congress, his next resource must be the meagre accounts contained in the Annual Reports of the Office, and the records, drawings, and models in its care. The last are arranged and spread before him as amply as the space afforded them will allow, and every facility for examining such as he desires will be accorded to him. Any records and drawings that he calls for will be cheerfully produced for his inspection, and he may have copies of such of them as he considers worth the cost of a moderate fee. Such as are deposited under caveats, or upon applications for a patent which are still pending, or which have not been withdrawn though rejected, must be excepted. The interests of the parties in these cases cannot well be secured without preserving entire secrecy, and no information respecting their claims can be furnished without their written consent.

Neither can the Office volunteer any opinion upon the numerous questions which may be raised in patent suits. Inquiries as to the mode of prosecuting for infringements, as to the probable results, and others of this nature, must be addressed to those who devote themselves to such matters. The province of this department is to give information respecting only its own rules of practice. For the same reason, all questions as to the value of any invention must remain unanswered.

Sec. II. RULES OF CORRESPONDENCE.

All correspondence must be in the name of the Commissioner of Patents; and all letters and other communications intended for the department must be addressed to him. If addressed to any of the other officers they will not be noticed, unless it should be seen that the mistake was owing to inadvertence.

Where an agent has filed his power of attorney, duly executed, the correspondence will, in ordinary cases, be held with him only. A double

correspondence with him and his principal, if generally allowed, would largely enhance the labor of the Office. If the principal becomes dissatisfied, he must revoke his power of attorney, and notify the Office, which will then communicate with him. For the same reason the assignee of the entire interest in an invention is alone entitled to hold correspondence with the Office, to the exclusion of the inventor.

It is not understood everywhere, as it should be, that all communications to and from the Commissioner, upon official business, are carried by the mail free of postage.

Sec. III. TO WHAT PERSONS PATENTS ARE GRANTED.

The inventor only is entitled to apply for a patent while he lives. If he has assigned his entire interest, and the assignment has been recorded, the patent may be issued to the assignee; but the assignor must sign the application, and make oath to his being the original inventor, as usual. The mere introducer of a discovery cannot have a patent for it in this, as he may in some other countries.

Upon the decease of the inventor, his executor or administrator may obtain one for the benefit of the heirs or devisees.

Aliens who have resided in this country one year next preceding the date of their application, and who have taken the requisite steps towards being naturalized, by taking the oath prescribed in such cases, have the same privileges in obtaining patents as citizens. Foreigners cannot enter a caveat or have a patent for a design; and they must put the article patented "on sale to the public" in eighteen months after the date of their patent, or it will be pronounced void. Upon applying for a patent, they must pay three hundred dollars, and five hundred if they are subjects of Great Britain. The assignee of a foreign inventor, though a native citizen, must pay the same.

Where several have united in a discovery, so that neither can consistently swear that he believes himself to be "the original and first inventor," they must all join in the application. No one of them can apply alone; much less can each of them have a separate patent.

Sec. IV. FOR WHAT DISCOVERIES PATENTS WILL BE GRANTED.

It is not proposed to even mention under this head all the principles which govern inquiries respecting the proper subjects of patents. Many of the most important of them have been greatly disturbed, and all are liable to serious modifications by the courts. They require, besides, such an amount of comment, of explanation and illustration, to prevent their being misunderstood, and encouraging unfounded expectations, that nothing less than a volume would do justice to the subject. It would be as idle to undertake embodying them in a pamphlet, as the law of contracts, or that of bills of exchange and promissory notes. Several valuable treatises upon this subject are already before the public; and those who wish for full and authentic information respecting it are referred to them. In these pages they will find only a few of the plainest and best settled rules. The responsibility of deciding whether their discoveries justify their applying for a patent, must, after all, rest with

themselves. This Office can give them no further light until they come with a formal application.

The productions of human ingenuity which may appeal to the laws of this country for protection, may be divided into three classes—Literary Publications, Works of Design, and Arts and Manufactures. The first class, which is regulated by the law of copyright, is intrusted entirely to other departments, and no control over it is exercised by the Patent Office. The other two are within its province.

Of Designs.

The subjects embraced under this head are determined by the third section of the act of 1842.

It will be observed that they bear a strong analogy to those which come within the law of copyright. Foreigners are not entitled to the benefits of the act. The fees for obtaining a patent under it are but half what is required in other cases, and, when obtained, it enures but half as long. If the application is rejected, no part of the fees is refunded, or accounted for on making application to have the same article patented as a manufacture. No provision is made, as the statute is generally interpreted, for a reissue or an extension of the patent, an additional improvement, or a disclaimer. There is, in fact, very little in common between this class of subjects and those which are contemplated in the great bulk of the Patent laws. The course of proceeding to obtain a patent for a design is, notwithstanding, the same as in other cases. A petition, specification, and oath must be filed, substantially according to the forms contained in the Appendix; a specimen with duplicate drawings must be deposited, and the fees be paid, before the application will be taken up for examination.

Of Arts and Manufactures.

The productions of ingenuity which constitute the other class, and are the chief objects of the several acts relating to patents, are defined by them to be "any new and useful *art*, *machine*, *manufacture*, or *composition of matter*, or any new and useful *improvement* of any art, machine, manufacture, or composition of matter."

The discovery of any new principle merely is not entitled to a patent. It must be first reduced to practice; must be made available in some practical form. To have found out that a blast of hot air instead of cold would increase the product of a furnace, and change the nature of the iron, was not enough. But when one set of machinery had been contrived by which this was carried into effect, it was held that the patentee was protected, not only in the use of the particular machinery employed by him, but in the use of the hot blast in every form. Other machinery, better calculated for the purpose, was held to be an infringement.

The discovery of any new natural substance is also precluded by the above language, and entitles no one to the exclusive use of it. Applications are often made by persons who have found a mineral paint; but they have been uniformly denied of late years, unless new qualities are imparted to the substance by an artificial process.

A mere change of proportions is not regarded, unless some new and useful result is effected. That may, however, consist in the production of a known article at a cheaper rate. A patent having been obtained for an improvement in making friction-matches with a new compound, objection was made to it because the same ingredients had been used for the purpose before; but the objection was overruled, and the patent sustained, on the ground that they had never been employed in the same combination.

So the mere substitution of one well known mechanical equivalent for another, as of cog-wheels for belting, is not regarded as an improvement within the language of the act.

It is a common thing, however, to grant a patent for a new combination of well known mechanical contrivances for a certain purpose, if the purpose is by these means better accomplished, or at less expense. And where a combination would be thus protected, if all the parts were old, and it embraces some new device, both the combination and device may be protected under the same patent.

The application of any known process to effect a new result, entirely different from any former one for which it has been employed, is frequently patented. The use of the flame of gas to singe off the superfluous and loose fibres of lace was held to be such a new application. On the other hand, it has frequently been determined that the new object to which the process is applied must not be analogous to the old one; nor is it easy to draw a clear line of distinction between the cases. To curl palm-leaf for mattresses by the same process which had been used before to curl hair for mattresses, was held to be a mere double use (as it is termed) of the process, and entitled to no protection.

A patent may be obtained for an improvement upon a machine already patented; but this does not authorize those who obtain it to use the old machine, with or without the improvement. They must still obtain the consent of the patentee of the old machine. And, on the other hand, he cannot use the improvement without their leave.

If the import of the word "new," which is contained in the statute, is not rendered more clear by what has been said, it will at least be seen, to some extent, what is the nature of the questions which have been raised upon the construction of it. It may be further observed, that the applicant must be strictly the first inventor of the device presented. If it is ascertained that another, in this country, had previously discovered it, the claim of the applicant will be adjudged void, unless the other had abandoned the discovery without perfecting or reducing it to practice. The word "before" in the oath of the applicant, "that he does not know or believe that the same was ever *before* known or used," is understood to mean before the discovery; not before the application.

If an inventor abandons his discovery to the public, he cannot afterwards reclaim it; and even if a patent should be granted for it, it would be declared void. To sustain it would be to entrap those who had meanwhile embarked in manufacturing the article, or using it. So, if he permits the invention to be publicly sold or used for upwards of two years. He has that time for testing its value and perfecting it by experiment, and may for that purpose make sales; but those who purchase are not held to infringe upon the patent obtained afterwards by continuing to use the articles purchased.

If the supposed invention has been previously discovered and patented in a foreign country by another, or has been described in any printed publication, it will be rejected. But the inventor may have a patent here after having obtained one abroad, or when his invention has been surreptitiously patented abroad by another. His term of fourteen years will, in the former case at least, be made to run from the date of the foreign patent. And if his invention has come into common use in this country, and he neglects to apply for a patent for six months after the date of his foreign patent, he cannot have one here.

The word "useful" in the act is to be understood in contradistinction from what is mischievous to society or frivolous, rather than as requiring any particular degree of utility. It is enough that a discovery serves any valuable purpose, though comparatively trivial.

Where several distinct contrivances contribute to produce some new result, and it is essential that they should be combined for the object, they may be embraced in one patent. So to some extent may different analogous modes of producing the same result, provided they operate upon the same principle, and that is distinctly stated to be the foundation of the claim. But where the contrivances are independent of each other, and effect objects entirely distinct, they must be protected by separate patents. It is not enough that they may be combined in one machine, unless they are mutually dependent upon each other, and in consequence of their connexion produce an effect which they could not if they were all made to operate separately upon the same materials.

Sec. V. CAVEATS.

Where an inventor who is not a foreigner wants time to mature his invention, or to prepare the papers, models, and drawings necessary to obtain a patent, he may prevent a patent being granted to any one else surreptitiously, or to a subsequent inventor, by filing a caveat and paying the sum of twenty dollars. Should he afterwards obtain a patent, that sum will be allowed him towards the fee usually required on that occasion; but the law does not authorize the Office to refund any part of it upon his withdrawing his application after a rejection, as it does in cases where no caveat is filed. A form for the caveat will be found in the Appendix.

It should describe something more than the mere effect to be produced. It is quite common to receive one which merely claims the accomplishment of some object, without explaining the means to be employed. This is not enough; it should also disclose the mode of effecting the object, so far at least as it has been matured in the inventor's mind. It is intended for two purposes, and should be particular enough to fulfil them. One of them is to enable the Office to determine whether any contrivance for which a patent is afterwards sought resembles it so closely as to interfere with it. This it is obvious cannot be attained, unless the caveat furnishes some information as to the devices which the inventor has in view. The other purpose, which also requires some account of these devices, is that the Office may see that the invention, when matured and brought forward, is substantially what was contemplated in the caveat. It is well to accompany it with a model and drawings, where it can be done conveniently.

As fast as the inventor makes any progress in maturing his contrivance, and adopts means for securing its successful operation, he may file additional papers describing them, which will be kept with the original caveat, and the date of their reception will be noted. If they have no relation to the subject of the caveat, however, they will be of no service.

One advantage of this proceeding is the facility with which the inventor is enabled to prove the date of his invention. Whenever a question arises on that point, the caveat itself furnishes ready and incontestible evidence; and the benefit of this is not impaired by any lapse of time.

The primary object, however, is to prevent the issuing of a rival patent for the same thing to a subsequent inventor. Before the issuing of a patent, the caveats which have been filed within the year preceding the application are carefully searched. If one is found which may conflict with the proposed patent, the issue is suspended. Notice is thereupon given to the person who filed the caveat so found, and he is required to complete his application within three months. Unless he complies, the Office will proceed with the other case, regardless of the caveat. If, on the other hand, he files his application as required, and it is found to cover the same ground with the one already in the Office, an "interference," as it is termed, will be declared between the two. The subsequent proceedings in such a case are described in Section XIII.

As only the caveats filed within the year preceding the application are inspected on such occasions, the caveator risks the issue of a patent to some competitor, unless, when the year is about to expire, he asks to have his caveat renewed, and pays a new fee. It should also be observed, that the year is reckoned from the time the caveat is made complete and the fee paid, and not from the time of filing any additional papers.

The papers filed upon a caveat cannot be withdrawn or altered; neither are they open to the inspection of the caveator himself, except in the presence of a sworn officer. He may have copies of them, as may others who have his permission in writing. Without such permission, no information respecting them will be furnished to strangers, except to a limited extent in certain controversies which may arise respecting them.

Sec. VI. APPLICATIONS FOR PATENTS.

Applicants would materially abridge the labors of the Office, and facilitate a speedy determination of their respective cases, if they would bear in mind that there are six requisites, uniformly insisted upon, before an application is considered ready for examination. These are—

1. The petition;
2. The specification;
3. The oath;
4. The drawings, and
5. The model, or specimens, where the case admits of them;
6. The payment of the appropriate fee.

Until these are all complete, no application will be set down for examination in its order.

Nothing is gained, therefore, by sending any part of them withoutthe remainder. The result will not be determined any sooner than if they all came together on the same day with the latest. The practice of sending them at different times may, on the other hand, occasion mistakes and consequent delay. It necessarily involves an inquiry, sometimes a laborious one, as new portions come in, for those which have previously arrived, and have been laid aside. And where applicants, with similar names, or with kindred inventions, are before the Office, it is easy to see that no little confusion may grow out of this practice. The Office cannot be held responsible for the consequences. If inventors persist in forwarding their applications in parcels, and at different times, they must not complain of the evils that follow.

Instructions will next be expected respecting the several components of an application.

Sec. VII. THE PETITION.

This must be addressed to the Commissioner, and signed by the inventor, even though it is intended that the patent shall issue to an assignee. If the inventor is dead, his executor or administrator may sign it. An examination of the form for a petition, which is given in the Appendix, will furnish all the information respecting this instrument which is usually wanted.

Sec. VIII. THE SPECIFICATION.

The importance of this document is not easily overrated. The rights of the patentee are limited and defined by the claims embodied in it, and it forms the chief, often the only, rule for determining what they are. It constitutes, in fact, the contract between the patentee and the public; and the other parts of the application are, so to speak, but its appendages. It is very rare that any mistake in them furnishes a ground for assailing a patent; but patents are frequently impeached and annulled for some error in the specification. It is of vital consequence, therefore, that it be drawn up with skill and care.

From the specimens to be found in the Appendix, it will be perceived that, besides describing the thing to be patented, it should, as a matter of precaution, contain full references to the drawings, if the case is proper for them; and some description of them may prove useful. It should be signed by the inventor, (his executor, or administrator,) and be attested by two witnesses.

No great aid is to be expected, in drawing up the substance of the specification, from any forms. The character of the devices to be described varies so widely, and the details to be embodied demand such a different consideration and expression in different cases, that the language adopted on one occasion can rarely be employed on another, without great modification. There is hardly any class of documents in preparing which so little aid is to be derived from precedents; none where more depends on skill, experience, and ingenuity, or where these are more indispensable. Reasons similar to those which forbid undertaking a full discussion of the proper subjects of patents, will permit only

a few of the most prominent and best established principles, which should govern in drawing specifications, to be mentioned here.

Upon referring to the act of 1836, section 6, it will be perceived that one principal object, intended to be secured by the specification, is such a full description of the invention, or discovery, that the public may know how to avail themselves of it with reasonable facility, after the patent has expired. It is not necessary for this that the description should be so minute and full that any man, however ignorant on the subject, shall be able to use it. It is enough if, to adopt the expressions of the statute, it will "enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same." Neither, on the other hand, will it suffice if couched in such terms that none but experts of the highest skill and ingenuity can understand it, or reduce it to practice. A person of ordinary capacity and skill must be able to follow it, and put it in operation, without contriving anything new of his own, without making any additions beyond what is prescribed, and, it has been decided, without resorting to repeated experiments. The latter rule should, however, be qualified. Where, for instance, materials are to be wrought upon which are variable in their nature, and require that the ingredients employed in producing the result should be used in different proportions, it is very possible that the inventor himself could not determine upon the proper proportions without experiment. A patent for a valuable flux would not be vitiated because the quantity to be used with a new combination of ores could be ascertained only upon trial. Such alterations, also, in the dimensions or proportions of the different parts of a machine as an ordinary mechanic would readily see were needed to make it operate successfully, would not impair a patent.

The materials to be employed must be such as are well known to persons conversant with the subject; and if they are described in terms calculated to mislead, it will be deemed a fraud. In fine, care must be taken to disclose everything which is essential towards accomplishing the object to the best advantage, as far as is known. On the other hand, nothing must be introduced as a part of the invention which does not contribute to the result. No secret improvement must be kept in reserve to enable the inventor to command the market after his patent has expired. Neither must he impair the usefulness of his discovery by inducing others to employ something as necessary to success which really serves no useful purpose.

The act of Congress also requires that the inventor should, in the case of a machine, "fully explain" "the several modes in which he has contemplated the application of the principle" of his invention. The safer way to comply with this is to describe expressly one or more methods of application, such as have been found to be most advantageous, and to mention others which are contemplated, as some that may be adopted. Where the invention consists of an improvement upon machinery already patented, this instruction cannot be relied on. The claim must then be confined to the precise improvement intended. If any method of effecting the object is claimed which proves ineffectual, or which has been anticipated, it may invalidate the patent.

The usual and approved course is to describe all the apparatus employed, whether old or new, as far as is requisite to make the operation of the invention perfectly clear. Such machinery as is already well known to persons of ordinary skill in the business, and in which no alteration is proposed, needs only to be referred to by name—as, for instance, the valves of a pump. Where alterations in the usual forms are necessary, they should be pointed out, and especially everything that is new; all that contributes to the new result, and forms a part of the invention, should be particularly described.

The act further requires that the applicant should "particularly specify and point out the part, improvement, or combination which he claims as his own invention or discovery." This is usually done by what is technically called a "claim," in which, after describing the whole mechanism or materials employed, old as well as new, the invention relied on is set out with precision, and expressly claimed. It is usual also to expressly disclaim everything else so described which might be supposed to be embraced in the claim, to the prejudice of the patent.

Sec. IX. THE OATH.

To the specification should be annexed the oath of the inventor, (or his executor or administrator,) the requisites and form of which may be gathered with sufficient certainty from the example given in the Appendix. Where an executor or administrator applies, the law has provided that a necessary and obvious variation in the form be used.

The oath must be administered by some magistrate who has authority for the purpose. If the applicant resides abroad, it may be administered by any minister, chargé, consul, or commercial agent of the United States, or by any notary public or other magistrate of the place, whom they certify to have been duly qualified.

If the applicant is an alien born, but claims that he has resided in this country one year next preceding the date of the application, and has taken the prescribed oath of his intention to become a citizen, the Office requires that all these particulars shall be sworn to by him; and this statement may be incorporated with the usual oath.

Sec. X. THE DRAWINGS AND MODEL.

These must be invariably furnished wherever the case admits of it. They are frequently omitted by the applicant, because he supposes that his invention can be clearly understood without them. This may be true, but they are wanted for other purposes. The drawings and models in the Office form the readiest and most usual means of ascertaining what inventions have been under consideration. The information which lies buried among the files and records is thus spread out before the eye, and is made accessible at a glance.

Duplicate drawings will hereafter be required in every case. They should be on sheets separate from the other papers, from eighteen to nineteen inches in length from top to bottom, and not less than thirteen inches across nor more than twenty-five, unless more space is necessary to exhibit the device or machine with clearness. One of them, which is to be kept in the Office for reference, should be on stiff drawing paper. The other, which is intended to be attached to the patent, should have a margin of one inch, at least, for that purpose on the right hand side, and should be on some material that will bear folding and transportation.

They should be executed in artistic style; and such parts as cannot be otherwise made to appear, must be represented in detail, by plans and sections, which should be numbered and described in the specification. Each part should be distinguished by some one number or letter having the same shape wherever that part is delineated in the drawings, and should be referred to in the specification by such letter or number. It is always safe, and may be found essential, to have them signed by the inventor, and attested by two witnesses, like the specification.

The Office cannot prepare drawings to accompany the applications. It furnishes certified copies of such as are on file, in proper cases, to those who call for them, but employs no one to draw for other purposes.

The model should be made of durable materials, and be firmly constructed, so as to bear the frequent handling to which it is necessarily exposed. If of any soft wood, it should be painted, stained, or varnished. Its external dimensions should not, if practicable, exceed one cubic foot in measure. The name of the inventor, and that of the assignee, if the patent issue to him, should be permanently affixed to it, either by engraving or otherwise.

When models or specimens come unaccompanied with a name, so much difficulty has been felt in assigning them to their proper destination, that the Office cannot answer for them if they are mislaid or even lost.

Where the invention consists of a composition of matter, samples of the ingredients, sufficient for the purposes of experiment, and also of the composition itself, must be furnished; also specimens of any article of manufacture for which a patent is sought.

No model can be withdrawn, except when the Office requires some defect to be corrected in it, or new drawings to be prepared from it.

"Neither models of machines, nor the substance of which they are usually composed—wood, glass, tin, or other metals—are entitled, by law or regulation, to transmission in the mail; and the mailing and forwarding of them will be refused in every instance," &c.—(*Extract from a letter addressed by the First Assistant Postmaster General to the Commissioner of Patents.*)

Models and specimens may be sent to the Office by express, if without charge to it; or they may be deposited with either of the following agents, who will forward them at the expense of the Office.

Agents authorized to receive Models and forward them to the Patent Office:

The Collector of the port of Portsmouth, New Hamsphire.
The Collector of the port of Portland, Maine.
The Collector of the port of Burlington, Vermont.
The Collector of the port of Providence, Rhode Island.
The Collector of the port of Boston, Massachusetts.
The Collector of the port of Hartford, Connecticut.
The Collector of the port of New York.
The Collector of the port of Philadelphia, Pennsylvania.
The Collector of the port of Baltimore, Maryland.
The Collecter of the port of Richmond, Virginia.
The Collector of the port of Charleston, South Carolina.
The Collector of the port of Savannah, Georgia.

The Collector of the port of New Orleans, Louisiana.
The Collector of the port of Detroit, Michigan.
The Collector of the port of Buffalo, New York.
The Surveyor at St. Louis, Missouri.
The Collector of the port of Cleveland, Ohio.
The Surveyor at Pittsburg, Pennsylvania.
The Surveyor at Cincinnati, Ohio.
The Surveyor at Louisville, Kentucky.

Upon the subject of fees, Section XXIII is referred to as furnishing, in connexion with the remarks already made, all the needful information.

It is proper here to repeat the caution already given, that until the petition, specification, and oath are filed, the drawings and model or specimens deposited, and the fees paid, the case is not regarded as ready for consideration; and it will not until then be set down to be examined in its turn.

SEC. XI. PROCEEDINGS OF THE PATENT OFFICE UPON AN APPLICATION.

The leading principle is, that applications shall be taken up by the examiner within whose province they fall in the order in which they have been rendered complete, by a compliance with all the requisites. He may, notwithstanding, take up one out of its turn, if it belongs to a class upon which he is engaged, and he finds that it will facilitate his labors. In cases of supposed interference between two or more applications, they must necessarily be considered together when the first comes up. If the inventor has already obtained a patent in another country, his application is entitled to immediate consideration if the business on hand will permit it; because the patent issued here can run but fourteen years from the date of his foreign patent, and every day's delay is a loss to him. Applications for additional improvements, reissues, and extensions, are entitled to a priority for a similar reason.

If the specification, drawings, or model are found to be defective, they will be returned with instructions how to correct them. If, however, they are altered at any stage of the proceedings, they are not entitled to the consideration of the examiner anew, until all the cases are disposed of which have been filed before the amended documents were received back. In order to secure an early place upon the list, applications have been hurried in without due preparation, and sometimes in so crude a state as to occasion a great deal of needless labor. The rule announced above seems necessary to discourage such a practice, and does no injustice, since the amendment is an admission that the papers were not complete. The Office reserves the right, nevertheless, to take up each case, when once reached, as often as it comes back, and to bring it to a final determination with all despatch, provided it is satisfied that due pains have been taken to perfect it, and to save labor.

Should the applicant, instead of amending his papers, have new ones prepared, he must return the originals to this Office. Until that is done, the case will receive no further consideration.

If the character of the invention is changed by any alteration or addition after the application is filed, the original application must be withdrawn, and a new one filed with appropriate drawings, &c., and the fees

must be paid anew; a deduction being made of two-thirds of the fees paid on the former application, unless a caveat fee was reckoned towards it.

If the examiner finds that the claims advanced are not patentable, the applicant will be notified of their rejection and of the reasons. If the objection rests upon the particular invention having been previously known, he will be furnished with a reference to the patent, the book, or other work in which he has been anticipated, or with other sufficient information. He may examine the references in the Office, if he is here; or, if at a distance, he will be furnished with copies or extracts, for the legal fee. If he is not satisfied upon an examination of the references, he may, upon submitting his views in answer to them, have a re-examination. He may also, if he desires, have an interview with the examiner, for the purpose of further explanation, at certain hours which have been designated. These are from two till three in the afternoons of Monday, Wednesday, and Friday of each week. It would be impracticable for the examiners to accomplish their work, if they were subject to interruption at other times; and they must not be, save in extraordinary emergencies.

After a second rejection the case is not entitled to any further examination, and will not hereafter receive one, unless under peculiar circumstances. When it has been twice deliberately pronounced upon, the Office may be fairly presumed to understand it then, if it ever will. Before it is thus rejected, however, it will be held under consideration, if desired, as long as there is reason to suspect that the application may have merits which are not yet developed. It is not forgotten that improvements of great value have eluded careful investigation, and have been elucidated only at the end of repeated examinations. In view of this fact, the final decision will always be suspended until the Office becomes perfectly satisfied that the case presents no patentable feature, or other reasons render a determination necessary. There must be some limit to the investigation; and in plain cases, or where no ground is seen for anticipating a favorable result, the Office must be permitted to say so, and to address itself to other applications which are always waiting. Nothing more can be reasonably expected from it; and if the applicant still considers it to be in error, his appropriate remedy is by a resort to the appellate tribunal. It is not often that the Commissioner is able to investigate a case in person, and only in very especial circumstances can he undertake it.

So many mischiefs have grown out of permitting an appeal to one Commissioner from decisions made under his predecessor's authority, that a rule has been adopted, that no deliberate decision of one Commissioner shall be reversed by another. And where a claim has been twice rejected under one Commissioner, it is deemed equivalent to a deliberate decision, and should not be reversed by his successor, unless it is shown that great injustice and wrong have been occasioned. It is better that the party should be required to withdraw and file a new application, which will cost him but ten dollars, than that the force of so salutary a rule should be weakened.

If the applicant acquiesces in the rejection of his claim, or deems it not worth prosecuting, he may withdraw his application; and on sending to the Office a certificate to that effect, and a receipt for the money, such

as are found in the Appendix, he will have two-thirds of the original fees advanced by him refunded, except where an appeal has been taken. He must also give directions whether he will have the money sent to him by mail in specie, or paid to his order at the Office. This department is not at liberty to make payments in bills.

It is proper to observe here that no part of the fees paid upon filing caveats, applications for designs, for reissues, extensions, or additional improvements, can be refunded upon withdrawing.

The drawing designed to have been annexed to the patent, had one been obtained, will also be returned on withdrawing—the other and the model are retained; and if the applicant has obtained possession of them for any purpose, he must restore them before his money will be refunded to him.

If the applicant esteems the claims, as modified by the decisions of the Office, so valuable as to warrant his taking a patent, he must amend his specification and claims pursuant to the instructions given him. The statute requires that he should make oath to them anew, but this is not always found necessary. Cases may arise in which the Office will feel constrained to insist upon it.

Personal appeals and importunity need not be employed by any one, and will prove of no avail in causing the Office to deviate from its prescribed course of business. This will be inflexibly adhered to as the only means of preventing the loss of time and the trouble which would be expended in such attempts, both on the part of applicants and of the Office. Every man would protest against his own affairs being delayed by such interference on the part of others, and should forbear resorting to it himself.

Sec. XII. THE PATENT.

The patent is issued to the inventor, if living, unless he has previously disposed of his entire interest in it, and his assignment of it is recorded in the Office. It will then issue to his assignee, if requested. If the inventor is deceased, it will be issued to his executor or administrator, for the benefit of his heirs or devisees. It will be transmitted to the patentee by mail, unless directions are given to the contrary, or a letter of attorney is on file authorizing some one else to receive it.

It usually bears date at the time it is issued, but may be antedated six months if it is desired, and the application has been on file so long in complete form. If the inventor has obtained a patent in a foreign country, the one he obtains here can run but fourteen years from the date of the other. It is questioned whether this restriction applies where the invention has been patented abroad surreptitiously, or without the concurrence of the original inventor.

A penalty of one hundred dollars is imposed upon every patentee, or his assignee, for neglecting to stamp or mark the date of his patent upon every patented article offered for sale. If it is incapable of this, the package containing it must bear the date. A like penalty is inflicted upon every person who thus stamps or marks an article that has not been patented, as if it were.

Thus far, these pages have been occupied with instructions relative to the ordinary routine pursued upon applications for patents. There re-

main certain other proceedings, which involve a departure from the usual course, though they are becoming frequent, and require some explanation.

Sec. XIII. INTERFERENCES.

Whenever it is seen that two applicants are claiming the same invention, it becomes the duty of the Office to declare an interference; and further proceedings are suspended, in both cases, until the question of priority is determined. So if there is reason to apprehend that an application conflicts with a caveat filed or renewed within a year, the caveator is forthwith required to complete and file an application within three months; and if, on its coming in, the parties are found to claim the same invention or discovery, an interference will be declared, as in the other instance. Whenever, also, an applicant claims anything already embraced in an unexpired patent, and, on being informed of it, insists that he is the prior inventor, the Office will, at his request, declare an interference between him and the patentee.

Whenever one is declared, a day is appointed for hearing the question, and the parties are notified. Their testimony must be taken in writing, by way of deposition. Instructions as to the mode of proceeding in taking it, are to be found in Sec. XIX. The testimony, and all other documents relied upon, must be filed on or before the day appointed for the hearing, or they will not be considered in the case. If either party has been prevented from taking testimony, or otherwise preparing for the trial in season, without fault on his part, the Commissioner will, at his discretion, allow him further time. To obtain this, the party must apply for it in writing, as soon as he is made aware of the hinderance, and show that he has used reasonable diligence, and how the delay was occasioned. He must state all this fully, and support the statement by his oath.

The arguments must usually be filed with the other papers; but where no opportunity has been enjoyed of inspecting the testimony before, or for other good reasons, the parties will be indulged with a short delay in presenting them.

When the interference arises between an application and a patent already issued, the Office has no power over the patent, though it decides in favor of the other party. Where it is between two applications, the unsuccessful party will be allowed a limited time in which to appeal; and if he does, the patent will be withheld until the result is determined. If no appeal is taken when the time has expired, a patent will be ordered to issue to the other party, if he is otherwise entitled to it.

Sec. XIV. APPEALS.

It has been adjudged that the decision of the Commissioner, granting a patent, is not subject to an appeal, even in cases of interference. When he refuses to grant a patent, and in that instance only, an appeal may be taken by the aggrieved party to either of the judges of the circuit court of the District of Columbia. Before it will be treated as an appeal, the following preliminary steps must be taken:

1st. The appellant must notify the Office of his taking the appeal, which he may do by filing a formal prayer for one.

2d. He must also file in the Office a statement of the reasons upon which he founds it.

3d. He must pay into it the sum of twenty-five dollars.

These requisites having been complied with, the appeal will be considered complete. A petition must then be presented to the judge, setting forth the proceedings in the case before the Patent Office succinctly, and the petitioner's compliance with the requisites for an appeal, and praying that the appeal may be heard. To the petition must be annexed an affidavit of the truth of the facts stated therein, or the certificate of the Commissioner that the requisites of the law have been complied with; which will be furnished upon presenting the petition at the Office for that purpose. The act of Congress requires that the judge should then give the Office notice at what time and place he will hear the appeal, and should direct it how to give the parties interested notice.

Blanks for the notice of appeal, the reasons of appeal, and the petition, will be forwarded on request.

Owing to various causes, the practice upon the subsequent proceedings in appeals remains unsettled. This will not, probably, remain so long; and as these cases must be conducted by persons upon the ground, they can readily inform themselves respecting the modes which shall have been adopted. Meanwhile, they are referred to the following rules, which have been promulgated by one of the assistant judges of the court:

Orders in Appeals from the Commissioner of Patents.

"1. In every case desired to be tried before me, the petition must be addressed to me as 'Assistant Judge of the circuit court of the District of Columbia.'

"2. Previous to any action by me, and preparatory to the hearing of any appeal, the party must comply with the requisites of the law *in the Patent Office;* and his petition to me must state concisely the application for the patent; its nature; and, if a case of interference, the residence of the party interested; the Commissioner's refusal; the prayer of an appeal, and notice thereof to the Commissioner; *the filing of the reasons of appeal in the Patent Office;* and the payment into the Office of the sum required by the law. To every petition must be annexed a certificate of the proper officer that the requisitions of the law have been complied with, or an affidavit of the truth of the facts stated in the petition. No notice to the Commissioner will be issued until such certificate or affidavit be made or produced.

"3. The appeal will be tried upon the evidence which was in the case and produced before the Commissioner.

"4. All applications must be in writing. The cause will be heard upon written arguments only, unless otherwise specially directed; which arguments must state the points of fact and law relied on, and the authorities in support of the same.

"5. Five days will be allowed, after the filing of the Commissioner's report, to the appellant to file his argument; and the like period will be allowed for any answer and reply: at the expiration of the last of which periods the cause will be taken up and decided, and the papers returned, with the decision, to the office of the Commissioner.

"6. Copies of the Commissioner's report, or grounds of decision, and of the arguments filed, can be had if desired, from the Secretary to be appointed, upon the payment of the usual fees for such services.

"JAMES S. MORSELL,

"*Assistant Judge of the Circuit Court of the District of Columbia.*

"SEPTEMBER 11, 1852."

On the hearing before the appellate judge, the Commissioner (as well as the examiner in the case) may be examined upon oath in explanation of the principles of the invention, at the request of the judge or of any party interested; and he will submit to the judge the original papers and evidence, with the grounds of his decision fully set forth in writing.

The circuit courts of the United States (and district courts possessing the power of circuit courts) are authorized, upon the application of any party interested, to declare a patent which interferes with another, or with one that has been prayed for, void in whole or in part, or inoperative and invalid in any particular section, according to the interests of the parties to the suit. None but parties are affected by the decision. The same courts may also adjudge an applicant entitled to a patent which has been denied him by the Commissioner, or on appeal; and the Commissioner will issue a patent accordingly, on filing in the Office a copy of the adjudication. The bill must be served upon the Commissioner, if there is no adverse party; and it has been decided in the district court of the eastern district of Pennsylvania, that all such proceedings against him must be instituted in the circuit court of the District of Columbia.

SEC. XV. ADDITIONAL IMPROVEMENTS.

"Whenever the original patentee shall be desirous of adding the description and specification of any new improvement of the original invention or discovery, which shall have been invented or discovered by him subsequent to the date of his patent, he may, like proceedings being had in all respects as in the case of original applications, and on the payment of fifteen dollars, as hereinafter mentioned, have the same annexed to the original description and specification; and the Commissioner shall certify, on the margin of such annexed description and specification, the time of its being annexed and recorded; and the same shall thereafter have the same effect in law, to all intents and purposes, as though it had been embraced in the original description and specification."—Act of 1836, sec. 13.

The claim in the original patent is subject to re-examination upon every petition to annex additional improvements; and if any part of it is found not to have been original when the application for a patent was filed, a disclaimer must be filed of that part, or the specification of claims be restricted, by having the patent reissued before the addition can be made. If the improvement cannot be added, it may be secured by a separate patent, if entitled to one, on the usual terms.

This proceeding is strictly confined to improvements made after the date of the patent. For such as were discovered previously, but were omitted, the remedy is by a new application or a reissue of the patent. (For this see next section.)

A form for an application is in the Appendix.

SEC. XVI. REISSUES.

Where a patent, through inadvertence, contains an erroneous description, or claims that which is not new, and would therefore be pronounced void in law, it may be surrendered; and, on the payment of fifteen dollars, a new patent for the unexpired term of the former will be issued, with a corrected specification.

It has been repeatedly decided under the same statute, though not uniformly, that the Patent Office has authority, upon the same terms, to reissue a patent embracing descriptions and claims for inventions, discoveries, or improvements, which were inadvertently omitted before. But it must be clearly and conclusively shown by testimony, other than that of the parties or others interested, that such inventions, &c., were embraced in the original machine or thing patented. If made after the date of the former patent, the patentee must obtain relief as pointed out in the preceding section.

Upon an examination for a reissue, the original patent is subject to a re-examination, as if presented for additional improvements, and the claims will be modified as found necessary on such re-examination. If more claims are embraced than ought to be in one patent, several will be issued on the payment of thirty dollars for each additional one required.

If the inventor has made an assignment of his patent, the right to a reissue vests in his assignee; and in his executor or administrator, if he is deceased.

For form see Appendix.

SEC. XVII. DISCLAIMERS.

If a patent claims anything to which the inventor was not entitled, either because it was not new, or for other reasons, the patent was formerly held void at law, even as to those claims to which he had an undisputed right. To obviate this, it is now provided that he may file in this Office a disclaimer, (for which a form will be found among the others,) in which the objectionable claims are expressly abandoned. He must also deposit a fee of ten dollars. His patent will then stand upon the same footing as if it had originally issued for the valid claims alone.

His executors, administrators, and assigns have the same privilege; and it is only when they become parties to the disclaimer that they can derive any benefit from it, or are affected by it, except such as purchase after it is filed.

SEC. XVIII. EXTENSIONS.

Upon addressing an application for that purpose to the Commissioner, and paying into the Office the sum of forty dollars, he is empowered, upon certain conditions, to extend a patent for the term of seven years, by endorsing upon it a certificate to that effect. The board, which was originally constituted to decide upon such applications, prescribed certain rules for regulating the proceedings, which were recognised by the act of May 27, 1848, and clothed, to some extent, with the authority of a statute. As they are out of print, they are here republished.

Rules of the Board originally instituted for extending Patents.

"PATENT OFFICE, *June* 21, 1845

"The undersigned, constituted by law a board to decide upon applications for the extension of patents, have adopted the following suggestions and rules, for the benefit of those persons who may hereafter apply for extensions:

"The questions which arise on each application for an extension are—

"1. Is the invention *novel?*

"2. Is it *useful?*

"3. Is it *valuable* and *important* to the public?

"4. Has the inventor been *adequately remunerated* for his time and expense in originating and perfecting it?

"5. Has he used due diligence in introducing his invention into general use?

"The two first questions will be determined upon the result of an examination in the Patent Office; as will also the third, to some extent.

"To enable the board to come to a correct conclusion in regard to the third point of inquiry, the applicant should, if possible, procure the testimony of persons disinterested in the invention, which testimony should be taken under oath.

"In regard to the fourth and fifth points of inquiry, in addition to his own oath, showing his receipts and expenditures on account of the invention, by which its value is to be ascertained, the applicant should show, by the testimony of disinterested witnesses on oath, that he has taken all reasonable measures to introduce his invention into general use, and that, without default or neglect on his part, he has failed to obtain, from the use and sale of the invention, a reasonable remuneration for the time, ingenuity, and expense bestowed on the same, and the introduction thereof into use.

"The report of the examiner, upon the novelty and utility of the invention, will be ready fifteen days before the day appointed for the hearing, which will be open for inspection at the Patent Office; copies of which will be furnished to all parties interested, if desired, on payment of the usual fees for copies.

"In case of opposition by any person to the extension of a patent, both parties may take testimony, each giving reasonable notice to the other of the time and place of taking said testimony, which shall be taken according to the rules prescribed by the Commissioner of Patents in cases of interference.

"All arguments submitted to the board must be in writing.

"In conclusion, the undersigned would remark, generally, that a monopoly of his invention is secured by law to the inventor for the term of fourteen years. This is done with a view to compensate him for his time and expense in originating and perfecting it. At the end of the time for which his patent runs his patent should cease, and the invention become public property, unless he can show good reasons to the contrary. The presumption is always against his application; and if he cannot show that his invention is novel, useful, valuable, and important to the public, and that, having made all reasonable effort to introduce it into general use, he has not been adequately remunerated for his

time and expenses in discovering and perfecting it, the board cannot grant an extension.

JAMES BUCHANAN,
Secretary of State.
EDMUND BURKE,
Commissioner of Patents.
R. H. GILLET,
Solicitor of the Treasury."

On receiving the application, the Commissioner is required to give notice of it, and of the time and place of hearing appointed by him, by advertising sixty days previously in one or more papers printed in Washington, and such other papers published in sections most interested against the application as he deems proper. As the extension cannot be granted after the patent expires, the application should be made early enough to allow not only for advertising sixty days, but for giving the case due consideration after the hearing. Without ample opportunity for this, it cannot be expected that the Commissioner will undertake to decide so important a matter, and grant an extension. He may be bound to receive the application, and act upon it, whenever it is in season for advertising a hearing before the patent expires; but unless he can appoint the day, so as to secure time for deliberation afterwards, he will not feel bound to grant it. Considering the delays which may interpose, and the opportunity which should be given to adverse parties to appear, take their testimony, and prepare their defence, the Office has felt itself justified in requiring it to be filed at least three months before the close of the original term; in cases liable to be much contested, it should be filed still earlier. On the other hand it must not be premature; the Office has refused to take one up when presented a year beforehand. The account of profit and loss might be materially changed during that period.

The following course of proceedings is to be pursued upon applications for extensions:

1. The applicant must file, together with his application, a statement in detail of his receipts and expenditures on account of the invention. Before the hearing, this statement, or a corresponding one, must be verified by his oath; and such further testimony be furnished as will show that he has not been adequately remunerated for the time, expense, and ingenuity bestowed in maturing the invention and in bringing it into use. Should it be required, this account must be brought down to the time of the hearing.

2. It must also be shown, by disinterested witnesses, that the patentee has used due diligence to bring the invention into use, and that his failing to obtain a sufficient remuneration for it is not his fault.

3. It must be shown by like testimony that the invention is important and valuable to the public.

4. The report of the examiner in the case, especially addressed to the question of novelty and utility, will be filed fifteen days before the hearing, and will be open for inspection.

5. Persons who wish to resist the extension must file in the Office a written notice to that effect (with their reasons) at least twenty days before the hearing. They will then be entitled to a copy of the application and of the account, and of any other papers in the case on file. They

will also be entitled to a list of the names and residences of the witnesses whose depositions have been taken by the applicant previously, and they must be notified of the time and place of taking testimony afterwards. And they may proceed to take testimony themselves, giving like notice to the applicant. (As to the mode of taking it, see the next section.)

6. The depositions, arguments, and all other documents relied upon, must be filed in the Office on or before the day of hearing. Such as are received afterwards will be entitled to no consideration.

7. Applications for a postponement of the hearing must be sustained in the same way as when made upon an interference. And they will not be granted at the risk of preventing a decision in season.

8. The case will be determined on written argument alone, unless the Commissioner sees good cause for consenting to a discussion of the merits before him.

After all, the Commissioner is required by law to have a due respect to the public interest in coming to his decision.

Sec. XIX. DEPOSITIONS.

It will be noticed that among the rules adopted by the old board for extending patents is one requiring the testimony to be "taken according to the rules prescribed by the Commissioner of Patents in cases of interference." The latter rules seem in this way to have been recognised by Congress, together with those of the board. They are therefore republished here, and will be considered as the basis of practice in taking depositions.

Rules of the Commissioner of Patents for taking testimony, adopted by the Board for extending Patents.

"1st. That all statements, declarations, evidence, &c., shall be in writing, setting forth, minutely and particularly, the point or points at issue, and shall be verified by oath or affirmation.

"2d. That all statements, declarations, proofs, and evidence, shall be filed in the Patent Office, by the parties respectively, before the day of hearing.

"3d. That, before the deposition of a witness or witnesses be taken by either party, notice should be given to the opposite party of the time and place when and where such deposition or depositions will be taken; so that the opposite party, either in person or by attorney, shall have full opportunity to cross-examine the witness or witnesses. And such notice shall, *with proof of service of the same*, be attached to the deposition or depositions, whether the party cross-examine or not; and such notice shall be given in sufficient time for the appearance of the opposite party, and for the transmission of the evidence to the Patent Office before the day of hearing.

"4th. That no evidence, statement, or declaration, touching the matter at issue, will be *considered* upon the said day of hearing, which shall not have been taken and filed in compliance with these rules: *Provided*, That if either party shall be unable, from good and sufficient reasons, to procure the testimony of a witness or witnesses within the above stipulated time, then it shall be the duty of said party to give notice of

the same to the Commissioner of Patents, accompanied with statements of the cause of such inability, which last-mentioned notice to the Commissioner shall be received by him on or before the day of hearing.

"5th. That all evidence, &c., shall be sealed up and addressed to the Commissioner of Patents, by the persons before whom it shall be taken, and so certified thereon.

"6th. That the certificate of the magistrate taking the evidence shall be substantially in the following form, and written upon the envelope, viz:

"'I hereby certify that the depositions of A B, C D, &c., relating to the matter of interference between E F and G H, were taken, sealed up, and addressed to the Commissioner of Patents by me.

J. K.,
Justice of the Peace.'"

In addition to these rules, the following regulations must also be observed:

The notice of taking testimony should be signed by the party, or the magistrate before whom it is to be taken, and should contain the names of the witnesses to be examined.

It must be served by delivering the adverse party a copy, and exhibiting the original if he desires it. If he is not to be found, it may be served upon his agent or attorney of record in this Office, or by leaving a copy at the party's usual place of business. And it must be annexed to the deposition.

The testimony must be taken in answer to interrogatories, and be committed to writing by the magistrate, or, under his direction, by some person not interested in the issue, nor the agent of one who is. The deposition, when complete, must be signed by the witness.

The magistrate must append to the deposition his certificate, stating the time and place of taking it; the names of the witnesses; the administration of the oath; at whose request the testimony is taken; the occasion upon which it is intended to be used; the names of the adverse parties, if any; and whether they were notified and attended.

The forms contained in the Appendix are recommended for observance.

Sec. XX. LOST PATENTS.

Copies of patents granted since December 15, 1836, and afterwards lost, can be obtained from the Office upon the payment of a prescribed fee; and, if duly certified, are evidence wherever the originals would have been.

It is earnestly requested that all patents issued previous to that date, which have not been recorded since at this Office, be forwarded to it for that purpose, and they will be returned directly. It shall occasion the holders no expense.

Information is so rarely wanted at this time concerning patents granted previous to December 15, 1836, and the course to be pursued in restoring such as were destroyed by the fire of that year, that it is thought not advisable to encumber these pages with it. Should it be desired by any one, it will be cheerfully furnished in another form.

Sec. XXI. ASSIGNMENTS.

The inventor may, "by any instrument in writing," assign the whole or a part of his interest, either before or after he obtains a patent. If he conveys an exclusive interest in his patent for any district, the assignment must be recorded within three months in the Patent Office; otherwise another purchaser, without notice, who has his assignment recorded within three months after its date, will hold against the prior purchaser, who has neglected this precaution.

The assignee of the entire interest in an invention which has not been patented, may have the patent issued to himself on recording the assignment.

The receipt of assignments for recording is not usually acknowledged; it being intended to have them recorded and returned in season to answer the same purpose.

The impression that they are to be recorded gratis is entirely erroneous. See act of May 27, 1848, sec. 2; and post, Sec. XXIII, "Fees," &c.

A form for an assignment is furnished in the Appendix.

Sec. XXII. PATENT OFFICE REPORTS.

As each Annual Report embraces the proceedings of a current year, it can only be prepared after the first of January. The printing is not at the control of this department, and is not usually completed for several months, sometimes not for a year.

The copies placed at the disposal of this Office are limited in number, and constitute but a small portion of the edition. They are wholly inadequate to supply its own wants and to furnish to those who have a right to expect it, by contributing to its funds, or supplying information for the Agricultural part. In fact, it has been found necessary, in repeated instances, to purchase copies to meet these demands. The Office is reluctantly compelled, therefore, to decline acceding to the requests of others for the work, and to refer them to the courtesy of their delegates in Congress.

Sec. XXIII. FEES, AND REFUNDING AND TRANSMITTING MONEY.

The fees to be paid this Office are the following:

On every	application for a design	$15 00
	caveat	20 00
	application for a patent, if made by a citizen, or a foreigner who has resided here one year, and made oath of his intention to become a citizen	30 00
	application, if by a subject of Great Britain	500 00
	application, if by any other foreigner	300 00
	application for a disclaimer	10 00
	application for adding new improvement	15 00
	application for a reissue	15 00
	additional patent granted on a reissue	30 00
	application for an extension	40 00

On every	appeal	$25 00
	copy of patent, or other instrument, for every 100 words	10
	copy of drawings, the cost of having it made.	
For recording every assignment	of 300 words or under	1 00
	if over 300 and not over 1,000 words	2 00
	if over 1,000 words	3 00

The expense of any copies will be communicated to those who apply for them. All fees must be paid in advance, and in specie, at this Office, or to one of the officers named below. If sent by mail, it must be at the risk of those who send it. The Office would, however, advise, when this is attempted, to confine the money closely to the letter enclosing it, by pasting over it a piece of firm paper, or thin cloth, so that it cannot move around, and wear its way out, as sometimes happens.

If paid to one of the officers named below, duplicate receipts should be taken, which should specify the particular object for which it is advanced; one of which should be forwarded to this Office, and will be treated as a payment here.

Officers who are authorized to receive Patent Fees on account of the Treasury of the United States, and to give receipts or certificates of deposite therefor.

Assistant Treasurer of the United States, Boston, Massachusetts.
Assistant Treasurer of the United States, New York, New York.
Treasurer of the Mint, Philadelphia, Pennsylvania.
Surveyor and Inspector, Pittsburg, Pennsylvania.
Assistant Treasurer of the United States, Charleston, South Carolina.
Collector, Baltimore, Maryland.
Collector, Richmond, Virginia.
Collector, Norfolk, Virginia.
Collector, Buffalo Creek, New York.
Collector, Wilmington, North Carolina.
Collector, Savannah, Georgia.
Collector, Mobile, Alabama.
Treasurer, Branch Mint, New Orleans, Louisiana.
Assistant Treasurer United States, St. Louis, Missouri.
Surveyor of the Customs, Nashville, Tennessee.
Surveyor of the Customs, Cincinnati, Ohio.
Receiver of Public Moneys, Little Rock, Arkansas.
Receiver of Public Moneys, Jeffersonville, Indiana.
Receiver of Public Moneys, Chicago, Illinois.
Receiver of Public Moneys, Detroit, Michigan.
Collector, San Francisco, California; and
Depository, Tallahassee, Florida.

In cases of withdrawal, the money will be paid in specie only, and at the Office, to the person entitled to it, or his authorized agent, or on his order; unless he directs it to be sent by mail, when it will be at his risk.

Money will be refunded in the same way which has been paid in by mistake. The Office is not permitted to disburse anything but specie, and will not be responsible in any case for money sent by mail.

FORM OF DEPOSITION.

A B, being duly sworn, doth depose and say, in answer to interrogatories proposed to him by C D, counsel for E F, as follows, viz:

1. *Interrogatory*. What is your name, your age, residence, and occupation?

1. *Answer*. My name is A B, my age thirty years; I am a carpenter, and reside in Boston, Massachusetts.

And, in answer to cross-interrogatories proposed to him by G H, counsel for I K, as follows, viz:

1. *Cross-interrogatory*.

Signed, A B.

STATE OF NEW YORK, } ss.
Rensselaer County. }

At Troy, in said county, on the day of , A. D. 1853, before me personally appeared the above named A B, and made oath that the foregoing deposition, by him subscribed, contains the whole truth, and nothing but the truth. The said deposition is taken at the request of E F, to be used upon the hearing of an interference between the claims of the said E F and those of I K, before the Commissioner of Patents of the United States, at his office, on the day of next. The said I K was duly notified, as appears by the original notice hereto annexed, and attended by G H, his counsel.

Certified by me, L M,
Justice of the Peace.

The magistrate must then seal up the deposition when completed, and endorse upon the envelope a certificate, according to the form prescribed under Sec. XIX, and sign it.

X.

DECISION

OF THE

COMMISSIONER OF PATENTS,

In the matter of the application of Charles Goodyear and Nathaniel Hayward, for the extension to said Goodyear, for the benefit of said Hayward, of a patent granted, February 24, 1839, to said Goodyear, as assignee of said Hayward, for an improvement in the manufacture of India Rubber, discovered by said Hayward.

One of the petitioners, Nathaniel Hayward, having discovered an important improvement in the manufacture of India rubber, as he alleged, filed in this Office an application for a patent to protect it. Pending the application, he executed an assignment of his interest to Charles Goodyear, the other petitioner, and requested that the patent might be issued to him. Accordingly this Office issued to Goodyear a patent for the supposed invention, bearing date the 24th day of February, 1839, and running fourteen years. As the period was about to expire, Goodyear and Hayward united in the present petition, and prayed that the patent might be extended for the term of seven years for the benefit of Hayward. A day was appointed for hearing the petition, and notice of it published, as is usual; and before it arrived, six different parties appeared and filed their reasons against the extension. Among these opponents was Horace H. Day, who appears somewhat prominently among the proceedings noticed on the hearing. The others it is unnecessary to name. The parties proceeded to take testimony, and by the day appointed had filed depositions taken for the occasion, and other documents, amounting in all to several thousand pages, and including the exhibits and records in a large number of suits instituted upon this and other patents, and growing out of them. In view of the immense bulk of this testimony, the importance of the questions involved, and the interests which were at stake, I consented to depart from the usual course of the Office, and hear oral argument. This was commenced upon the 2d day of February, and continued through six days. The questions arising in the case were certainly discussed with great ability; but the expectation of saving time was so far from being fulfilled, as to afford but slight encouragement for repeating the experiment.

The first objection in order urged by the opponents derives its chief title to notice from the zeal and confidence with which it was brought forward. They contended that Mr. Judson, who signed the name of

Goodyear to the petition as his attorney in fact, acted without instructions, and that there was consequently a fatal defect of parties before the Commissioner. It is true that no written authority was produced for Judson's affixing Goodyear's name, and also true that this Office requires the production of such an authority in some cases before it will recognise an agent. There is no rule, however, which binds it to require, as courts have sometimes done, a power of attorney on all occasions, any more than the merchant who insists on written orders in some instances is bound therefore to discredit every man who professes to be acting for another, and for his benefit, because he can produce none. Some discretion must be allowed in this matter. Judson has been long intimately connected with Goodyear in business, and produces the patent issued to him. He would at law be presumed to act for him if the extension is for Goodyear's benefit. If it is for Hayward's, Goodyear would probably be compelled in chancery to allow his name to be used. I see no reason therefore why Judson's power should be doubted, and cannot entertain the idea of defeating Hayward's claim entirely (for such would be the result of dismissing the petition) upon an objection which would only turn him over to institute a new proceeding, under the most stringent practice, elsewhere.

The next objection presents a question far more grave in its character and more difficult of decision. The authority of the Commissioner to proceed in this case is denied, upon the ground that the patent can be extended only to the assignee; while it has been frequently decided that the benefit of the extension belongs to the inventor alone. It is true, that the 18th section of the act of 1836, upon which this proceeding is founded, uses throughout the word "patentee," and nowhere mentions the inventor *eo nomine* as the person to whom the extension is to be made; and this defect, if it be one, has not been remedied by any subsequent enactment. It is also provided that the patent, when extended, shall have the same effect as if it had been originally granted for the term of twenty-one years; from which it is argued that the assignee alone can have the benefit of the additional term; and that such an absurdity could not have been contemplated by the Legislature. It is further asked, how the assignee in such a case can be compelled to execute the trust arising from the extension being made in form to him? And, in fine, a decision of the board originally instituted for the purpose of extending patents, as well as the former action of this Office, are cited as conclusive upon this subject. As the proceedings thus adverted to do not appear in print, I propose to state them succinctly.

The first of these cases originated in the application of John Thomas for the renewal of a patent which he alleged to have been granted to him on the 26th day of March, 1834, for improvements in floating dry-docks. Opposition being made, it appeared, upon the hearing, that Thomas had sold his invention to Robert Wash and others, to whom the patent was in fact issued. There was evidence also that he had already received large sums on account of the invention; had sold it to different persons, and disposed of the right of extension; and that the purchasers were opposed to the proceeding. It will be remembered that the Patent Office was consumed by fire in December, 1836; so that the fact of the assignment to Wash and others, and the issuing of the patent to them, was not to be ascertained at the Office, and was only elucidated

upon the coming in of the testimony. It is not surprising that Thomas should, under such circumstances, be suspected of attempting to impose upon the Board of Extension, which consisted of the Secretary of State, then the Hon. James Buchanan; the Commissioner of Patents, the Hon. Edmund Burke; and the Solicitor of the Treasury, the Hon. R. H. Gillet. However that may be, on the 22d March, 1848, the Board decided in terms that "the applicant, having assigned all right, title, and interest in the invention, before the letters patent, was not the patentee, and consequently not entitled to the benefit of the act," &c.

In another case, John Hanson and Charles Hanson applied for the extension of a patent (for an improvement in the manufacture of lead pipe which they had invented) originally granted to their assignees, Benjamin Tatham, jr., and Henry B. Tatham, on the 29th of March, 1841, and reissued to the same parties and George N. Tatham on the 16th of March, 1846. The patent was limited in its duration to the 31st of August, 1851, the invention having been previously patented in England. Strenuous opposition was made upon several grounds; but it would seem that the decision was based upon the report of the examiner, which presented the following reasons for rejecting the application: One was in substance the same with that already adverted to, that the language of the statutes on the subject did not authorize the Commissioner to extend a patent issued to an assignee. Another of a similar kind was, that the act of May 27, 1848, by which the power previously exercised by the Board of Extension was vested in the Commissioner of Patents, restricted him to cases "where an application is made to him," "according to section 18 of the act of July 4, 1836." The remaining reason was, in effect, that the act of 1848, above cited, provided that the "Commissioner shall grant or refuse the extension of" a "patent upon the same principles and rules that have governed said Board" of Extension; and this rendered the principle adopted in the case of Thomas (which was stated to be directly in point) imperative upon that functionary. The application was accordingly rejected by the Commissioner, the Hon. Thomas Ewbank, who adopted in his decision the precise phraseology employed by the Board of Extension, and quoted above.

In confirmation of these views, the following order was also introduced on the part of the opponents, which speaks for itself.

"Having, on the application of James Nasmyth, decided that when the patentee has parted absolutely with his invention and letters patent for the same, he cannot have an improvement added to his original specification, because he has no legal possession of the letters patent, and cannot surrender them to the Patent Office for that purpose, the examiners will govern themselves by this decision until it is reversed by appeal from the Commissioner.

"The principle of the decision also applies to reissues. The assignee of a patent only can surrender it for reissue, and not the original patentee, who has not control over it.

"EDMUND BURKE.

"PATENT OFFICE, *November* 9, 1846."

The petition of Thomas, in the first of the above cases, is quite informal, and does not designate the person to whom the renewal should be granted. As he represented the patent to have been obtained by himself,

there can be no doubt as to the import of his prayer, and that his intention was to have it extended to himself. It is perfectly obvious that, the patent having been issued to Wash and others, the Board of Extension had no power to extend it to him. They could do no less, therefore, than dismiss the petition. Whether they might not have devised a remedy for him, had he presented himself under more favorable auspices, and had his assignees united with him in the proceeding, does not appear. It is sufficient for the present purpose that their decision did not proceed upon the ground that a patent issued to the assignee of an inventor could in no case be extended. Upon that point they gave no opinion.

If, therefore, in the case of the Hansons, whose petition was in proper form, and prayed an extension to the patentees, the Commissioner acted upon the supposition that the previous decision proceeded upon such a principle, and that the act of May 27, 1848, rendered that principle binding upon him, it is obvious that he was entirely misled. It might well bear an argument whether the legislature intended by that act to give the force of a statute to the decisions of the Board. Admitting that it did, it is plain that the Board had never adopted the principle contended for.

The last decision, therefore, can have little weight as a precedent, except what it derives from the form in which it was expressed. But when it is understood that the language was drawn from that adopted in the former case, without adverting to the fact that in that case the petitioner asked an extension to himself when the patent had been issued to others, while in the latter the prayer was for an extension to the proper parties, the inference drawn from the form of the decision is entitled to very little consideration. There were circumstances beside in the case of the Hansons which amply warranted the Commissioner in dismissing their application, and which distinguish it widely from the present. It is only necessary to mention that the patentees were not parties to the proceeding.

The order of Mr. Commissioner Burke denies the right of the inventor, who has parted with his patent, to have new improvements endorsed upon it, or to have it reissued. It would seem as if this was intended to operate where the question arises between the inventor and the assignee. The right of the assignee to the benefit of the proceedings described is expressly recognised in the latter branch of the order; and the order, if it has any bearing upon the controversy, gives countenance to the claims of the applicants.

Upon the merits, I should myself decide the question in their favor, were that the only ground to be considered. As for the expressions in the statute, so much relied upon, it is clear that the word "patentee" is used throughout as synonymous with inventor. Neither that. nor the provision that the extended patent should have the same effect as if originally granted for twenty one years, was used with any reference to the right of the assignee, and throws little or no light on the subject. When the act in which they are contained was passed, there was no provision for issuing the patent to an assignee; and whatever the previous practice may have been, as appears from Thomas's case, the passage of the act of March 3, 1837, authorizing such an issue, plainly shows that the legislature had contemplated no such proceeding in the

previous enactment. Had these several provisions been embraced in one statute, there would have been some force in the argument derived from their incongruity. I see very little as it is. On the contrary, the act of 1837 was plainly not intended to restrict inventors in the enjoyment of the rights and privileges conferred upon them, but rather to facilitate them in bringing their discoveries into market, by enabling them to hold out to the purchaser, as an additional inducement, the right of taking out a patent in his own name. The inventor who takes this course is certainly not admonished by anything the legislature have said that he is parting with so valuable a privilege as that of having his patent renewed. There is nothing in the nature of the transaction that renders his claim to it less meritorious, or shows that he does not come within the spirit of the law. That he may be subjected to some inconveniences, and prepare for himself some embarrassments when he comes to avail himself of the privilege, may be true. But, as I understand the rule, it is the inconvenience to the public that authorizes a tribunal to reject a proposed construction of a statute; not the circumstance that the privileges thereby conferred are trammelled with some difficulties, which a different legislation might have avoided. Every objection against the policy of this view may be urged with the same force in case of a sale by the inventor immediately after the granting of the patent. The practice of foreign governments is in accordance with the one advocated, and tends strongly to show its expediency and propriety. And that no such prohibition of it was intended by the legislature is rendered certain, when we reflect that the only effect would be to render nugatory and abolish in practice the provision for issuing patents to assignees. The patent would hereafter be taken out in the name of the inventor, though he had assigned his interest; and he would thus evade the difficulty with ease.

It is said, however, that the jurisdiction of the Commissioner is a limited one, meted out to him by the statute, beyond the express words of which he cannot go. The same objection was raised in the case of Woodworth *vs.* Sherman, 3 Story R., 171; and Nelson *vs.* Rousseau, 4 How. R., 646, where the patent in controversy had been extended to the administrator of the inventor, and it was held to be correct. If, under the word "patentee," an extension may be granted to an administrator, there ought to be little or no misgivings as to the right of granting one to the patentee himself, although he is the assignee; and a trust may be implied in one case as well as in the other. The clause prescribing the effect to be given to an extension, cannot in fine be supposed, with much reason, to militate against the Commissioner's jurisdiction. The truth is, this argument is a misapplication of the doctrine; and the cases above cited answer it so fully as to render further discussion unnecessary.

Were my opinion directly the reverse of what it is, another consideration would impel me to the same disposition of this point. If the applicant is defeated on this ground, he has no means of correcting the decision, if erroneous. The opponents, on the other hand, can test its legality by resisting the patent in the courts. They have protested against being driven to such a remedy, as involving a repetition of the enormous litigation already produced by this and kindred patents. The complaint has little or no foundation. It would be impossible to frame a bill or a declaration for any future infringement upon this patent that

would not be open to a demurrer, upon which the question under consideration must meet with a speedy decision. The more doubt there is about it, the more important it becomes that it should be settled on the highest authority. Until then there will be so much uncertainty and complaint respecting it, that the Commissioner who persists in preventing a resort to the courts of law, by deciding against these applications on this ground, assumes more than usual responsibility. And should the point ever be carried up, and the doctrine be settled in favor of such extensions, he will hardly be able to satisfy his own sense of justice for what he has done, much less that of the public.

It was also urged, with great earnestness, upon the argument, that Hayward had sold out his entire interest in the invention—not merely his right under the patent; that the extended term would belong to his assignees if granted, and should therefore be denied. That depends upon the question whether the inventor can sell this contingent right. There are evils attendant upon recognising such a sale, no doubt. The same emergencies or want of thrift, which have so often led the inventor to sacrifice his original patent, may lead him to part with this last *tabula in naufragio*, if he is allowed to do so. I have yet to learn, however, that Congress have undertaken, in their care for inventors, to secure them against the consequences of their weakness or misfortune by any general provision; or that the Commissioner is warranted in putting a construction upon the law for such a purpose. If this objection were allowed, the patentee who had held his patent fourteen years could not sell his right to a renewal; which it will hardly be contended is law. As to the language which has been used by the courts, they have nowhere said that a patent could not be extended for the benefit of an assignee. They have gone no further than to declare that under certain forms of conveyance the right did not pass to him; and that the statute, which provides that the benefit of such renewal should extend to assignees and grantees, was limited to the right to use such machinery or other article as they had at the time the original term of the patent expired. On the other hand, the court, in Wilson *vs.* Rousseau, 4 How., 646, seem plainly to have recognised the possibility of the right to an extension being sold, and make no question as to the validity of such a contract, to be enforced in equity or treated as an absolute assignment. (See pages 679, 680.) That there is no serious objection to it on the score of policy, may be inferred with confidence from the English practice, under which a large proportion of the extensions recommended by the Judicial Committee of the Privy Council are made to assignees. (Webster's Patent Cases, 725, note.)

In this case moreover the petitioners deny that Hayward has parted with his right to an extension. After an examination of the exhibits referred to, and construing them according to the principles laid down in Wilson *vs.* Rousseau, it seems to me that the conveyances from Hayward do not amount to a sale of his entire interest in the patent, and that he is not estopped by any of the other instruments put into the case. The intention to part with the contingent right to a renewal should, according to the opinion of the court in the case mentioned, be more decidedly and distinctly expressed. As this issue becomes of no importance, however, in consequence of the views expressed in the preceding paragraph, I shall discuss it no further.

The counsel for the opponents next argued at great length that the original patent was void for want of both novelty and utility, and also because Hayward had sold the articles manufactured under his invention for more than two years previous to the date of his application, and had in fact abandoned it. It was to these points that the mass of testimony and exhibits filed in the case was addressed. Although the conclusions to which I have arrived upon other parts of it might have warranted me in dispensing with an examination of this, yet, as far as the brief time allowed for the purpose, and other pressing employments, have permitted, I have looked into it. Nothing will be gained by a minute discussion of it here; it will answer every purpose to briefly record the views I have adopted.

A great deal of time was consumed upon the question how far Mr. Day, one of the opponents, was estopped from setting up this objection by various recoveries upon this patent against him and his agents, both at law and in equity. If he had interposed some objection to the proceeding arising out of a contract between himself and the petitioners, he might be estopped by the record of a suit in which the contract had been adjudicated upon. Nothing of that kind is pretended, and it is difficult to conceive upon what ground the doctrine of estoppel can be made to apply. Hayward was no party to any of the records; in fact, he was a witness in some of the suits. There were other opponents to the extension who would not be affected by these proceedings. Had they all, notwithstanding, been between Hayward and Day alone, and had the latter been the sole opponent, it might well be questioned whether he should not be admitted to contest the application on grounds of public policy.

These recoveries were also claimed to be, like undisturbed enjoyment, evidence of the right of the patentee. Had they been founded on this patent alone, they might have been entitled to a good deal of weight. But, on inspecting the records produced, they seem, every one of them, to have counted upon others as well as this. The validity of it does not appear to have been the subject of any separate issue, or of any distinct adjudication. In all these suits the defendants may have seen that the expense of trying the question upon this alone would be worse than thrown away, if the plaintiff could recover upon the other patents embraced. They would have to bear the cost of the investigation, and the verdict would not prevent this patent being set up anew. The victory, therefore, would prove worse than barren. I cannot, on the whole, attribute much weight to these recoveries. The question must be decided upon other grounds.

In order that the Office might have the most satisfactory knowledge, and act intelligently on the subject, the examiner who has this case in charge, Dr. Gale, has instituted a careful investigation in the laboratory, and has reported the result. From this it appears that a chemical affinity exists between sulphur and rubber, in nearly the proportions indicated in this patent; as a consequence and proof of which, the combination, when effected, is no longer soluble in the essential oils or spirits of turpentine, which is commonly used in such operations. To effect this combination, however, it is not enough that the two substances be mechanically blended according to Hayward's process. If nothing more is done, and they are directly submitted to the action of the usual solvent,

they will yield to its power. But if they are subjected to a high heat, as in the process employed by Goodyear under his vulcanizing patent, the chemical union is produced, and they are no longer attacked by it. The same result is brought about by time, as was shown by subjecting to spirits of turpentine goods which were manufactured under Hayward's process several years since. In itself there can be no doubt that the process is valuable, the sulphur operating with peculiar advantage as a drier when under mechanical union only with the rubber. And these experiments show it to be still more valuable as a part of a process resulting in one of the best, if not the best, combination of India-rubber that can be produced.

A like inquiry was made by the same officer into the history of rubber and of its manufacture, as well as it could be ascertained from the records of the Office, and the publications and other sources of information at its command, independent of the testimony filed in the case. From his report it appears, so far as the intelligence thus obtained can be relied upon, that this combination of sulphur and rubber, for the purposes of manufacture, was not known till Hayward discovered it. Taking the report of the examiner for a guide, therefore, the process embraced in this patent was patentable when it was granted, as far as novelty and utility are concerned.

This conclusion is by no means overturned by the testimony, with such examination as I have been able to give it. It may be readily conceived that, without the improvement effected by the lapse of time, or the operation of heat, the value of Hayward's invention would not be duly appreciated, and that it would be superseded in a measure by Goodyear's vulcanizing process. As a natural consequence, it may have been underrated and spoken of in disparaging terms. All this does not determine the question. After looking through the subject, I have no doubt, upon the evidence, that the discovery is valuable, especially as an essential part of an improved process.

Upon the point of novelty, the evidence has taken a wide range. It has not been necessary for me to examine it as critically as if the case had turned upon it; indeed, it was hardly practicable. One thing, however, is plain. Until Hayward published his process, and obtained his patent, the manufacture of India rubber goods was comparatively a failure. Numerous companies embarked in it, and successively abandoned it. We nowhere find it prosecuted successfully. Without canvassing the testimony on this point at length, it is obvious that whatever has been done previously, was a mere matter of experiment. A merchantable article could not be found to supply the market; had there been, it would have poured into it in abundance, as was evinced at last. Such attempts are not allowed to defeat a patent; to do that, it must be shown that they are effectual for practical purposes. Upon any other ground, where a number are simultaneously employed in making a discovery, a patent must be denied to the person who succeeds, unless he can show that he was also the first who conceived it.

The same view should be taken of the evidence respecting the sales made by Hayward before taking out this patent. They are all to be regarded in the light of unsuccessful experiments. He had not, it is plain, discovered the precise process that afterwards accomplished the desired end. I think they were not such sales of the invention to the public as to preclude a patent.

The same considerations put the question of abandonment at rest. As to that, it may be further observed, that grave doubts have been expressed in highly respectable quarters whether the decision of that question is within the jurisdiction of this Office. It is not expressly delegated by any statute.

Another objection interposed is, that Hayward has not brought his invention into public use; that he has, on the contrary, put it out of his power, by selling it to Goodyear. The last stricture is of very little weight. Selling his invention might be the best means to get the article into market. And though it should be superseded by a better manufacture, it does by no means follow that the owners come within the spirit of the act on this subject. There can be no doubt that Hayward sold his imperfect manufactures before the patent was obtained; and quite as little that both he and Goodyear exerted themselves to their utmost to enlarge their sales afterwards.

There remains the question whether Hayward, to quote the act of Congress, has "failed to obtain from the use and sale of his invention a reasonable compensation for the time, ingenuity, and expense bestowed upon the same, and the introduction thereof into use." In order to satisfy the Commissioner on this point, he has filed an account, under oath, of his receipts and disbursements as is usual. He credits, on the one hand, $3,000 in all, being the proceeds of the sale to Goodyear of his rights, under this patent. He charges, on the other hand, for his expenses and time, $1,825 75, leaving a balance in favor of the invention of $1,174 25. On examining the items, they do not seem intended to exhibit the exact amounts expended, which was not probably in Hayward's power at a time so distant. They are mere estimates; and though not entirely satisfactory, they may be passed over. It has not been deemed necessary in practice to scrutinize such accounts very closely.

Among them, however, is a group of items that calls for a word of comment. It embraces several charges for expenses incurred while engaged for six months in pursuing a course of experiments at Easton, and amounts to nine hundred dollars. The charges are unusual—such as one hundred and fifty dollars for shop-hire, and four hundred and forty dollars for "rubber, sulphur, spirits of turpentine, paints, and other materials and expenses;" but are explained by the fact that he undoubtedly disbursed nine hundred dollars while he was thus engaged. He charges, also, for time while thus employed, five hundred dollars, which he puts upon the ground that immediately afterwards he entered into the service of the Eagle India Rubber Company, at an annual salary of one thousand dollars. This arose no doubt from the undue expectations of that company, and did not last. He had previously labored for two dollars per day; and subsequently, as he testifies, was employed by Goodyear at an annual salary of five or six hundred dollars, though, by a contract among the exhibits, he was at one time to have eight hundred dollars. In addition to this, it is evident from the statement, that the nine hundred dollars disbursed at Easton must have defrayed his personal and other expenses, such as are usually borne out of a man's wages. Up to this period he had accumulated but little, his earnings had been nearly consumed in his support, and this charge of five hundred dollars ought in

justice to be reduced to such a sum as he could reasonably be expected to have saved in another pursuit in that time. How much the balance should be increased cannot be ascertained; it is clear, however, that it is not as large as it should be.

It will be observed that his time and his expenses are charged in the account, and that a balance remains, after remunerating him for both, leaving us only to inquire whether that balance is sufficient to compensate him for his "*ingenuity.*" Before entering upon this question, it is proper to notice a position taken by the opponents, who argue that by making a deliberate sale of his invention the petitioner has set his own valuation upon it; and having received the price, as he concedes, he should not be permitted to ask for more. There is great force in this, especially in those cases where an inventor has made a deliberate, understanding sale; but it should be applied with caution where he has been constrained by poverty to make a sacrifice, or where he has acted in ignorance of the merit of his discovery, and has sold for a trifle what has proved of great value to the public. In either instance it seems that he ought to be entitled to the benefit of this proceeding. Both of these considerations, it is alleged, exist in this case. I am not satisfied as to that. The whole transaction shows that Hayward set no trifling estimate upon his discovery. The price he received does not indicate that any advantage was taken of his need, and he was receiving an annual salary of $800 a year from Goodyear at the time. The merits of the invention will be adverted to directly.

It is insisted, also, that nothing more is implied in the phrase "ingenuity" than time; and that where the inventor has received adequate compensation for that and his labor, his ingenuity has been rewarded. In confirmation of this, authentic assurances were given that the former Board for extending patents had never allowed anything for ingenuity over and above time. It would have been more to the point had an assurance been given that they had ever in fact disallowed such an item, and denied a renewal, upon the ground that the applicant had been remunerated for his time and expenses. The use of the word "ingenuity" in the act, in addition to the words time and expense, is inconsistent with this objection; it must be presumed to mean something more. Neither is the view thus taken by the opponents compatible with the provision for ascertaining the value of the invention to the public. It is said that the object of this was merely to show that it was of some value; otherwise the Commissioner would not be authorized to proceed. The act, however, calls for "the ascertained value of the invention," which would seem, therefore, to be required for another purpose. Looking at the expressions of the statute, and at the practice upon these applications, I am convinced that two elements are to be considered in determining the question of remuneration for ingenuity. One of these must be inventive genius. It would be wholly unreasonable to pay for the number of years that an uneducated plodder might waste in perfecting a contrivance, and to measure the compensation of a man who, by the exercise of uncommon ingenuity and skill, had produced the same result, by the few days it had cost him. Where the invention displays great talent, therefore, and is evidently the product of extraordinary capacity, it should receive, if otherwise deserving, some corresponding remuneration. The other is the degree of utility possessed by the in-

vention. Judging from the language of the statute, it would seem that the legislature intended to acquiesce in the widely-expressed sentiment that the contrivers of pre-eminently beneficial mechanisms or devices—like the cotton-gin, the steam engine, and the electric telegraph—are entitled to something more than day's wages and the reimbursement of their expenses. I believe it was designed that they should be liberally rewarded somewhat in proportion to the debt which humanity owes them, and as an encouragement to such benefactors.

The question then arises, Does either of these considerations apply in the present case? In the first place, has Mr. Hayward displayed any such extraordinary ingenuity in this invention as entitles him to a large remuneration? It is possible that such ingenuity was called into exercise, while he was engaged in his long course of experiments, for the purpose of maturing his device. There is not a particle of evidence respecting it, however; it is not to be discovered by inspection, as it might be in some machines. In order to give him the benefit of having displayed the ingenuity that the law contemplates, it must be wholly presumed; and without proof of it I do not feel at liberty to infer it. Experiments for the same purpose were at the time constantly making on all sides, and he could not be said to have advanced more than a step beyond others. I cannot, therefore, deem him entitled to any unusual emolument on this ground.

As to the question whether the value of Mr. Hayward's invention entitles him to a reward so much larger than he has received, I have had more doubts. It is said to be worth $150,000 by itself—$1,000,000 in conjunction with other patents. By this I do not understand that it is worth so much as a means of levying a contribution, but that the process is worth so much when employed in aid of other patented processes. But have the public derived so large an advantage from it? Looking at the examiner's report, and at the whole testimony, I have come to the conclusion that it was the invention of vulcanizing India-rubber patented by Goodyear that created this new branch of manufacture, and caused this wonderful activity in the market for goods of this material. It is true Goodyear may find it advantageous to call Hayward's invention to his aid; it may be more or less essential to the success of his process. It is upon this point I have labored; and while I incline to the opinion that the invention of Hayward has been a public benefit, the estimate I have formed of it is not so high that I can grant the petition upon the strength of it. The act enjoins that these requisites should be made to "appear to the full and entire satisfaction" of the Commissioner. He must also have "a due regard to the public interest" in making this determination. The community have already contributed immense sums to the owners of these patents, and the question now is whether they shall continue to do so on this. I can only say that I must take a very different view of the case before I can be induced to grant the exclusive interest for seven years longer in this invention, which would necessarily subject the public to a further tax, almost beyond estimation. There is no other alternative; the patent must be extended for that period, or not at all. The case would be different, if, as in England, it was a subject of discretion how long a term to give.

This suggests another inquiry. Admitting that the applicant is on every other ground entitled to have his prayer complied with, and especially that he has never received a suitable remuneration, ought he not to be denied upon the ground that the public have paid abundantly for his improvement? Of this fact there can be no doubt. It would seem as if both of the parties should be taken into consideration; that the inquiry should be not merely how much has the inventor received, but how much have the public contributed? It may be held that the community can afford to be and ought to be generous and liberal towards its benefactors, and cheerfully submit to a double tax for the sake of remunerating those who have bestowed great advantages upon it. That is not an easy position to maintain. Admitting it to be sound, however, there is a danger growing out of it to be guarded against with care. It places the inventor under great temptation to make a nominal sale of his invention, reserving a secret interest, (whether before or after the patent issues makes no difference,) and at the close of the first fourteen years to ask for an extension, on the ground that the sale was on an inadequate consideration. This will not often take place, I trust; yet the possibility of it will entail upon the Commissioner the duty of scrutinizing thoroughly the transactions between the inventor and the assignee.

These considerations have been forcibly suggested to my mind by some statements in the applicant's schedule of receipts on account of his invention, so unusual, as to lead me, in fine, to a careful examination of the transactions between him and Goodyear relating to this patent. As near as can be ascertained from the testimony, they are as follows:

The original contract between them bears date October 19, 1838. Hayward then sold and transferred his right under the patent he had applied for to Goodyear. Goodyear, on his part, was to pay Hayward one hundred dollars down, give him his note, at six months, for nine hundred dollars more; and he also licensed him to manufacture three hundred yards of India rubber cloth per day, under the patent; Hayward, on the other hand, covenanted to release the license upon Goodyear's paying him the further sum of two thousand dollars. Subsequently, it was agreed that the patent should issue to Goodyear; and on the 23d of November, 1838, Hayward executed to him an assignment according to the form prescribed by the Patent Office for that purpose. This did not affect the license, and was not intended to, as evinced by the dealings of the parties.

In the applicant's statement of the account, he says that Goodyear paid him on this note only about $550, and then uses the following language: "Goodyear being in embarrassed circumstances until 1847, I did not press him for the balance; and although I considered at one time that the license remained mine, because Goodyear had not paid the two thousand dollars in full in the precise manner stipulated, I never elected to enforce such a claim against him, but preferred to hold that the license had ceased, under which I never manufactured; that the assignment rested in Goodyear, and he remained my debtor in the balance of say $350. Therefore I am content to have the whole $3,000 charged as received by me."

It cannot but be deemed singular that Hayward should never have collected this balance of one who has been for years floating in affluence. It calls for an explanation. He seems to feel this, and, in place of one, he

gives us the views he has entertained respecting the license being in force. How does this account for the note remaining unsettled? The license was never contingent on the payment of the $900. It is not easy again to understand the inference he draws—"therefore I am content to have the whole $3,000 charged," &c. How does this follow from abandoning the license? And when it is seen that, though he "preferred to hold that the license had ceased," yet he does not profess that it was ever discharged or surrendered, I think every one will feel that here is a good deal to awaken inquiry.

The statement that upon the $900 note Hayward received but $550, and that $350 remain as yet unpaid, is, furthermore, not easily reconciled with the deposition he gave in June and July, 1851, to be used on the trial of what is widely known as the "Great India-rubber Case," at Trenton, New Jersey. Among the exhibits there is a contract between Goodyear, Hayward, and Henry Burr, dated November 19, 1845, under which Goodyear licenses Hayward and Burr to manufacture boots and shoes under the present patent and Goodyear's patent of 1844, they paying a tariff of five cents per pair. On being inquired of respecting this contract, Hayward says, in his answer to question 603, that a Mr. Dorr, on behalf of Goodyear, "agreed to give me a license to manufacture 300 pairs of shoes per day for the right I hold under Goodyear, and to pay me what Goodyear owed me. Goodyear owed me a little over $1,000." In answer to question 605—ultimately "there was nothing paid me only a free license to manufacture 500 pairs of boots and shoes per day, *to offset what Mr. Goodyear was owing me*, and the rights and claims I held under his patent were allowed me by Goodyear." In his next answer he says he was thinking of the five cents per pair, and was mistaken in saying he was restricted to 500 pairs per day; it was 300 pairs per day. In the last statement he was probably misled by the interrogatory, which stated that the contract named 300 pairs per day, and by his recollection of a simultaneous contract under which Goodyear released Hayward and Burr from the tariff on 300 pairs of boots and shoes per day, or 93,900 per year. It will be observed that Mr. Hayward here says that Goodyear owed him a little over $1,000, and for that Goodyear gave him the license to himself and Burr, who was his partner, and afterward a member of the Hayward India rubber Company. These circumstances are not introduced so fully for the mere purpose of eliciting the apparent inconsistency of these statements of Mr. Hayward, which may be owing to inadvertence, and throw no great light upon the question at issue; but because they have an important bearing upon the other part of the case. Before proceeding, it should be observed that the counsel for Mr. Hayward claimed that Goodyear had no authority to give the license to Hayward and Burr, having previously granted the entire and exclusive shoe right to the "Goodyear Shoe Company." No such document is to be found among the exhibits. The records of the Office to which general reference was made, have been searched, however; and from them it appears that on the 4th of March, 1845, Goodyear licensed "Goodyear's Metallic Rubber Company" to use his improvements in manufacturing boots and shoes, not exclusively in terms, but with a stipulation not to manufacture himself, nor grant a license to any one else. On this statement alone there is nothing to impair the license to Hayward and Burr, as I apprehend; and

the remedy of "Goodyear's Metallic Rubber Company" must be on the covenant against Goodyear for granting this license. It is perfectly valid in itself. Reference was also made to a contract between Goodyear and Candee, and others; but that bears date July 1, 1848, and could have no effect on this license. The counsel for the opponents were also challenged to deny the assertion that nothing had ever been manufactured under it. But from another deposition of Mr. Hayward, taken in August, 1851, it is plain that Hayward and Burr, and after them the Hayward Rubber Company, were engaged in manufacturing shoes about this time. (See answer to questions 325 to 330.) It does not appear whether they had any other license than that to Hayward and Burr until the contract above mentioned with Candee and others, of July 1, 1848. An obscurity hangs over this part of the transaction, which is not cleared up by anything produced upon the hearing.

Of the $2,000 to be paid by Goodyear, in order to have the license of 1838 cancelled, Hayward says that on the 3d of April, 1841, he paid $1,000 in a license to make boots and shoes, which he, Hayward, afterwards sold to Leverett Candee, for that sum. The license, as found among the exhibits, empowered Hayward, or any one he authorized, to manufacture boots and shoes without limit, under any patent Goodyear might have or obtain, paying five cents per pair; the license not to take effect for six months, and to be void if in that time Goodyear paid Hayward $1,000. Now, in Mr. Hayward's first deposition, he testified on this subject, in answer to questions 209 and 211, as follows: "That $1,000 I think Mr. Candee paid me." "He gave me $1,000 for the agreement of April 3, 1841, and $800 on other claims which I had against Goodyear, which I afterwards gave Goodyear credit for." If Candee purchased this license for $1,800, it was proper that $1,000 of the money should be credited in Hayward's account of the invention. But why should Hayward apply the other $800 upon Goodyear's other debts? Why was it not a part of the proceeds of the invention, and to be credited as such? Goodyear's right to redeem the license was lost; he had no interest in the fund.

The other $1,000 Goodyear paid Hayward on the same 3d April, 1841, by three drafts on John Ryder, payable at six, nine, and twelve months, on the payment of which Hayward was to execute a release to Goodyear of the license he held under the original sale of October 19, 1838. The release was prepared and left in the hands of counsel, to be dated and executed on the payment of the drafts, but, the drafts not being paid, was never perfected. Passing over other negotiations, there is among the exhibits a copy of an instrument dated April 30, 1842, in which Hayward, after stating that two of the drafts on Ryder remained unpaid, agreed that, if they were paid by the 28th June after, Goodyear should have the benefit of it the same as if the drafts were promptly paid. In Hayward's deposition, he testifies as to this paper in answer to questions 677, 679, 683: "I cannot state it was ever in their hands," (those of the counsel.) "I found it among my papers." "I think I gave it to Goodyear."

The documents referred to are all among the exhibits. From them it appears that the original license granted by Goodyear to Hayward, on the 19th October, 1838, is still in full force. It is true that Mr. Hayward, in his account, says he "chose to consider that the license had ceased," and that he never manufactured under it. Yet it is undeniable that he insisted upon its being in force at various times. On these points his deposition above mentioned throws some light, and is not a little remarkable.

The 195th question, referring to the present patent, is this: "Are you now a manufacturer of India-rubber goods under that patent?" Answer. "I am."

Question 196. "From whom have you a license?" &c. Answer. "The company that I am interested in has a license from Mr. Goodyear," &c.

Question 198. "Who signed your license to use the so-called sulphur patent?" Answer. "Charles Goodyear."

Question 199. "When? And is it still in force?" Answer. "The sulphur license was signed in 1838. I should think that license was good. I think I made an agreement with Goodyear to surrender that license to him at a certain period. Owing to his embarrassed circumstances he did not fulfil the agreement, so that I think it stands in force as when it was given."

Again, in answer to question 202. "He has never paid me the $2,000. I still hold the license." And in answer to question 337, he states that he holds nearly one-fifth of the capital of the Hayward India-rubber Company, the company spoken of in his answer to interrogatory 196.

It is conceded by Mr. Hayward, then, in terms that admit of no misunderstanding, that he still holds in full force the very license for the manufacture of goods under this patent which he obtained from Goodyear in 1838, as part of the consideration for the sale of his invention, and that the company, of whose stock he owns nearly one-fifth, have, in fact, been manufacturing under an arrangement with Goodyear, and Hayward says under this patent. What profits he has made it is unnecessary to consider. If I may conjecture from the value set upon the patent under oath, and from the remarks which have passed upon the subject, they have been an ample recompense for the ingenuity he displayed, estimating it by any principle whatever. It is enough that he has not embraced any portion of these profits in his account. From the testimony he gave in relation to the Hayward and Burr license, quoted above, it would further seem that Goodyear expressly assented to his retaining the license.

Apart from Mr. Hayward's admissions, it is not to be denied that he has been a large stockholder in a company working at great profit under this patent for his own process. This circumstance will, in almost every mind, prove decisive against his claim for further remuneration. If he has already made, from the use of his invention, enough to compensate him, why should he have more? Had he made an absolute sale of his invention, without reserve, and failed to receive a due remuneration from it, yet if he afterwards purchased an interest in it, and reaped a profit sufficiently large from working under it, he would not, I think, be entitled to the benefit of this act. He might show that the two transactions were entirely independent. He might, therefore, contend that he had not received an adequate reward, and that what he had accumulated since was the result of disconnected transactions, and not to be taken into the account. It would not be in his power, nevertheless, to say that he had "failed to obtain, from the *use* and sale of his invention, a

reasonable remuneration," adopting the words of the statute. The relation in which he stands to the invention and its owners, and his acquaintance with the operation of it, give him unusual opportunities for availing himself of its advantages. I cannot think, therefore, that he comes within the spirit of the act, or is entitled to receive an additional reward, when it appears that he has already obtained one from the use of his discovery—even though it was under arrangements ever so independent of his selling it. Besides this, a connexion has been maintained between him and Goodyear from the first sale of the invention to the time when Hayward made his deposition, and through the whole of it the license of 1838 has been kept on foot and played an important part in their negotiations. How much it has had to do with his enjoying the emoluments of the shoe license, as he terms it, it is not for me to say; for the extent of that connexion is not disclosed. That it had none, is not easy to believe. On no other ground can we account for the unliquidated condition of the original demand for the purchase-money, the sale to Candee, the license to Hayward and Burr, and the application of $800, paid by Candee to Hayward upon Hayward's other debts against Goodyear. If an inventor may leave such a state of things between himself and the assignee of his invention unexplained, and yet have his patent renewed on the ground that he has not been adequately rewarded, I see nothing to prevent every inventor from making an arrangement with an assignee under which he may receive a consideration ostensibly small, yet secure to himself advantages of which he need render no account when he claims an extension. He may thus compel the public, in every case of a valuable discovery, to pay him for it twice, besides enriching the assignee. I do not charge Mr. Hayward with any such design in this instance; but, if the course he has pursued is sanctioned, it will be impossible to prevent the planning and execution of such schemes hereafter. In fine, I challenge the warmest advocate of this proceeding to say that it has been made to appear to the "full and entire satisfaction" of any one that Mr. Hayward has failed to obtain a reasonable remuneration for his invention; or even to deny that there is ground for presuming that he has made large sums out of it, by availing himself of the license he originally received on the sale of his right, for which sums he has not accounted.

The conclusion at which I arrive is forced upon me, therefore, by the following considerations: I believe that the applicant, with a full sense of the value of his discovery, and under no pressure from want, deliberately sold it at the valuation which he himself had fixed, and has been paid accordingly; and I do not see enough in the ingenuity of the discovery, or in its utility to the public, to justify the extension of this patent for seven years longer, in order to remunerate him further. He has also reaped, from the use of this invention, an abundant reward for it; and by what means he obtained the license I am disposed to regard as not material. In fine, he has not shown, as required by the act, to "my full and entire satisfaction," "that he has failed to obtain from the use and sale of his invention a reasonable reward for the time, ingenuity, and expense bestowed upon" it. With these views I can do no less than dismiss the application.

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS

VOL. 1, 1852

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REPORT

OF THE

COMMISSIONER OF PATENTS

FOR THE YEAR 1852.

PART II.

AGRICULTURE.

CONTENTS.

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LETTER

FROM

THE COMMISSIONER OF PATENTS,

TRANSMITTING

His Annual Report.

MARCH 2, 1853.—Laid upon the table, and ordered to be printed.

MARCH 3, 1853.—Ordered that 110,000 extra copies of the Agricultural, and 60,000 extra of the Mechanical part be printed; 10,000 of each of which are for the use of the Patent Office.

UNITED STATES PATENT OFFICE,
February 28, 1853.

SIR: I have the honor of transmitting to you the Agricultural part of the Annual Report required by law from this Office.

It would have been gratifying to have given a new character to the work, and to have made it such as would better satisfy the wants and the tastes of the best informed among those for whom it is especially intended. Soon after entering upon the duties of this Office, I made strenuous efforts to have this effected; but directly found that no competent person would undertake such a task at so late a period. It has, in fact, cost more than usual efforts to have it completed in the present form, even at this late stage of the session.

The arrangements for obtaining seeds had also been perfected when I came. Measures should be taken hereafter to secure their being delivered at an earlier day, so that they may be distributed in season for the Southern portions of the country.

Very respectfully, your obedient servant,

SILAS H. HODGES.

Hon. LINN BOYD,
Speaker of the House of Representatives.

I.

AGRICULTURE AND AGRICULTURAL EDUCATION.

PROGRESS OF AGRICULTURE IN THE UNITED STATES.

BY DANIEL LEE, M. D.

Agriculture gives employment to more capital and labor in the United States than all other pursuits combined; and its progress marks, in a peculiar manner, the advancement of the republic in wealth, civilization, and power. The natural fruitfulness of the American soil, its vast area, and wide range of climates, between the gulf and the great lakes, the Atlantic and the Pacific oceans, present for consideration resources and capabilities almost unlimited in extent and quite inestimable in value. We shall not attempt to do more than point out the direction in which American tillage and husbandry are making such rapid progress, and indicate the probable result of our present system of farm economy, if steadily pursued to the close of the present century.

In 1821 there were exported from the United States 124,893,405 pounds of cotton. In 1849 the export was 1,026,602,269 pounds. These figures show an increase of more than 800 per cent. in 28 years in the surplus production of the most important commercial staple of the country and the world. At this time an average crop of cotton may be estimated at 3,000,000 bales, of 400 pounds each; and the prospect is that the demand will equal, if it does not exceed, the supply for many years. Hence the production of this article is destined to increase much faster than population; for, as civilization and commerce extend, the number that will consume cotton fabrics, and the annual consumption of each person, by reason of his greater productive power, will extend in a still greater ratio; in other words, the same causes that increased the foreign demand for American cotton more than 800 per cent. in 28 years, will augment the amount now exported 300 per cent. in the next quarter of a century.

Fortunately we have the land and climate most desirable for the annual growth of 9,000,000 bales, and we shall probably have the labor and capital needed for the economical production of such crops. At a half bale per acre, only 18,000,000 acres would be planted to realize the crop named; while the four States of Georgia, Alabama, Mississippi, and

Texas, contain four times that number of acres of choice cotton lands. Without some unforeseen and improbable event, the exportation of cotton will steadily and rapidly increase until its value reaches three hundred million dollars per annum. It is as unlikely that the vascular tissue of flax or hemp will ever supersede the cellular tissue of cotton for the cheap production of desirable clothing, as that loaves of baked clay will serve as a substitute for loaves of bread in feeding the human family. There is an organic difference between the fibres of cotton and flax, in favor of the former, that can no more be changed than iron can be transmuted into gold. Nevertheless, great improvements in the preparation and manufacture of flax are doubtless attainable, as they are certainly desirable.

Cotton culture presents one feature which we respectfully commend to the earnest consideration of southern statesmen and planters, and that is the constantly increasing deterioration of the soil devoted mainly to the production of this important crop. Already this evil has attained a fearful magnitude; and, under the present common practices, it grows a little faster than the increase of cotton bales at the South. Who can say when or where this ever-augmenting exhaustion of the natural resources of the cotton-growing States is to end short of their ruin? Every year's labor in tillage renders the existing impediments, in the way of adequate restitution to the injured soil, more difficult to be overcome; and if the depleting policy be much longer pursued, with the rapid increase of field-hands and mules, deeper ploughing, and greater facilities for sending cotton to market, to what future resources can the community look for manure enough to recuperate all the impoverished land in the planting States?

No cotton-grower should wish to conceal from himself or the public the fact that the soil of the South will be injured as much in the next fifteen years as it has been in the last twenty-five; while the means of renovation in cultivated fields, fifteen years hence, will be less than half what they now are. If, in practice, it is now found somewhat difficult to give back to cotton plantations a fair equivalent for the elements of crops, removed by the leaching and washing of many sudden showers and heavy rains falling upon light and thoroughly or poorly-tilled land, can it be easier to make restitution after many million tons of the few precious atoms extracted in the growth of agricultural plants have been either wasted at home or sent to distant States and countries for consumption? If a wise and skilful planter finds it apparently impracticable to export largely the raw material of crops drawn from the surface of his fields, and not impair their fruitfulness, when they are rich in the elements of cotton and grain, who can do any better by these same fields after they have been partially or wholly exhausted? If adequate restitution is ever to be made, who does not see that every year's delay to begin the great work lessens the resources of every owner of the soil, while it augments the necessities of all arated land? In case no restitution is contemplated, and the present system of planting is to continue, what a humiliating and inglorious destiny must not the sunny South finally reach? Can her patriotic statesmen close their eyes against the evidence of an erroneous policy which impoverishes the soil, because full and perfect restitution appears impracticable? Our old colonial system of agriculture is defective and wrong in the extreme. Having come down to us from before the Revolution, the evils which are entailed admit of no remedy short of wise and timely legislation. Isolated cultivators are entirely powerless

to change a public policy that has grown up with the growth of six or eight generations, whose uniform practice has been to take everything from the virgin earth and give nothing back. This great error is by no means limited to the cotton and tobacco-growing States. It exists in New England, New York, Pennsylvania, Ohio, and all the other States, and will lead to precisely the same results as at the South. The difference in climate makes a corresponding difference in degree and in the length of time that the natural fertility of land will last; but in the end a common system will lead to a common result in all parts of the republic.

It would gratify our self-esteem, as owners of the soil which we cultivate, to conceal our short-comings in reference to its obvious wants, and dwell upon the statistics that prove our ability to extract more of the agricultural staples of the country from its arable lands than an equal number of laborers ever before extracted. By the aid of better farm implements, greater experience, and more skilful operatives, cotton, corn, wheat, and tobacco are grown very cheaply on rich lands; and if all of the so-called improved farms were really fertile and exempt from the loss of the essential constituents of crops, American agriculture would soon approximate perfection. As an *art*, it has made wonderful progress in the last thirty years: but as a *science*, we have yet to plant the seed; and, what is worse, the ground has to be grubbed, and ploughed, and manured, before the germs of rural science can thrive in American soil. Agricultural statistics show this, and we shall appeal to them to prove both the advancement of tillage and husbandry as arts, and their deplorable condition as sciences.

American agriculture as an art.

In the *art* of subduing wild lands, whether forest or prairie, American farmers have no equals. The census of 1840 did not ascertain the number of acres of improved land in the United States; therefore, there are no data showing the increase during the last decade. Corn, being the most important and universal crop grown, is the best test of the progress of the art of tillage in all parts of the Union. In 1840, the returns of this cereal were 377,531,875 bushels; in 1850 they were 592,141,230. These figures indicate a gain of over 50 per cent., while population increased only about 35 per cent. in the same length of time. The crop of wheat would have shown an equal advance, had it not been very badly damaged before the harvest from which the census of 1850 was made. To our knowledge, this staple has been raised in some States, and sold at from twenty-five to fifty cents a bushel, during the last thirty years. Since the discovery of the gold deposites of California, and the partial exhaustion of the best wheat lands in the country, the price of this crop has advanced considerably in all the newly-settled districts. In no other nation can wheat and maize be grown at so small an outlay in the labor of man and beast as in the United States. This advantage, which extends to cotton and tobacco culture, and the production of hay, is to be ascribed mainly to the circumstance of the comparative scarcity of labor in this country of cheap farming lands since the first settlement of the British colonies. A demand for labor beyond the supply has operated as a standing bounty on improved agricultural implements, and

extraordinary skill in every manipulation practised in rural affairs; and the natural result is unrivalled attainments in the arts of tillage and husbandry. The same amount of toil of a man and horse which will produce a bushel of wheat in England, will yield ten bushels of corn on good land in this country. Hence it is that our annual crop of maize now exceeds six hundred million bushels. We have often had occasion to admire the tact, skill, and industry with which over three thousand million pounds of seed-cotton are picked by human fingers, in a harvest of a few months' duration. Both cotton and corn are grown in many countries, and where labor is much cheaper than in the United States; but one travels in vain to find a people whose knowledge of the *art* of cotton and corn-planting approaches that of the citizens of this republic.

Productiveness of crops and destructiveness of soil are the two most prominent features of American agriculture. The latter feature arises from the fact that we have a continent to cultivate and exhaust of its virgin fertility. Long experience has taught us all the advantages of this American system; its disadvantages have been sadly overlooked. They consist in compelling all classes to give an ever-increasing amount of labor in all the older States for their daily food and necessary clothing. Railroads and canals extending into the heart of fresh lands, temporarily abate the evil named, and inspire a false confidence in the popular policy of the age. If we will take the time required to master the true principles of rural economy, and the statistics of tillage, as they affect *the soil*, we shall find abundant evidence of the great and almost irreparable injury done to one hundred million acres of our so-called "improved lands." The number of acres returned at the census of 1850 was 118,435,178 "improved," and 184,596,025 "unimproved." It is only in two or three States, where State statistics aid us in our researches, that the constant deterioration of the soil is demonstrated. The object sought by those that prepared the blank schedules for the collection of agricultural statistics by the United States marshals, appears not to have been to promote the interests of agriculture by improving the soil, but to benefit inland and foreign commerce, trade, and manufactures, which look to the products of rural industry, not to its influence on the enduring fruitfulness of the earth. The careful and critical study of agriculture, with a view to make it the foundation of a wise system of political economy, has never been undertaken by American statesmen. Hence, their statesmanship and political economy have been at war with the true principles of tillage and husbandry from the first settlement of this continent by Europeans. Instead of inculcating the public duty to feed the land, that both feeds and clothes all classes and all generations, they have taught doctrines and established a policy which render it wholly impracticable to supply cotton, tobacco, and grain, for home consumption, without seriously impairing the natural resources of the soil. The truth of this remark we will now proceed to demonstrate: All will admit that the farmers of New York have the benefit of canals, railways, plank roads, cities, villages, and home markets.

With these advantages, it has been assumed that no further aid to agriculture was necessary, except such as the free schools, academies, and colleges now established would furnish. Since the State census of 1845, New York farmers have had the best services of a popular and

powerful State agricultural society, of a local society in nearly every county, of numerous and widely circulated agricultural journals; and they have enjoyed all the assistance that cities and villages can give to the cultivators of the soil.

In 1845 there were 11,737,968 acres under improvement in that State; in 1850 the number had increased to 12,408,968. Gain in five years, 671,692 acres. If the land neither increased nor decreased in fertility, the crops, neat stock, horses, swine, and sheep should have gained in the same ratio with the increased area brought under cultivation. If the land yielded more food for man and his domesticated animals per acre in 1850 than it did in 1845, then it would have increased in productiveness; but if it produced less, the legitimate inference is that it must have parted with more of the essential elements of crops than it regained.

The number of horses in the State in 1845 was 505,155; in 1850 it was 447,014; showing a decrease of 58,141 in five years. In these five years a large number of horses was brought into the State and sold in the growing cities of New York, Brooklyn, Albany, Troy, Utica, Syracuse, Auburn, Rochester, and Buffalo. The decrease of horses in the farming districts must have been not far from 100,000, instead of an increase proportionate to the increased number of acres of improved land.

In 1845 there were 999,490 cows milked in the State, and in 1850 931,324; showing a decrease of 68,066, in place of a gain, as there should have been had the soil not been deteriorated, and with 58,141 less horses to feed, and 671,692 acres of land more for dairy purposes.

Of other cattle there were 1,072,840 in 1845, and 945,315 in 1850; showing a decrease of 127,525, in place of a gain.

Of swine there were 1,584,344 in 1845, and in 1850, 1,018,252; showing a decrease of 566,092.

Of sheep there were 6,443,865 in 1845, and only 3,453,241 in 1850. These figures indicate the prodigious falling off in five years of 2,990,624. It would take 400,000 cows to replace all the sheep slaughtered, to say nothing of the diminished number of horses, oxen and young cattle, and swine.

Of potatoes the decrease was 7,255,056 bushels.

Of peas and beans there was a decrease of 1,182,054 bushels.

Of flax there was a decrease of 1,956,485 pounds.

Of wool there was a decrease of 3,793,527 pounds.

Of wheat there was a decrease of 270,724 bushels.

Of buckwheat there was a decrease of 450,724 bushels.

We will now name the crops in which there was an increase.

The crop of corn was 14,722,114 bushels in 1845, and 17,858,400 in 1850; increase 3,136,286 bushels. To produce the corn stated in the census of 1845, 595,135 acres were planted; indicating an average yield of 24¼ bushels per acre. From the impoverishment of pastures and meadows, and the decrease of forage for sheep, horses, and neat stock, more acres are now planted in corn, relatively, than ten years ago. At least one-tenth of the 671,567 acres increased area of improved land in the State may be set down as planted to this excellent forage as well as grain crop. This estimate indicates an average increase of corn per acre of two bushels. In the Patent Office Report for 1849 we estimated the number of farmers in New York who are improving their lands at one-twelfth of the whole, representing about a million acres of cultivated

land. No reason to vary this estimate has since been found. One-twelfth of the corn growers, it is believed, raise an average of 50 bushels per acre, who produce 2,760,000 bushels from 55,200 acres. One-fourth of the farmers in the State so cultivate their farms as to keep them from deterioration, and of course make and apply manure, in one form or another, equal to the draughts on the land by the growth of grass, grain, and roots, and by tillage. The average crops of corn made by these men may be set down at 35 bushels per acre. They cultivate 165,573 acres in corn, and harvest 5,595,055 bushels per annum. These figures leave 441,518 acres in the hands of two-thirds of the cultivators in the State, who grow 9,503,345 bushels, being an average product of 21½ bushels per acre.

Of rye there was an increase of 1,181,860 bushels. The rye crop of 1845 yielded only 9⅓ bushels per acre. If we allow one-tenth of the 671,692 acres of fresh land brought under improvement between the census of 1845 and that of 1850 to be sown with rye, and produce 15 bushels per acre, the increase would be 1,007,535 bushels, or nearly the quantity that the actual returns indicate as the gain in the State.

Similar remarks will apply with greater force to the increase of 228,163 bushels of oats; the increase of 476,354 bushels of barley; and of 26,796 tons of hay. One-tenth of the new lands in meadows would be a gain of 67,169 acres, and these, yielding 1½ ton per acre, would show an increase of over 100,000 tons, instead of 26,796. There is an increase of 264,361 pounds of butter, and one of 12,991,437 pounds of cheese. These dairy statistics are exceedingly interesting: first, because an increase of population of 494,323 in five years would lead to a corresponding increased consumption of milk before it could be used for making either cheese or butter; and, secondly, because there were nearly 100,000 less cows milked in 1850 than in 1845. In the census of 1850 dry cows were returned among the "milch cows" of the State; in the census of 1845 no cows were included except such as gave milk. These facts prove incontestably that the praiseworthy efforts of the members of the State and county societies to improve dairy stock have been eminently successful. A very considerable share of the domestic animals in New York has been increased in value within the last twelve years by the diffusion of rural knowledge among the people. The "live stock" at the census of 1850 was returned as worth $73,570,499 in that State.

The construction of numerous canals, railways, and plank-roads, and the rapid growth of cities and villages, have operated to enhance the market price of farming lands in all parts of the State. So far is this increase of value from indicating a corresponding gain of the elements of fertility in the soil, that it arises solely from the power of its owners to extract these elements in crops, products of the dairy, the orchard, and the garden, and sell them at a fair price on the farm. Grain, hay, provisions, fruit, and vegetables bring prices that render farming lands valuable in New York to *wear out* by the usual system of tillage and husbandry. Two-thirds of all the improved lands in that State are damaged to the extent of at least three dollars per acre a year, involving an annual loss of $25,000,000. How to prevent this constant impoverishment of the soil in all the States is a question of vast moment to the well-being of the republic.

Before we proceed to the consideration of remedies, it is thought advisable to bring before the reader additional evidence of the extent and certainty of the malady. "To know ourselves diseased is half our cure."

The Massachusetts State Board of Agriculture has adopted the following pregnant resolution :

"*Resolved*, That the necessity of this improvement [agricultural education] is apparent from the report of the valuation committee to the last legislature; by which it will be seen that, although there have been added to the lands under improvement since 1840 more than three hundred thousand acres, and although the upland and other mowing lands have been increased more than ninety thousand acres, or nearly 15 per cent., yet the hay crops have increased only about 3 per cent., showing a relative depreciation of 12 per cent.; and although the tillage lands have been increased more than forty thousand acres in the same period, yet there has been no increase in grain crops, but an absolute depreciation of *six hundred thousand bushels;* and although the pasturage lands have been increased more than one hundred thousand acres, yet there has been scarcely any augmentation of neat cattle, while in sheep there has been a reduction of more than one hundred and sixty thousand, and in swine of more than seventeen thousand."

These facts prove that home markets, a net-work of excellent railroads, and most flourishing agricultual societies and journals, are as insufficient to teach the true principles of agriculture in Massachusetts as in New York. The practice of drawing on American soil as an inexhaustible capital prevails equally all over the United States, and it is truly bred in the bone and flesh of the people. Wherever it is possible to bring the light of truthful statistics to bear on the land under cultivation, there the consumption of its virgin fertility is demonstrated. Of the one hundred and twenty-five million acres now under cultivation in the United States, four fifths, or one hundred millions, are damaged to the extent of three dollars an acre per annum. By which remark we mean that complete restitution of the elements of crops removed, such as potash, soda, lime, magnesia, chlorine, phosphoric and sulphuric acids, and ammonia, cannot be made short of an expense of three dollars per acre. All manuring of every kind implies the necessity of making restitution to the earth cultivated by man; but this first and highest duty of the cultivator and husbandman is now almost universally neglected.

Remedies considered.

In what way can the natural resources of the soil be best preserved from injury and saved from destruction? Of all problems in agriculture the one just stated is the most important, and perhaps the most difficult to solve. Public sentiment, and the moral sense of the people everywhere, assume the right to extract from the surface of the earth its elements of bread, meat, wool, flax, hemp, cotton, and tobacco, and waste them at home or export them abroad, never to return. These elements of crops, of which a cubic foot of common soil contains about one part in a thousand in an available form, are now being extracted and wasted in cities and elsewhere, as fast as five million laborers and five thousand million dollars capital can well perform the task. Commerce, trade, the mechanic arts, and manufactures, all participate in the wealth drawn

from the impoverished grain, cotton, and tobacco fields of the United States. Hence not one of these great interests has ever manifested a wish to arrest the present practice of exhausting the natural fruitfulness of the soil. Commerce urges the cotton planter, the grain grower, and the producer of provisions to push every laborer and every acre of improved land to their utmost, and furnish agricultural staples to be exchanged for foreign goods. The owners of railroads, canals, steamboats on rivers, and shipping on the great lakes, as well as on the ocean, look mainly to the tillers of the earth for freight, travel, and profits; while all manufacturers desiderate cheap wool and cheap cotton, cheap wheat, corn, butter, meat, and lard, no matter what damage is done to the arable lands of the country. The great primary source of the food and clothing of all is regarded as unworthy of a moment's serious consideration. At what cost of the elements of fertility three million bales of cotton are annually made and sent off the plantations which produce them, is a question of fact about which no statesman inquires, and to which public attention has never been turned. In the absence of statistics calculated to throw light upon this subject, we are constrained to ask, in what way such an annual drain upon the cotton lands of the South can be supported in all coming time? What answer does art or science give to this question? The soil loses thousands of tons of its most precious constituents of crops every year, and receives no equivalent in manure, potash, soda, and magnesia, or in ammonia and phosphoric acid. Without adequate restitution the impoverishment of arated fields is inevitable. But how can full restitution to all the cotton, tobacco, corn, and wheat fields of the United States be made?

It is important to show that individual farmers and agricultural societies can never accomplish this truly national object. So long as the inhabitants of Boston, New York, Philadelphia, Baltimore, and other cities, choose to waste the elements of fertility taken from the soil in breadstuffs and provisions, and necessarily sent to cities for consumption, what can the owners of impoverished land do to prevent them? Clearly the wheat grower of Michigan has no control over the flour sent from that State, whether it be consumed in New York, New England, or Old England. The farmer must export his grain and provisions, and the planter his cotton, tobacco, rice, and sugar, whether his fields suffer exhaustion or not. While American soil is thus parting with millions of tons annually of the atoms which alone secure fruitfulness to the earth, from what source, and by what agencies, is the equivalent of these exported atoms to be restored to the land that is barren, because it has lost them? It is not the cultivator that wastes the raw material of cotton, wool, grain, vegetables, fruits, and provisions. It is commerce, manufacturers, and the community at large, that place the elements of crops beyond the reach of the good husbandman. If the community, through its State and national legislatures, will do nothing to aid the farmer in giving back to the land its own elements of fruitfulness, restitution is impracticable. The same principle which secures to every one the quiet and peaceable possession of the acres to which he has a legal title, as a common right enjoyed alike by all, must be applied to the enduring fertility of these acres, in which every one that eats bread, or wears clothing, has an inalienable interest. The twenty-five millions of people now in the United States did not create, nor produce in any way, the natural fertility of the land which they are so rapidly exhausting, as the most trustworthy statistics demonstrate. It is right and proper for each generation to use all the natural resources of the earth; but for any one generation to destroy or seriously injure them, is a wrong of the gravest character and of inestimable magnitude. In twenty-four years from this time there will be fifty millions of inhabitants in the present confederacy to be supported, no matter how much we may injure the soil by taking every thing out of it and putting nothing back. The damage done to the arable lands in the present decade, from 1850 to 1860, will be at least fifty per cent. greater than was ever before inflicted in the same length of time. This result will accrue, because every improvement in tillage, husbandry, farm implements, railroads, river, lake, and canal navigation, furnishes increased facilities for robbing the subsoil as well as the surface soil of its elements of crops. Art and genius alike assist the cultivator to draw constantly on the subsoil for the raw material of cotton, grain, grass, tobacco, and roots. The certain and most obvious effect of this practice will be the impoverishment of the subsoil in a few years. Deep ploughing, and large crops sent off the farm, mean nothing more than deep sterility in the end. Such farming will build up cities, construct hundreds of railroads and thousands of ships, and erect numberless mechanic shops and manufactories; but it will certainly consume the natural fertility of a continent in the operation. There is but one way now practicable in which to escape such a disaster. The means already in use for the benefit of agriculture, important and valuable as they are, can never overcome all the difficulties in the way of universal reform. The evil is too deep-seated, and the wrong imposed upon the soil and posterity too little appreciated by the masses, for them voluntarily to adopt, as by a miracle, the proper remedy.

As a principle, founded in nature and sound morality, restitution is the offspring of modern science. When plants and animals grow, and gain in weight and substance, not an atom of new matter is called into existence; and when they die and rot, not an atom is lost or annihilated. Some atoms are scarce, like those of potash, soda, chlorine, magnesia, ammonia, sulphuric and phosphoric acids, in ordinary soils; others are abundant, like those of water, sand, iron, and alumina. Every product of farm labor is either a vegetable or animal substance, and is always formed of the same kind of atoms. Thus no other atoms than those of oxygen and hydrogen can yield the water, so largely consumed by all living beings; nor can any other substance perform the functions of water in the vegetable and animal kingdoms. The same remarks apply to carbon, nitrogen, and other constituents of crops. The science of agriculture consists mainly in the systematic study of atoms, and of the natural laws by which they are governed, as minerals, and as organized bodies endowed with vitality. The deeply interesting but occult phenomena of tillage and husbandry cannot be successfully investigated by common farmers with their present advantages, and therefore they need institutions designed expressly to develop new truths in agriculture, for the equal benefit of mankind. The want of such institutions is the true reason why rural sciences are exotics in the United States, and appear incapable of taking root in American soil. In all North America there is not one agricultural school; and yet there are men so hopeful and credulous as to expect agricultural sciences to yield a rich harvest before the

first seed is planted! All concede that knowledge is power in agriculture as well as in other callings; but when it is proposed to adopt measures to augment our knowledge of rural affairs, by more extended and critical research, that all may advance from things known to things unknown, which alone constitutes progress in wisdom and power, we are met by constant and successful opposition. We repeat the same common-place remarks in our agricultural books and papers a thousand times every year, because no legislature lends the least assistance to those who would gladly experiment for the advancement of agriculture. Weigh this great interest in all its bearings on other interests, and study its intimate association with the primary sources of fertility in land, and the various causes of infertility, and then say what better remedy than the increase of knowledge among the owners and cultivators of the soil can be suggested. All that the friends of agricultural education ask is, that the remedy which they propose have a fair trial before it is condemned and rejected. Certainly the systematic study of all agricultural phenomena can do no harm, and may be worth indefinite millions to the country, by saving the natural resources of our farming lands from needless waste and exhaustion.

It may be asked, what assistance in behalf of agricultural education ought Congress to render? It should establish an industrial university near the federal metropolis, partaking of the character of a normal school, for the thorough education of professors of the applied sciences, who are now needed in State institutions as teachers. Agricultural and mechanical schools of a high order would multiply rapidly if there existed the right sort of professors to serve the public, by the skilful union of mental culture and physical labor. Science may not do so much for the industrial interests as many expect; but let the application of science to agriculture and the mechanic arts have as much of government favor as has been extended for the application of science to naval and military operations. We have no agricultural text-books for the use of schools and private students; and there is not an agricultural museum in the United States. About six hundred million dollars are invested in live stock, which is susceptible of easy and valuable improvement. But before the science of breeding horses, dairy cows, beef cattle, hogs, and sheep can be generally known, farmers must have good text-books on comparative anatomy, natural history, and agricultural physiology; and before such text-books can be written in this country, a museum, illustrative of the organic structure of all domesticated animals, facilities for anatomical dissections and microscopic investigations, and a good agricultural library, are indispensable. Without an educational institution of a high order, at which teachers and authors may be qualified to discharge, in a creditable manner, their respective duties, we can never begin aright to study either agriculture or the mechanic arts. The intelligent farmers and mechanics want an industrial university to educate educators, that all that is valuable in science may be united with all that is useful in the industrial pursuits of civilized man.

Justice can never be done to the soil until all classes study, understand, and obey the laws of nature, in accordance with which they are to be abundantly fed and clothed at the minimum price in all coming time. Those that dwell in cities must fully appreciate the necessity of concentrating and deodorizing all fecal matters, that they may be sent, like

guano, a thousand miles, to recuperate the land from which such matters were extracted. So soon as the light of science is let in upon the popular mind in cities, villages, and rural districts, all will see that the pestilence of towns is the offspring of ignorance. Remove the deplorable ignorance that now darkens the human understanding in reference to the true sources of three-fourths of the diseases which afflict society, and they will be prevented by wise and timely sanitary regulations. Every acre of the twelve million acres under cultivation in the State of New York really needs five dollars' worth of manure a year. Here is a demand for sixty million dollars' worth of commercial manure in a single State. Why, then, should the rotting of vegetable and animal substances in the numerous cities and villages of that commonwealth be permitted to breed pestilence in a thousand forms? Thirty-odd persons died in two or three days in Rochester in the summer of 1852, from cholera, generated from rotting cabbages and codfish in the cellars of a small block of provision stores. Sixty years ago, when New York was subject to the yellow fever, Dr. Samuel Mitchell wrote the letter from which the following is an extract: [It should be stated that Dr. Mitchell was secretary of the first agricultural society established in New York in 1791, and that he is treating of the importance of azote or "septon" (now called nitrogen) as a constituent of agricultural plants.] "American municipalities had rather offer a yearly sacrifice of hundreds of citizens to the demon of pestilence than make the most easy and obvious of all public provision for washing away such pollution. I have often thought the sixth labor of a great deity of antiquity very applicable to the considerable towns in the United States, which may be considered as so many Augean stables, requiring the waters of a river to be poured through in order to cleanse them."

Again, he says: "Neatness and elegance are thus found to be as conducive to good health as to good husbandry. On considering the matter it appears that the effluvia from the neighborhood of dirty cottages and mean huts, in the country, are of a like nature with the pestilential fumes which insinuate themselves into foul and unventilated tenements in cities; and the reason is apparent: wherefore, as penury is generally associated with ignorance and nastiness, and often with indolence, these distempers rage with such tremendous violence among the poor.

"When I see a farmer permit such unwholesome substances to collect around his habitation, I cannot help reflecting on the danger which awaits him. The manure, which ought to have been carried away and spread over his lots, serves, as it lies, but to make his family sickly, to disable his laborers, and lead him to the dubious and expensive routine of physic; and as in common life, as well as in logic, one blunder leads to another, the want of crops, and the consequent failure of income, drive him to mortgages, judgments, and executions—those fatal expedients of the law.

"In like manner do I lament the indiscretion of tenants contending in our cities which of them shall obtain, at a high rent from the distant landlord, *a pestilential stand for business!* With the view of bettering themselves they venture, at all hazards, amidst the poisonous exhalations of the neighborhood. By and by they are visited with distempers; and as they are honest and sober citizens, having no uneasy consciences to reproach them for their sins, they piously consider the infliction as a

monition from Heaven to try their virtue. Their sense of constancy and firmness forbids them to fly from the scourge of the Lord; and thus they religiously stick to the infected spot! What is the true interpretation of such conduct, but that both the farmer and the trader, *obstinately persisting in the means of self-destruction*, are guilty of a sort of suicide?

"It is a fact long ago established, that great cities are the graves of the human species. It is a truth of almost equal importance, that the foul habitations of country people are nurseries of pestilential distempers."

In vain have medical men preached the above doctrines for three-fourths of a century. Habits stronger than a love of life prompt the citizens of this free land to persist in desolating the earth, and accumulate the elements of pollution, sickness, and premature death in all American cities. To remedy the evil, something more must be done than has ever yet been attempted. Municipal, State, and national legislation must initiate the needful reforms, or no reforms will ever be realized. Three years ago, when the writer took charge of the agricultural department of the Patent Office, he begged permission to expend two hundred dollars in experiments designed to ascertain the best way to deodorize and concentrate night soil, that it might be put up in bags and sent far into the country for agricultural purposes; but not a dollar could be had. To expend $100,000 in printing, binding, and distributing through the mails, a book on agriculture, and at the same time refuse two hundred dollars for the most valuable information within our reach, to put into the book, seems like being penny wise and pound foolish.

The Royal Agricultural Society of England has offered a premium of a thousand pounds for the discovery of a manure equal to guano in strength, that can be manufactured and sold in large quantities, at five pounds, or twenty-five dollars, a ton. This liberal bounty shows that the subject is yet in the dark in England, and that the science of manures is deemed worthy of critical research and study. If it be so there, how much more so in this country, where the fruits of agriculture are not consumed near the fields that produce them, but exported by millions of tons, in cotton, sugar, tobacco, corn, wheat, rice, and provisions? Irrespective of all crops, a year's tillage injures the soil in the United States, and especially in the planting States, at least twice as much as it does in Great Britain. When the plough, hoe, and cultivator stir the vegetable mould in cotton culture nine or ten months in twelve, the mould is largely consumed, just as the organic elements of a manure heap are rapidly wasted away by the frequent turning and stirring of the mass while exposed, as all tilled lands are, to alternate rains and sunshine. Twice the quantity of rain falls in the southern States in the course of a year that falls in England, and it falls in one-third the time. It is not so much the atoms removed in crops, as those washed out in solution, or suspended in water as fine mud, that impoverishes the arated fields of the planting States. Southern agriculture is not at all understood out of the States where it is practised, nor is it so closely studied in those States as it ought to be. Agricultural meteorology and engineering deserve far more attention, not only at the South, but in every part of the country, than they now receive.

The farms in the United States contain over 300,000,000 acres, on every square foot of which there falls an average of 200 pounds of water, or more, per annum. Wisely husbanded, this immense quantity of rain-

water may render the farmers and gardeners a vastly greater service than it now does. Skilful engineering has yet to be applied to American agriculture, with a view to make the most of steam power, water, fuel, earth, rocks, air, sunshine, and vegetable and animal vitality. Never was there opened up a field so inviting and boundless for the successful employment of capital, learning, labor, talent, and genius. We have a continent for the basis of agricultural operations, embracing climates, and physiological and material resources, equal to the wants of a thousand millions of prosperous and happy people.

With such unlimited wealth, it is painful to contemplate the fact, that we so misapply our physical and intellectual energies as needlessly to impoverish the land in every State and Territory of the republic. Tennessee contains 28,160,000 acres, of which, according to the census of 1850, only 5,175,173 are "improved land." These figures show that there is a wide range for stock in that State, outside of improvements as well as on them; and, consequently, that we may expect to find a large increase of neat cattle in the Commonwealth from 1840 to 1850. So far, however, is this from being true, that, like New York, Tennessee is forced by the exhaustion of her soil to keep fewer cattle in 1850 than she did in 1840. At the latter period the State returned 822,851 head. In 1850 the number was reduced to 750,765. Decrease in ten years, 72,086.

The people of Tennessee have been engaged fifty years in exporting the few available atoms which a beneficent Providence placed in the surface of their lands, in the shape of grain, tobacco, live stock, and provisions. Probably not one hundred tons of manure of any kind were ever imported into the State to balance the account with the soil. Hence its constant deterioration was inevitable.

Kentucky contains more acres of improved land than any other State except New York, and more than twice as many as Tennessee. It is a remarkably fine grazing and corn-growing State, having a great deal of naturally rich limestone land. Acres under improvement in 1850, 11,368,270. Number in the State, 24,115,200. Acres of unimproved land, 10,972,478. These figures are interesting, as showing that more than nine-tenths of the whole area of Kentucky are covered by farms. There are embraced in improved and unimproved land, 22,340,748 acres of the 24,115,200 in the State. Fertile as much of the soil of Kentucky naturally is, it is unable to endure without serious detriment the American system of tillage and husbandry. Instead of increasing their neat stock with the increase of acres subdued for pasturage and tillage, the number decreased from 1840 to 1850, 33,786. In 1840 it was 787,098, and in 1850, 753,312.

Horses and mules are largely reared in Kentucky for exportation to the cotton and sugar-growing States; and one might suppose that, instead of rearing neat cattle, mules and horses had taken their place. Such, however, is not the fact. In 1840 there were 395,853 horses and mules in the State; in 1850, 381,291. Decrease in ten years, 14,562.

While the owners of the land in Kentucky are enriching all who are engaged in trade, inland and foreign commerce, by unprecedented draughts on the soil, they forget that their own children and grandchildren must suffer an almost irreparable injury by their folly.

An intelligent wheat-grower in Wisconsin writes to the agricultura

department, that lands which have been cultivated only twelve years in that newly-settled State now yield but half the number of bushels per acre which was obtained at the beginning. Other farmers equally entitled to our confidence corroborate this important information. Extensive corn-growers in Indiana say that river bottoms that once produced from sixty to eighty bushels of corn per acre now yield only from thirty to forty. It is much to be regretted that the census of 1850 did not give the number of acres devoted to the production of each of the great staples, as a means of instructive comparison hereafter. If there were not room in the blank schedules without extending them too far, then the almost vacant column that contains the few pounds of hops grown in the great cotton-producing States, would have sufficed to set down the number of acres planted in cotton in every county, district, and parish at the South. It would have been infinitely better to remain ignorant of the pounds of beeswax made in the United States, if need be, than of the number of acres cultivated to produce 592,141,230 bushels of corn.

These suggestions are made not in a spirit of fault-finding, but solely with a view to encourage State legislatures to do more than they yet have for obtaining reliable agricultural statistics. The writer drew up the bill and schedules for taking the agricultural part of the census of New York in 1845, and he has labored many years to persuade both statesmen and the masses that something more ought to be done for agriculture than has yet been attempted in this country. The public interest demands that reliable statistics be obtained in reference to what the soils of the several States really possess of the indispensable elements of crops, which are available for agricultural purposes. If this were done, it would doubtless be found that some lands have a surplus and others a deficiency; and that by removing the surplus elements of fertility from exceedingly deep and rich soils to such as are comparatively thin and unproductive, the latter may be greatly and permanently improved without sensible injury to the former.

In the Report from this department in 1850, we endeavored to call public attention to the advantages of a critical study of soils, for it is believed that their positive resources have been sadly neglected and are not generally understood. Our agricultural statistics and practice are alike imperfect and deceptive, and nothing but appropriate legislation by Congress and State legislatures can save the farming lands of this continent from being made poorer than the poorest old field in any State at the present time. Ten million laborers will soon be at work under our equally progressive and destructive policy in the production of crops, whose elements will be wasted in cities and villages. Before the close of the present century, this country will doubtless contain one hundred million inhabitants; and as we educate the children who are to bear rule twenty-five and perhaps fifty years hence, so they will act either to improve or desolate the farming lands of the republic.

If agricultural sciences are never taught in the United States and never properly studied, how is it possible for them to be understood? Without qualified teachers, without text books, without agricultural schools or agricultural statistics worthy of the name, and without popular sympathy, how is a change to be effected for the better? Thirty years ago we thought that agricultural education would soon be popular; now we believe that one or two generations must live and die before we shall fairly begin to investigate the true principles of farm economy. If four-fifths of the elements of fertility contained in the residue of the food consumed by the twenty-five millions of people in the United States were restored to the land, the gain to the latter beyond what it now receives would be equal to one hundred million dollars a year.

That the health of all cities, and sound farm economy, alike demand such restitution of all fecal matters, is denied by no one. But so long as indefinite millions of acres of rich virgin lands, over which no plough has ever passed, are accessible to all, few will incur the expense of making adequate restitution to the soil as a duty. Hence the science of tillage and husbandry will long be neglected on this continent, while the inventions and advancement of rural arts will continue, and enrich the present generation and one or two succeding ones, by creating a barren territory for all that may come after them.

Population in cities will continue to increase twice as fast as it does in farming districts, simply because the treasures of the land will be transferred to commercial and manufacturing towns, there to be consumed and wasted. American statesmanship has adopted a system of political economy which renders full and perfect restitution to the soil impossible so long it shall prevail. This statesmanship, which ignores the very existence of agricultural science, and repudiates all its teachings, costs the country three hundred million dollars a year by the needless destruction of its agricultural resources. All power seeks to perpetuate itself, and therefore it is not to be expected that the systematic study of agriculture will be encouraged during the last half of the present century. If the best informed men in the country will do nothing to foster agricultural science, it is folly to pretend that men less informed will do any better in that behalf. So long as American statesmen shall lack both foresight and forethought in all that relates to the planting, farming, commercial, and manufacturing interests of the United States, the soil on which their interests rest for their enduring support will lose all, and gain nothing but desolation. If it were possible to persuade State legislatures to give a true statistical account every year of the number of acres under tillage, and in meadows and pasturage, and the products of each, additional evidence would be furnished corroborating every statement which we have made respecting the ceaseless drain upon one hundred million acres in this republic.

AMERICAN AGRICULTURAL LITERATURE.

BY DANIEL LEE, M. D.

There are more agricultural journals published in the United States than in all the world beside. This is a pregnant fact, and one that promises future achievements in rural literature which no other nation is likely to equal. In fifty years this republic will contain one hundred million inhabitants, all speaking and writing a common language, and enjoying all the advantages and blessings of popular education, in an unprecedented degree. Then, as now, three-fourths of the people will be happily engaged in agricultural and horticultural pursuits. What, then, is likely to be the most prominent, interesting, and commanding feature of American literature? What other department of human knowledge presents so many points of attraction to the popular mind in all the States as the knowledge that relates to tillage, husbandry, fruit culture, rural literature, and sciences? As an intellectual employment, the field to be cultivated is almost unlimited, while the harvest that may reasonably be expected far transcends, in dignity and importance, anything which the world has ever witnessed.

Hitherto, educated men have strangely overlooked the wealth that lies on the very surface of American soil, in its vegetable and animal products. Such, however, is the keenness and activity of American intellect, that every branch of agriculture and horticulture will, ultimately, have its text books, its special schools, its professors, its museums, its science, and its literature. This division of labor is indispensable to advance any department of the most comprehensive of all professions. Let a gifted mind concentrate all its powers on one object, and the chances are greatly increased that the end aimed at will be attained. The climates of the several States and Territories between the Atlantic and Pacific oceans are so various that they secure to agriculture and horticulture almost the widest possible diversity of employment and study. All tastes, and every grade of talent, may find fitting and congenial associations. In this circumstance, coupled with a common and earnest effort to improve, may be seen the elements of universal success.

Among the early cultivators of agricultural literature in this country, the name of Robert R. Livingston, of New York, long distinguished as chancellor of the State, deserves honorable mention. Mr. L. was over twenty years president of the first State society for the promotion of agriculture in New York, which was organized in 1791, and supported till after the death of the chancellor in 1813. In point of literary and scientific merit, the papers of no other society in the United States connected with agriculture excel, if they equal, those published by the one over which Mr. Livingston presided with so much dignity and usefulness. To Pennsylvania is due the honor of originating the first agricultural society after the Revolution established in this country. It was founded in 1785, and Judge Richard Peters was its president and most active promoter

and patron. In 1792, a similar association was formed in Massachusetts; and we believe, soon after, a society, having the same object in view, was called into existence in Connecticut. We have not the transactions or records of any of the societies founded in the last century, (nor the time to do them justice if we had,) except that of New York. On another occasion we shall endeavor to bring before the present generation of agricultural readers the merits of the home correspondents and agricultural compeers of the illustrious Washington. As agriculturists, the great men of the Revolution and the authors of our present incomparable constitution deserve far more consideration than they have hitherto received. Although not learned in the technicalities of modern sciences, nor thoroughly educated in literary attainments, yet no men of any age ever had a clearer perception of the wants and interests of an agricultural people, or labored more faithfully to elevate the calling and improve the condition of the tillers of the soil. Washington and his compatriots were too far in advance of the masses and public opinion to be duly appreciated as agricultural writers; and the public duty devolves on us, their posterity, to bring out their many excellences, that the world may know what they thought, and said, and did, in behalf of American agriculture. We know not how to promote the great farming interest better than to appeal to the united testimony of the founders of our republican institutions, and the fathers of our first agricultural societies. If the statesmen and sovereign people of this day will not regard the teachings of the wise men of the last century, and of the first quarter of the present, no arguments drawn from recent history are likely to be more successful.

Robert Robert Livingston was born in 1745. The family of Livingston is a very ancient and respectable one in Scotland, "distinguished for its numbers, opulence, talents, Christian virtue, and attachment to liberty." That branch of the family which came over to this country emigrated about 190 years ago. On their first arrival, there were but two heads of families, an uncle and a nephew, from whom have descended the numerous persons bearing the name of Livingston in the United States. In the first American Congress, which sat in Philadelphia, Robert R. Livingston was a member, and a distinguished advocate of an immediate declaration of independence. By his education, talents, wealth, and position in society, Mr. L. gave to the cause more than a common support, and was wisely selected as one of the immortal committee to draught the declaration which separated the Thirteen Colonies forever from the crown of Great Britain. Mr. Livingston was chairman of the committee that draughted the first constitution of the State of New York, to the excellences of which that prosperous Commonwealth owes much of its wonderful success and present unequalled wealth, population, and greatness.

George Clinton, the first governor of New York after the Revolution, was a working member of the agricultural society under consideration. The distinguished Dr. Samuel Mitchell was secretary, and contributed several valuable papers to its transactions. John Jay, Ogden Hoffman, Philip Van Cortlandt, Simeon De Witt, Samuel Jones, Ezra L'Hommedieu, Jeremiah Van Rensselaer, and many more of the most talented men of the 18th century, appear by their names as members, or in the act of incorporation. They had read Roman history, poets, and orators with care; and they admired the sentiment of Cicero, a name synony-

mous with eloquence itself, who declared that "of all pursuits, none is better, none more productive, none more delightful, none more worthy a freeman, than agriculture." Rome saw her best days when such practical farmers as Cincinnatus and Cato were honored with the confidence of the people, and the farmer of Clermont, on the Hudson, next to the farmer of Mount Vernon, on the Potomac, did most to foster a taste for rural literature and occupations in the young republic, for which they jeoparded so much, and labored so long, and so successfully. Chancellor Livingston administered the first oath to the first President of the United States; and at the conclusion of the solemn ceremony, he pronounced, "Long live George Washington," declaring as the oracle of Heaven, "that Washington should forever live in the hearts of his countrymen."

Mr. Livingston was the first to introduce the use of gypsum, or plaster of Paris, as it was then called, into the United States. He was a liberal importer of Merino sheep, improved Durham neat stock, and of many valuable seeds. When Mr. L. and his associates began their organized efforts in behalf of an improved system of tillage and husbandry, New York was the fourth State in the Union in population; and its cultivators were emigrating out of it because the old farms were "worn out." In the twenty years that intervened between 1790 and 1810, when this State society was in active operation, her truly great men, co-operating under a charter, made New York the most populous State in the Confederacy. Instead of losing by emigration out of the State, its farmers were made so prosperous by the diffusion of agricultural knowledge, that thousands and tens of thousands of immigrants from New England on the east, and Pennsylvania on the south, came and settled upon the soil of the Commonwealth, whose statesmen appreciated its value, and labored to improve its cultivators. The same enlightened policy led to the construction of the Erie canal—a work projected before the death of Chancellor Livingston, although not commenced till 1817. If the agricultural history of New York were fully and properly written, it would be one of the most instructive and useful books that could be placed in the hands of the American people. It was the farmer of Clermont who expended many thousands of dollars in France and on the Hudson, in experiments, before he and Fulton got a steamboat to operate successfully. This educated, scientific farmer was too deeply engaged in practical operations to write much for the instruction of posterity. In 1796, he applied to the legislature for exclusive privileges in the use of steam on the Hudson river in case he was successful in the construction of steamboats. The liberal education of farmers in this country has ever been attended with useful results; and the historical evidence of this fact may rightfully be considered as a part of our agricultural literature.

After the British had burnt the village of Kingston, the farmer of Clermont gave the distressed inhabitants five thousand acres of valuable but uncultivated land, to aid them in rebuilding their town. Generous feelings and noble sentiments should be cultivated as well as the soil. It is an exceedingly short-sighted policy that prevents the establishment of agricultural colleges and schools in the United States. Sixty years ago the secretary of the New York State Agricultural Society discovered the importance of azote or ammonia as one of the constituent elements of plants. Although the fact was published at the time, as a matter

worthy of the attention of all farmers, and the inhabitants of cities and villages, who are so often poisoned by the pestilential effluvia generated by the decomposition of manures and other vegetable and animal substances, yet the information attracted no notice until Liebig wrote a small book on the subject, about ten years since. One hundred thousand copies of Dr. Liebig's speculations on the growth of cultivated plants have been printed and sold in this country, while the more correct views of Dr. Mitchell, written and printed before Liebig was born, have received no consideration whatever. We all neglect, and too often repudiate, the rural science and literature of our own citizens as worthless, and receive as law and gospel in agriculture the hastily-formed opinions of foreigners. It appears to be easier to adopt the notions of other nations, whether right or wrong, than to think, study, and reach the truth by original investigations of our own.

On page 41 of the first volume of Transactions, Mr. Livingston makes the following statement:

"May 20, 1791.—I received a piece of flax, about half an acre, sown by a poor tenant, very injudiciously, on a dry, sandy declivity; it looked (as might be expected) extremely sickly, and, as it was evident that it had not sufficient stamina to sustain the heat of summer, he proposed ploughing it up. I took upon me to be its physician, and prescribed three bushels of gypsum, to be taken the next morning while the dew was on the ground. I sent him the dose, which was faithfully administered, and I had the satisfaction of seeing him gather more flax from this half acre, notwithstanding the uncommon drought of the summer, than any acre in this neighborhood afforded.

"N. B.—I borrowed this hint from Mr. William Cockburne, who had experienced the beneficial effects of gypsum on flax."

To "borrow" useful knowledge never impoverishes the lender; therefore it is that the wisest men are able to lend and borrow the most valuable information. Dr. Elliot, of Connecticut, in the last century experimented in feeding hogs on dry corn and corn soaked in water. The latter was found to be much the better way, in an economical point of view. This and many other useful suggestions are given to the public in his essay on husbandry. We can now add, from recent experiments, that boiled corn is better than soaked, or ground and not cooked.

Under the heading "The manure of leached ashes," Mr. L'Hommedieu says: "Ten loads of this manure on poor land [on Long Island] will produce ordinarily twenty-five bushels of wheat, which exceeds by five dollars the expense of the manure; the five dollars pays for the expense of labor in raising the crop. The land is then left in a state for yielding a crop of hay of between two and one and a half tons per acre, which it will continue to do for a great number of years. In short, no manure has been found as yet to continue so long in the ground as leached ashes."

One of the best articles on the tarring of seed-corn before planting and rolling it in plaster or ashes was from the pen of James G. Graham, esq., and read before the Society, February 28, 1798. He calls particular attention to the still common error of tarring dry corn, which has the effect to exclude moisture when planted, and of course prevent the germination of the seed. Seed-corn should be soaked before it is coated

with either cold or warm tar; and it should be immediately planted in fresh earth. To dry again, either before or after planting, affects injuriously the vitality of the germ. Tar protects the seed from the attacks of grubs and worms, birds, squirrels, and mice.

A well-filled volume of a thousand pages might be compiled from contributions to the agricultural literature of the United States in the 18th century, showing that the farmers of the Revolution, their fathers and grandfathers, were in no respect the inferiors of men of their class in any other nation. Under date of April 28, 1797, Noah Webster gives an interesting account of his success and experiments in growing potatoes. To form the most perfect tubers, he says that potato hills should not be less than four feet apart, especially where the soil is rich and the tops or vines spread much. L'Hommedieu's description of the Hessian fly, showing that two generations are produced in a year, has never been essentially improved, although written over sixty years ago. The most serious defect in our present rural literature is an excess of agricultural papers, and the too voluminous records of the proceedings of State and county agricultural societies. The popular taste is vitiated and cloyed by a superabundance of the chaff and parasitic fungi of science, while the pure grain and nourishing bread, needed by all, are forcibly driven out of the market. Quacks in agricultural science and literature, and speculators in farm implements, manures, neat stock, sheep, swine, seeds, and fruit trees, are reaping a rich harvest. Notwithstanding these drawbacks, agriculture is advancing faster than ever before, so far as the production of crops, domestic animals, fruits, and dairies is concerned. But we do not hesitate to express our belief that agricultural sciences are less cultivated now than they were thirty years ago. The popular mind is so taken by the showy flash exhibitions of mere pretenders, that scores of the best men in the country, whose attainments, properly directed, would qualify them to instruct the millions aright, have ceased to labor for the benefit of an unappreciating public. The friends of popular education, and of the best possible agricultural books, should discriminate between truth and error, selfishness and patriotism. Agriculture demands the services of men who are not only learned in the natural sciences, but skilled in the art of teaching them to uneducated laboring persons. In place of a sound and profitable agricultural education, young farmers are taught to grasp and attempt to comprehend the most recondite problems in geology, chemistry, vegetable and animal physiology, at the beginning of their professional studies. The intellect of the masses is overtasked at the outset of its labors, and it soon becomes discouraged, and ceases to make an effort to master sciences which appear perfectly incomprehensible.

Wise and valuable professors of the principles of tillage, farm economy, agricultural engineering and physiology, have yet to be educated in this republic. The truth of this remark cannot be seriously questioned, and the only debatable point is the length of time we ought to wait before the principles of agriculture shall be publicly recognised as worthy of systematic study in schools adapted to the teaching and learning of the same. Shall the owners and cultivators of American soil wait twenty-five, fifty, or one hundred years longer, before the first agricultural school or college is founded on this continent? This is really the only literary agricultural question before the public at this time; and until it is decided either for or against a systematic effort to increase our professional knowledge, advancement in rural sciences, except by accident, is impracticable. Hence, in the fifty new volumes on agriculture yearly furnished by State and county agricultural societies, agricultural journals, Patent Office reports, horticultural reviews, and book publishers in cities and villages, one searches in vain for enough that is new to fill six hundred pages octavo. Important original researches are nowhere prosecuted, so that the discovery of new truths is neither expected nor made. Under such a state of things, how is it possible to enrich our rural literature by additions to our present stock of professional knowledge? We may all repeat what little we really know a million times each, and leave the sum total of knowledge just as we found it. Progress implies an advancement from things known to things unknown—an addition to the aggregate wisdom of the world. Of the true principles of tillage and husbandry the world is profoundly ignorant, and the evils resulting from this ignorance are increasing in this country faster than population increases. We suggest not merely the manufacture of fewer works on agriculture, but the expenditure of more time and money to develop new and useful facts, to be printed in these works for the instruction of their readers.

Among the most valuable published, the eleven annual volumes issued by the present New York State Agricultural Society deserve particular commendation. The first dates no farther back than 1841, and the last received is for the year 1851. Whatever is valuable in northern agriculture, as now practised, is plainly, truthfully, and copiously set forth in the transactions of this State institution, which is as wisely as it is liberally fostered by the legislature. The Society has availed itself of the scientific labors of Professor Johnston, of England, who delivered a course of lectures at Albany; of Professor Norton, of Yale College; of Professor Emmons, State geologist and agricultural chemist; of Dr. Salisbury, of Albany, chemist to the Society; and of hundreds of educated farmers in that large and populous Commonwealth. Our limits forbid the making of extracts from any of these eleven volumes, a majority of which approximate a thousand pages each. That for 1851 contains the elaborate and instructive report of B. P. Johnson, esq., the distinguished secretary of the Society, to the Governor, on the great London Exhibition, to which Mr. J. was sent as the commissioner to represent the State of New York. His report fills nearly two hundred pages of the eleventh volume.

The agricultural societies of Massachusetts have contributed largely and creditably to the rural literature of the United States. To do justice to these comparatively old and energetic associations, one needs to devote the labor of a year to read, compare, collate, and condense the valuable matter contained in many volumes. If all that is most worthy of study and preservation were printed in one book, it would deserve a place in the library of every farmer in the country; and we respectfully invite the attention of Boston publishers to the opportunity of getting out one or two volumes on the agricultural literature of Massachusetts, which would command an extensive sale out of that State and New England. The wants of reading farmers in most of the States are now quite indifferently supplied; and agricultural books of real merit would pay well for their publication.

The State societies of Ohio, Michigan, and Wisconsin are printing annual volumes of their transactions, which contain much valuable information. The spirit of improvement is fairly aroused in the West, and Indiana, Illinois, and Iowa will soon be in a condition to issue each an annual volume. The Southern Central Agricultural Society of Georgia has published one volume, and a continuance of the work is confidently expected. It has long appeared to the writer that an associated effort should be made by the three hundred agricultural societies in the United States to cultivate and improve the rural literature and science of every State and Territory, for the honor of the agricultural profession. An attempt has been made to realize this wish by the organization of a United States agricultural society, having for its basis all State and county institutions for the promotion of agriculture. How far this national society will fulfil the intentions of its founders depends entirely on its future management. An error has been committed in putting the price of its quarterly journal at two dollars per annum. Several attempts have been made by men of capital, talent, and business capacity to establish agricultural periodicals at prices above a dollar a year, but they have all signally failed. The journal of the United States society may be supported by donations from patriotic motives, or by aid from Congress. This, however, is to destroy its independence of character and influence. It should rely not on a few rich men or government for support, but on several hundred thousand working farmers, members of the society. At two dollars per annum, not two thousand *bona fide* subscribers can ever be obtained and kept two years in succession. A journal of so limited a circulation will be nearly powerless for any purpose of public utility. In a nation that has some millions of farmers, a work has little claim to popular favor or nationality which costs twice as much as a majority feel able to pay, or one in a hundred is willing to pay, for it. Reading farmers have many local journals, State and county societies to support; and, therefore, the number that will permanently give two dollars a year for a national work is comparatively small. By attempting too much, we often fail to accomplish the good which is clearly within our means and reach.

II.

AMERICAN POMOLOGY.

At the second session of the American Pomological Society, held in the city of Philadelphia in September, 1852, several valuable papers were read, being reports of committees from different States; so much of which as our limits will permit are copied, that the useful information therein contained may have a much wider circulation.

The communication of Mr. H. F. French, of Exeter, New Hampshire, on the same subject, written for this Report to Congress, is given as an introduction, and indicates many of the advantages to accrue from the extension of fruit culture in the United States.

NOTES UPON FRUIT GROWING IN NEW HAMPSHIRE.

He would have been a bold man who, even ten years ago, had prophesied that *fruit* would one day become a principal source of wealth to any part of New Hampshire, as bold as he who, but a few months since, ventured to announce that *caloric* would ere long supersede *steam* as a motive power. Both these strange events, however, seem already near their consummation.

In the present year, 1852–'53, it is a fact beyond controversy, that many towns in the county of Rockingham have received more money in exchange for their surplus product of *apples* than for any other article raised upon their farms.

The fact that this is the most profitable crop which can be cultivated among us, is well understood, and the only apprehension is, that the supply may exceed the demand. It is a fair estimate in this part of the State, that ten barrels of winter *apples* will generally sell for as much money as a ton of the best *hay*. *Hay* has been considered, for many years, the most profitable crop that can be raised for sale in this section of the State, and it has borne a price, for the ten past years, not upon the average above ten dollars per ton.

Mr. Robert F. Williams gathered from an orchard of *one acre only*, the present year, from grafts set in the year 1849, in very old and decayed trees, *two hundred barrels* of first-rate Baldwin apples. This statement is more valuable as showing how readily old trees may be changed from producing worthless fruit to the production of that which is of the best quality, than as giving evidence of a remarkable product.

To show how long a time is required to bring trees from the nursery into bearing, I will give another statement, which is about a fair example of the success of good cultivation among us.

John A. Lowe, esq., of Exeter, set sixty trees about three years from the bud in his orchard in the spring of 1843, and forty more in the fall

of the same year. They bore a few apples in 1847 and 1848. In 1850, he gathered six barrels; in 1851, twenty-one barrels; and in 1852, fifty barrels of fruit of the best quality.

A writer in the New England Farmer states that he knows "an orchard of *forty* Baldwin apple trees that yielded more than three hundred barrels of fruit of the best quality the past season, and about the same quantity in the season of 1850."

He says, further, "the ground about these trees has been kept in a perfectly pulverized state for half a dozen years or more, and manured like a garden." It should be borne in mind, however, that the Baldwin usually produces only every other year.

It would be a fair estimate that fifty trees, which would stand upon an acre at the distance of about thirty feet apart, would produce an average annual crop of sixty barrels of apples, worth at least sixty dollars. It is not uncommon to see a single tree bear ten barrels of fine apples, and instances have occurred where *sixteen* barrels have been gathered at once from a single tree. At the lowest rate of product that any man in his senses, who has ever properly cultivated an orchard in this county, would estimate as a common crop, an apple orchard will give *four times* as much profit as the same quantity of land in grass for hay, with less cost of cultivation.

With these remarks, as to the profit of the apple crop, I will proceed to other considerations. By way of apology to those who have given attention to this subject, and who will find nothing new in my suggestions, it may be proper to state that, abundant as fruit is in some parts of our State, in other parts no attention has been given to its cultivation. Indeed, apples are carried every year from Boston market fifty and even a hundred miles into New Hampshire, and sold at double the price of their first sale by the producer, because the demand can be met at no cheaper rate. In the greater part of the State, indeed, I suppose there is nothing like a supply adequate to the home consumption.

In the Patent Office Report for 1849, in an article on this subject, I gave some directions for *planting and cultivating* orchards. I shall pass over that topic at this time, with the remark, that the same manuring and working of the land which is bestowed usually in this State upon the cultivation of the corn crop is sufficient for an apple orchard. Indeed, my own practice has been to plant my orchards with corn and potatoes as if no trees were there, until the apple trees shade the land so that nothing else will grow, and then to plough and harrow the land once a year, applying about ten loads of compost to the acre, and letting the land lie fallow. No orchard kept in grass will flourish; and it is said, on good authority, that small grain, especially *rye*, has an extremely injurious effect upon fruit trees when raised among them.

VARIETIES OF APPLES FOR THIS LOCALITY.

For reasons which are not easily understood, the apple seems extremely sensitive to changes of climate. A variety which thrives well in New England, often fails in New York; while the favorite apple of

New York, the Newtown Pippin, cannot be raised in our part of New Hampshire.

A different list is therefore necessary for each locality, to be determined upon by careful observation of the actual success or failure of each variety.

In planting an orchard, regard should first be had to *home consumption*, so that the best variety of each *season* may be produced, and not a profusion followed by a famine.

I have, with some care, prepared a list of apples which have been proved in this county to be good bearers and of good quality, and which will probably, with such additions as every man will make, of two or three varieties from the *old homestead*, which taste better to himself than to any body else, be found a sufficient variety for all useful purposes. Except to the mere amateur, a great variety is a source of great trouble and little profit. Such an assortment as will supply the dessert and the kitchen through the whole year with the best varieties, both sweet and sour, and which comprises the best that can be profitably grown in this portion of the country, I have endeavored to include in my list.

For the *market*, unless for a mere market man, who sells daily, the less *kinds* of apples one raises, the more profitable. A single bushel of the best fruit will scarcely pay the trouble of selling, especially if it be not of a well-known variety; while a hundred bushels of Baldwins or Boxbury Russets will entice a fruit-dealer from Boston the whole length of our State, for the privilege of buying them in the cellar of the producer.

I have placed against each name the season at which the fruit may be considered fit for use in this locality. The same fruit is earlier as raised further south.

1.	Sweet Bough	August.
2.	Williams	August.
3.	Porter	September and October.
4.	Gravenstein	October.
5.	Minister	October to January.
6.	Calef Sweet	October to January.
7.	Hubbardston Nonsuch	November to January.
8.	Rhode Island Greening	November to February.
9.	Baldwin	November to March.
10.	Boxbury Russet	December to July.
11.	Green Sweet	December to July.
12.	Red Russet	December to July.

For orchard culture for the *market*, the last seven upon the above list, having been long tested in this part of the State, are recommended with confidence.

The Calef Sweeting originated at Kingston, New Hampshire, on the farm of a clergyman whose name it bears. It is well known in this region, and has found a ready market wherever offered. It is of about the size and form of the Baldwin, of a whitish-yellow color, a great bearer, and the very best *baking* apple known to me. Were not the character of this fruit established by the opinion of some of the best judges of fruit in the country, I should not dare to place it, all unknown to fame as it is, upon my list.

The *Hubbardston* is perhaps the most beautiful apple that grows, and in this instance "outward beauty is an index of inward good." Being

an *early* winter apple, it comes into the market in competition with the fruit from New Nork and New Jersey, and can therefore never bear the highest price.

Of the *Rhode Island Greening*, the same remark may be made; as its name indicates, its *home* is a little south of us. It is one of the principal market apples of Rhode Island, New Jersey, and New York.

The *Baldwin* stands decidedly at the head of market apples, thus far, in New Hampshire and Massachusetts; indeed, I think *one-half*, at least, of all the fruit sold from Rockingham county is of this variety. It is a fine grower, an enormous bearer, principally in the *even* year, and it is in eating from November to March, and even to May. In the northern part of this State, and in Maine, it is said that the young trees are liable to be winter-killed. The Baldwin is a native of Massachusetts, and seems impatient of removal far from its home. At the West it is affected with bitter rot. Further south it becomes an autumn apple.

The *Roxbury Russet* is an old, well-known variety. It requires good soil and high cultivation. Properly secured, it keeps until July, as it has as yet no competitor, at the end of the season, in Boston market. The *Red Russet*, it is thought, may eventually supersede it.

The *Green Sweet* is not named by Downing or Cole. Thomas speaks of it in favorable terms, and it has been long cultivated here. I find it recently coming into favor among judicious cultivators, who are producing it largely for the market. It is a great bearer, hardy, and keeps till June. For baking, in the spring months, it is very valuable. For feeding stock, I think it will prove the best variety known.

The *Red Russet* originated in Hampton Falls, and appears to be allied both to the Baldwin and Roxbury Russet, partaking of the good qualities of each. It grows well and bears as bountifully as the Baldwin, and keeps two or three months later. It has been raised long enough to be thoroughly tested in the neighborhood of its birthplace, and is thought by many of the "knowing ones" to be the most profitable of all for cultivation for the market.

Of the *Northern Spy*, which I have omitted in my list, because it has not been sufficiently tested in this region, I may say that it seems to me to be a larger, handsomer, better flavored, and later-keeping variety than the Baldwin. Large numbers of young trees of that sort are growing about us, and seem thrifty and hardy, and fine specimens of the fruit have been produced upon them. Whether it will prove a good bearer, remains yet to be decided. If it should produce fair fruit abundantly, it would take the lead in our orchards at once. I regard this as the only New York variety which can compete with northern fruit in our own market.

Apples for Stock.—No accurate experiments have been tried by which the value of apples for cattle and swine has been ascertained. This, like so many other important agricultural questions, has been left to be guessed out by Yankee shrewdness.

Most observing men believe now that apples of all kinds are valuable for milch cows and swine. The general impression is that *sweet* apples are, for such purposes, more valuable than *sour*, although an analysis, I believe, shows little difference in their constituent elements. The opinion has been confidently expressed by intelligent farmers, that sweet apples are of more value for stock than the same quantity of potatoes

My own opinion is that they are worth raising for this purpose, but that many years will elapse before good grafted winter fruit will be so cheap as to be thus disposed of.

The *Green Sweet* is, of all others, the apple to be cultivated for stock. Such food is not required till winter, and this variety will last till the 20th of May, which is *pasturing time*, in this State.

Supply and demand.—Great fears are expressed by many well meaning people, that no market can be found for the apples which will be produced upon the great numbers of trees recently planted in New England. The plentiful crop of the present year has seriously alarmed some, who seem not to consider how small a portion of the world they themselves inhabit. In fact, however, the *home* market is not yet half supplied. Every family should, and will in future years, consume at least twice as many barrels of grafted apples as of *flour*, and they who fear an over-supply may as well commence their lamentations over the immense crops of *wheat* of our western States. New Hampshire does not yet produce half so many apples as would supply the inhabitants of the State as abundantly as the people of this *county* consider necessary to their comfortable subsistence.

As to the *foreign* market, it should be borne in mind that the production of fine fruit of this sort is limited to a small portion of the earth, and probably no portion of it is better adapted to the culture of the best *late-keeping* varieties than New Hampshire.

No *late-keeping* apples can be produced in warm latitudes. The apples of England are inferior to ours in size and flavor and keeping qualities. Those of New York and New Jersey, which fill the markets early in the season, with the exception of the Northern Spy, are mostly gone by February, when the Baldwin of New Hampshire is in its best condition, and entirely disappear while our late varieties are perfectly sound. Most of the South and California are buyers, and not producers. By steam navigation, we may carry our fruit, in a few days, to the ends of the earth, and the fact that *ice* and the best apples are produced in convenient proximity for shipping together, and agree remarkably well in a voyage at sea, gives additional advantages to New England enterprise in this direction.

Ships freighted with ice and apples have already left our ports for Egypt and for China, as well as for many nearer markets.

The *late-keeping quality* of our apples is the circumstance which must always give the North an advantage over "the rest of mankind," and this has been an important consideration in preparing the foregoing list.

The prices at which apples shipped from this country have been sold in England would afford an enormous profit to the producers here. Seven, eight, and even twelve dollars per barrel, have been common rates of sales at auction.

So recent has been the production of any surplus crop, and so recent, too, the use of *steam* conveyance, either by railroad or navigation, that markets have not been sought, and no regular foreign trade in this fruit has been established. The surplus of our crop has been bought up by speculators, at their own prices, and the producers have not received a fair share of the profits.

Soon, a regular trade will be opened, and many years must elapse before any product of our soil can yield so liberal a return for labor and

capital as our crop of apples. Even at the low price of one dollar per barrel, which is the lowest yet reached among us, the culture of this fruit pays twice at least the profit of any other of our crops.

Pears.—So far as has been observed, the soil and climate of New Hampshire seem as well adapted to the growth of the pear as the apple.

Dwarf trees, worked upon quince, have been planted in large numbers about us, and as fine specimens of fruit from them have been exhibited at our State fair as have ever been produced anywhere. The dwarfs are preferred to standards for garden culture, because they occupy but little space. Besides, they come into bearing much sooner than the standards, usually in two or three years from transplanting, and some have borne perfect fruit *the same year* they were imported from France!

Pears upon the quince require high cultivation, because the quince root must always remain small and cannot wander far for nourishment. The farmers of New Hampshire are by no means accustomed to the thorough cultivation which dwarf pears require, and I have no doubt that an orchard of them, managed as even the best of our apple orchards are, would be worthless. Indeed, pears of all kinds, standards as well as dwarfs, require a deeper and richer soil, and more careful cultivation, than the apple.

For the convenience of those who are not "*posted up*" in this matter, I will give a list of twelve varieties, which will be found as good as any others which have been tested for our State.

Pears on Quince Stocks.

Names.	Time of ripening.
1. Louise Bonne de Jersey	September and October.
2. Urbaniste	October to November.
3. Duchesse d'Angoulême	November.
4. Vicar of Winkfield	Nov'r and December.
5. Beurré Diel	Nov'r and December.
6. Glout Morceau	December and January.

Pears on Pear Roots.

Names.	Time of ripening.
1. Rosteizer	August and September.
2. Bartlett	September.
3. Flemish Beauty	September and October.
4. Seckel	October and November.
5. Dix	November.
6. Beurré d'Aremberg	December and January.

I regret that the old St. Michael (White Doyenné) cannot be recommended. It is the very best of all pears, but for many years has failed in the eastern part of our State. The Flemish Beauty succeeds both on the quince and as a standard in this State as well as in Maine. Pears of this variety were produced in Exeter last autumn which weighed fourteen ounces each, and were of fine flavor.

Plums.—Plums are succeeding as well in New Hampshire as in any part of New England. The *curculio*, its greatest enemy, has not for the past two years monopolized, as usual, this delicious fruit, and in many sections of the State plums have been abundant. It is said that as far north as Lancaster the curculio is not known; but I fear he is *there*, notwithstanding. I give below the names of six varieties, which will be found of good quality, and adapted to our State:

1. Washington.
2. Jefferson.
3. Prince's Imperial Gage.
4. Royal Hôtive.
5. Lombard.
6. Green Gage.

The *McLaughlin*, a new variety, from Maine, is there recommended as superior to any other, but it has not yet fruited here.

Peaches.—Peaches have been cultivated to considerable extent near the coast, and some flourishing trees are seen far in the interior. They suffer from the effects of winter, especially upon low and sandy land.

Cherries may be raised in abundance in the eastern part of our State. Care, however, should be taken to procure trees raised in the State, as those brought from New York have, for several years past, generally failed. Strawberries, raspberries, and currants are also raised here in perfection. We have native grapes of tolerable flavor, but we are too far north for the cultivation of the Isabella and Catawba, except in sheltered positions

Upon the whole, the tendency of our recent agricultural exhibitions is to show that New Hampshire has a fair proportion of the most valuable fruits of the earth, and to satisfy us that, however good a State it may be "to emigrate from," it is a *home*, too, to which we may gladly return from our wanderings.

Winter-killing of Fruit Trees and Fruit Buds.—Throughout New England, if not everywhere, we hear much complaint every spring that fruit trees are *winter-killed.* Again, we find that in some localities the peach trees have all their fruit buds destroyed, while the wood is not affected, but grows vigorously. The peach is more liable to injury of this kind in New Hampshire than any other fruit; occasionally the apple suffers injury, not only of its fruit buds, but of the wood also, and sometimes the tree is entirely destroyed. Of one hundred and sixty young apple trees which had been set in my orchard, from one to six years, about thirty were severely injured by the winter of 1851–'52, and many more somewhat affected. The first symptoms were observed early in April, when, in cutting off small branches near the trunk of the trees, I noticed a circle of yellowish wood immediately under the bark. The ends of the limbs and the outside of the bark, and even the buds, at that time appeared perfectly healthy. As the season advanced upon most of the trees, the buds opened, but some of them did not start at all. The bark on a few of them blistered and came off about the trunk. Such trees died to the ground; others put forth leaves on part of the branches, and some at the ends of the limbs, with the rest of the tree bare. The foliage upon many through the summer was very meagre, except upon the newly-formed twigs, where it was luxuriant.

Three trees, which had been growing about four years, and which I had regrafted in the previous spring, died utterly, except the root, although the scions had grown finely and remained plump and full of sap until the bodies had turned black under the bark. I cut off several at the ground and grafted them, and the new scions grew vigorously, indicating that the roots were still sound.

In the autumn, one of those which had put forth a scanty foliage, though making a fair growth, was accidentally broken off. Upon examination, I found that all the wood was discolored, except a ring of the alburnum, next the bark, which appeared healthy. Upon cutting into others, I observed a similar appearance, as if nature had made an effort to cover with a living stratum of wood that organization which had been so disturbed as to obstruct its proper offices. Having occasion in May, 1852, to travel over the westerly part of the State, I carefully observed the condition of the fruit trees wherever I went. The results of my observations were uniform. More injury had happened to the apple trees that winter than for many previous years. To low and sandy land, *subject to early autumn frosts*, and to *highly cultivated trees*, the injury was almost exclusively limited. My own trees stand upon a sandy plain, and were growing very rapidly, and I found scarcely an instance of an apple tree upon hilly land affected in the least.

The same remark may be made of the *peach buds*. My own, near my apple trees, and on similar soil, had set full of blossom buds, but not a single peach was produced, although the trees were not much injured.

Mr. Downing's theory has been, that whenever the thermometer sunk 12° below zero, the fruit buds of the peach were always destroyed by the mere intensity of the cold. But this theory was not correct as applied to New Hampshire. The thermometer in all parts of this State fell to 18° below zero last winter, and yet peaches were abundant. I myself saw trees loaded with peaches, at Derry, within twenty feet of the spot where the thermometer had indicated 18° below zero the previous winter. Mr. Downing himself, in one of the last numbers of the invaluable publication which he prepared, admitted that his theory was not supported by his more recent observations. *What then produces the injury?* It cannot be the mere *intensity* of the cold under ordinary circumstances, because, if it were, all trees of the same kind would perish at a given extreme of cold. The tree on the plain would not be taken, and the tree on the hill be left. The same tree would not pass unscathed through extreme cold of one winter, and perish the next at a higher temperature. We must look for the solution of our problem in some peculiar accidental condition of the tree.

In New Hampshire no winter ever passes without weather which sinks the thermometer below zero. Water freezes at 32°, and the sap, in the small twigs, must be frozen long before the weather is at zero. We all know that water, as it becomes solid, *expands* by crystallization, and we can readily comprehend that such expansion may rupture the sap vessels of the wood or bud, and so destroy its organization. If this be the cause of the destruction of the buds, and the injury to the wood, then it *should* happen whenever the sap freezes. Now, I will not undertake to affirm that the sap in the peach *does* freeze before the cold reaches 12° below zero. It is *possible* that there is in the sap of trees, and in the incomprehensible phenomenon of its circulation, a power of resistance to cold sufficient for its protection to that degree. I speak cautiously on the subject, because there is no theory of the circulation of sap, which seems perfectly consistent with known facts, and I set this subject down among the matters not yet perfectly revealed. The circulation of the blood in animals generates heat in some way, and possibly the circulation of the sap in plants may do the same.

Count Rumford, in his essays, seems to assume that the sap of trees does not freeze, and reasons as if it were incontrovertible that if the sap freezes the tree must die. The first demonstrates that heat is propagated in fluids only by *circulation*, never by contact of the particles of the fluid one with another; or, in other words, that these particles are non-conductors of heat. Heated water rises, if heat be applied to the bottom of the vessel, because it is lighter, and the surface water must, of course, descend to make way for it. Water cannot be heated by the application of heat to the *surface*, but will remain at the boiling point for hours, resting upon cold water, or even ice, in a glass vessel, if the ice be confined so as not to rise.

Again, the *circulation* of water is impeded by mingling with it any fibrous matter, like eider-down, or by a solution of resinous substances, and so parts with its heat less readily. And, further, *wood* is almost a perfect non-conductor of heat. Considering all these facts, it must be manifest that the sap of trees, thickened as it doubtless is in winter by the evaporation of its watery particles in autumn, shut up in capillary vessels of *wood*, so curiously fashioned that it has been ascertained, in the process of *kyanizing*, that fluids cannot well be forced through them downwards. I say it must be manifest that heat escapes very slowly from a living tree; or, in other words, that the cold enters and freezes the sap only at a very low temperature.

Still the fact has been observed by every man who has chopped in the woods of New Hampshire in winter, that the logs *appear* to be frozen solid, and will fly open like blocks of ice at the blow of the axe, and show the frozen sap sparkling like diamonds.

After the sap has actually become solid by cold, as it would seem must be the case every winter, what *further change can be produced in it by greater intensity of cold?* What mechanical or chemical process, which thus destroys the trees or buds, is induced by twenty or thirty degrees of cold added to that which has already rendered the sap solid? I dwell upon this point, because the winter of 1851-'52 was one of the severest on record, and the injury to trees—apple trees in particular—was unusually great. Yet I am not willing to concede that the extreme cold of the winter caused this injury. The nurserymen of this region have assured me that tender, half-hardy shrubs, with the ordinary protection, endured that winter unusually well.

My conclusion upon the whole matter is, that it is not the *intense cold* of the winter which injures the peach and the apple in the manner referred to, but the early sudden frosts of autumn, which find the trees on warm and sheltered land, full of sap, unprepared for the sudden change. The vessels filled with the watery fluid are burst by the crystallization of freezing long before the extreme of winter. It is not improbable that the same effect may be sometimes produced in the winter or spring by sudden changes of temperature on wood not fully ripened.

This is a matter not merely of curious investigation, but of practical importance. If intense cold weather, to a certain degree, necessarily kills all our trees, we have nothing to do but submit as gracefully as we may. If, however, our trees are killed because they are *growing too rapidly* from over-cultivation, or because they are too much *sheltered*, or upon land *too sandy*, or land *undrained*, or in the *valley* rather than on the hill, we have the remedy, by the exercise of good judgment, in our own hands.

A careful and constant application of scientific principles to known facts will eventually bring out of the chaos of what we call *accidents* new evidence of the constant, uniform operations of the laws of nature.

HENRY F. FRENCH.

EXETER, N. H., *January* 29, 1853.

REPORTS OF STATE FRUIT COMMITTEES.

REPORT FROM MAINE.

Although a portion of the State of Maine has been permanently settled since 1630, and apples, pears, and other fruits were early planted in some sections, yet the systematic cultivation of such fruits, and of improved varieties, has, comparatively speaking, but recently begun to attract attention among our people generally.

It is true, that in some towns you will find the good effects produced by the zeal and taste of some enterprising person or persons, who planted orchards, and took pains to introduce the select and choice fruits of their time many years ago. But these were the exceptions, and their exertions were isolated, in a certain degree, and confined mainly to their immediate neighborhood. Among the fruit pioneers were the late Hon. Dr. Vaughan, of Hallowell, and the Hon. Ephraim Goodale, of Orrington, still living at an advanced age.

The territory of Maine is large, extending about three hundred miles from east to west, or through more than four degrees of longitude, and from south to north through nearly five degrees of latitude. This extent of surface would, of itself, cause quite a diversity of climate. The peculiar location, and the face of the country also, add to this diversity. In the first place we have more than three thousand miles of sea-coast, with all its indentations of creek, bay, cape, promontory, and islands. In the next place we have, extending far into the interior, plains and mountains, lakes and rivers, with all the accompanying changes of soil, from primitive upward, and from rich alluvion to barren heath. From these causes there must, inevitably, be quite a difference of climate in different localities, sufficient to vary essentially the times of ripening of many kinds of fruit. We can introduce you to a portion of the State where most of the choice varieties of the apple grow and mature in perfection; and, without travelling beyond our boundaries, also introduce you to the very northern limit of the apple region, or at least where it is difficult to mature more than a very few varieties of that fruit. In one section, extending from the western boundary to the central portions and along most of the seaboard, the well-known *Roxbury*

Russet grows and matures in abundance and perfection, while in the northeastern section the autumnal season is not long enough nor warm enough to allow it to mature; yet some of the earlier varieties of northern origin—such as the *Red Astrachan*, *Duchesse d'Oldenburgh*, and also the *Fameuse and Ribstone Pippin*—exhibit a condition of growth and flavor deemed by many to be superior to any raised in other parts of New England.

It will therefore be borne in mind, that the notes on fruits herewith submitted as flourishing and ripening in Maine, have reference to the first-named portions of the State, and not to the northeasterly part, on the valley of the St. John's. The latter is as yet but sparsely settled, though it has a fertile soil, and is still a region where the hardy pioneer is making way for future improvements in the culture of field and garden products. During the first twenty-five years of the present century, almost every farmer planted an orchard, and some of them very large ones. The trees were mostly seedlings, and the principal object in view was the manufacture of cider, which then commanded a ready market and high price.

In process of time, the supply of this article far exceeded the demand, and, consequently, attention is now turned to engrafting these trees into varieties of established reputation in the market as table fruits. Those who now plant orchards are careful to select the best varieties. From the immense number of seedling trees which compose the older orchards among us, some very excellent varieties have been found, and are worthy of propagation; and, though they may not yet be widely known or fully proved in other localities, are nevertheless highly valued in the vicinity of their origin.

The present season has been a fruitful one, and marked by some peculiarities. Very little rain fell from the middle of May until the latter part of August—in some parts of the State the drought was severe and crops suffered. The value of *mulching* has been seen in an eminent degree in the case of newly-planted trees, which have made a fine growth; while of those not so treated many failed and others barely survived. The heat and drought combined have caused some fruits to ripen prematurely, and we notice considerable variation from the usual period of ripening in pears, especially *Doyenné d'Eté* and *Madeline*, which ripened as usual the first half of August. We have now, (September 1,) *Dearborn's Seedling*, *Rostiezer Bartlett*, *Beurré d'Amalis*, *Belle Lucrative*, *Flemish Beauty*, *Marie Louise*, and others, which usually furnish a supply during two months, all ripening together. The later sorts—as Aremburg, Vicar of Winkfield, Napoleon, &c., which, just before the late heavy rains, parted readily from the tree and seemed on the point of ripening—are now firmly attached and rapidly swelling, and bid fair to mature at the usual period.

The crop of apples is large. Of fine pears more will be grown than in any previous year; and so of choice plums in the central and eastern parts of the State, particularly in the vicinity of Bangor, where the curculio seems to have suspended operations for this season at least. In the western part of the State the blossom-buds, which were never more abundant, shrivelled and fell in spring, from some cause, without opening. [Query. What was the cause?]

APPLES.

Bell's Early—similar to, if not identical with, Sopsavine, or Sops of Wine—best; productive and highly esteemed.

Early Sweet Bough—best.

Red Astrachan—good; productive and profitable.

Duchess of Oldenburgh—good; productive and profitable.

Williams's Favorite—very good; needs high culture.

Porter—best; productive and fine.

Vermont—very like the Porter in form and color; flesh more tender, of milder flavor, and a week or ten days earlier—probably same as the apple more recently known as Walworth, and also by other names; has been cultivated here upwards of forty years, and considered highly valuable.

Gravenstein—best; productive, excellent.

Golden or Orange Sweet—best; productive; tree of moderate growth.

Fameuse—very good; hardy, and bears well.

Nodhead or Jewett's Fine Red—best; delicate flavor, skin thin, and liable to the curculio, its only fault.

Winthrop Greening—very good, if not best; originated in Winthrop; large, tender, crisp, and sprightly flavor.

Hubbardston Nonsuch—best; of rapidly increasing popularity.

Minister—very good; productive.

Baldwin—best, productive and fine; young trees very liable to be winter-killed.

Rhode Island Greening—very good, and reliable; best cooking apple.

Roxbury Russet—very good; profitable for its long keeping.

Ribstone Pippin—best; fully sustains its English reputation.

Vandevere—best; beautiful and fine.

Golden Ball—very good; tree hardy and a good grower, but not an early or great bearer; often supposed to be a native of Maine, but is not. Some fifty years ago the scions were brought from Connecticut without name, and for thirty years or more known only as the "Connecticut apple."

Danvers Winter Sweet—very good, long keeping.

Talman's Sweet—good, profitable.

Blue Pearmain—very good, fair and fine.

Mother—best; moderate grower and bearer.

Northern Spy—rapid grower, and very hardy; has fruited but two years; specimens not uniform, the well-grown ones only being very fine; is likely to be well proved, as large numbers of young trees have been planted.

PEARS.

The cultivation of this fine fruit is rapidly extending in this State, a great impetus having been imparted by the introduction of the quince stock, it being found by the use of the *Angers variety*, and the careful selection of sorts adapted to it, that many varieties can be grown in the highest perfection, which either entirely failed on the pear root, or would not repay the trouble and cost of cultivation.

Doyenné d'Eté—best early pear; tree of feeble growth, and overbears.

Dearborn's Seedling—very good, productive.

Bartlett—best; but on pear root trees very tender; hardier on quince.

Beurré d'Amalis—good, often very good; perfectly hardy, and a prodigious grower and bearer on quince.

Louise Bonne de Jersey—best; hardy and productive; on quince only.

Belle Lucrative or *Fondante d'Automne*—best; productive and delicious; pear or quince.

Marie Louise—usually very good; somewhat variable; pear root only

Beurré Bosc—best; so far as proved; pear only.

Flemish Beauty—best; combines more good qualities than any other pear; grown so far mostly on pear stock.

Rostiezer—best; small, but fine.

Seckel.—The cultivation of this popular fruit is, in this State, in four cases out of five, a complete failure; the trees neither grow nor bear; double-worked on the quince, it has succeeded tolerably in some instances.

Fulton—best; a native of Maine, and is here what the Seckel is in Pennsylvania.

Jalousie de Fontenay Vendée—so far as two years' trial goes, we think very highly of.

White Doyenné—best; on quince, in most localities as good as in olden time.

Urbaniste—very good; pear or quince.

Napoleon—very good; pear or quince.

McLaughlin—a native of Maine, very good on pear only.

Duchesse d'Angoulême—very good, hardy and fine, on quince only.

Glout Morceau—very good; more productive on quince than on pear.

Passe Colmar—very good; best on quince, very hardy and desirable; liable to overbear.

Winter Nelis—best; productive, and equally good on pear and quince.

Beurré d'Aremberg.—Several varieties are cultivated under this name, two of which are similar, yet we think distinct, and answer to the description in standard works; best, very productive on quince, high flavor, and much esteemed.

Vicar of Winkfield—good; often very good; improves with age of tree; most productive and profitable; a good cooking pear also, and can be grown cheaper per bushel, for this purpose, than any other.

QUINCES.

Fine crops of the apple or orange variety have been grown in the western part of the State and in the valley of the Kennebeck; but in other portions the winter is too severe, and they generally fail.

GRAPES.

The finer foreign grapes—as *Hamburg*, *Chasselas*, *Muscat*, &c.—ripen as well under glass in cold houses as in any other State; but for open culture, we greatly need a good variety at least a month earlier than the *Isabella*, which rarely matures perfectly, and the *Catawba* never—such a one we are not without hope of obtaining from among the many seedlings now on trial.

PLUMS.

Great quantities of this fruit are raised in Maine, but most successfully on the Penobscot river, in Bangor and vicinity, where plums meet a ready sale at prices from three to five dollars per bushel. The following are most cultivated:

McLaughlin—we consider this the best, and is faultless.
Washington—firstrate, and a good bearer in Maine.
Jefferson—firstrate, and a great bearer.
Green Gage—firstrate; well known where the plum is cultivated.
Imperial Gage—firstrate; very productive and profitable.
Bleecker's Gage—firstrate; hardy, and a good bearer.
Columbia—good, showy, and a great bearer; large and handsome.
Royal Hâtive—firstrate; early plum, preferred here to the Purple Gage.
Purple Favorite—firstrate, productive, and fine flavor.
Corse's Nota Bene—firstrate; one of the best purple plums, and hardy.
Lombard or *Bleecker's Scarlet*—good in all soils, and productive.
White Magnum Bonum, or *Yellow Egg*—second rate, large plum; very popular for preserves.

Among other plums highly esteemed are the Imperial *Ottoman*, *Drap d'Or*, *Lawrence's Favorite*, *Smith's Orleans*, *Yellow Gage*, *Hudson Gage*, and Apricot.

CHERRIES.

This fruit is not extensively cultivated in Maine, with the exception of the *Kentish*. This is the hardiest and most reliable in this State, as it will thrive farther north than any other; add to this May Duke, Belle de Choisy, Black Eagle, Downer's Late, Elton, and Downton.

From experiments in progress we hope that the Mahaleb stock may do for us with this fruit what the quince stock has done for the pear.

GOOSEBERRIES.

This fruit is cultivated by many persons in the State somewhat extensively, and thousands of plants have been imported from England, and most of the fine English varieties succeed well in many localities. They grow to a very large size, but for quality and productiveness the Houghton's Seedling and American Hybrid sort surpass them all, and, as they have never been known to mildew in any situation, are deservedly held in high esteem.

Joseph Sinclair, of Levant, in 1848, purchased one plant of this variety, paying therefor twenty-five cents. He has sold from layers and slips which he has multiplied from the said plant over fifty dollars' worth, and has one hundred plants on hand at the date of this report. It would be safe to say he has received a profit of sixty dollars on his outlay of twenty-five cents.

RASPBERRIES.

Fastolf, Franconia, and Knevel's Giant are uniformly fine, and give satisfaction Antwerps often fail. River's large-fruited monthly promises well.

Strawberries are not *extensively* cultivated in Maine. Our fields abound with wild ones, which are mostly used. Among those mostly cultivated are,

Hovey's Seedling.
Early Virginia.
Jenny's Seedling.
Boston Pine.

To conclude, we believe that it is only necessary for us, in order to produce an ample supply of the most delicious fruit, to understand what varieties best suit our climate, combining in the greatest degree the requisites of hardihood, vigor of growth, productiveness, and high quality, and to act accordingly.

All which is respectfully submitted.

HENRY LITTLE, *of Bangor*.
EZEKIEL HOLMES, *of Winthrop*.
S. L. GOODALE, *of Saco*.
B. F. NOURSE, *of Bangor*.
ALEX. JOHNSON, Jr., *of Wiscasset*.

REPORT FROM VERMONT.

The season the past year in Vermont has been a peculiar one for fruit culture. The winter commenced at least three weeks earlier than usual, suddenly, and when trees had scarcely stopped growing; consequently, they were much winter-killed by the most severe winter with us for many years. Nurserymen suffered severely, particularly in Seedling Pears; many—in fact most of them—were lost by "heaving out," which I had never before known to any extent.

The spring was cold, late, and very dry—very little rain in March and April—less than three-fourths of an inch in May; so that as a whole it may be noted as one of the worst seasons ever known for planting trees of every description.

The season was about ten days later than an average—apple trees not in bloom until the last of May.

Apples are the fruit of Vermont, a large portion of the inhabitants out of villages having no other, excepting the most common plums. The crop this season is perhaps less than half an average. The early part of June was cold and wet, and, although they flowered very full, the cold, wet weather caused a large portion to drop when the size of peas.

Pears.—The same as apples.

Plums.—Very abundant. From the most delicate sorts down to the Canada or native plum of many parts of the State, the trees are literally breaking under their loads of fruit.

Grapes.—Same as plums; no mildew.

Diseases.—The apple under ordinary culture is healthy; no special diseases. The borer in some places is troublesome to young trees, but not generally.

Pears.—Old trees uniformly healthy. Young trees *sometimes* injured by *blight*. This is, however, *very* little known, but increasing. No remedy but cutting off.

Plums.—Generally healthy. In some parts of the State there is some

complaint of *black knots;* but in Burlington, and north, in the Valley of the lake, all diseases of plum trees are unknown.

Varieties.—The State having apples introduced from Canada by merchants in the lumber trade, and by settlers from Massachusetts, Rhode Island, and Connecticut without names, has many sorts cultivated extensively with only local names. Among well known varieties, the *Rhode Island Greening* is most extensively cultivated. Hardy and productive in all parts of the State.

Baldwin.—Hardy and productive. Were I limited to one sort, it should be the Baldwin.

Roxbury Russet.—Hardy, good bearer, but not so great a bearer as the Baldwin.

Esopus Spitzenberg.—Much cultivated; is apt to be spotted; too tender for all parts of the State.

Newtown Pippin.—Too tender, excepting for the most favorable locations. Some seasons good, others worthless.

Northern Spy.—Not yet fully proved; no apple grows better or appears more hardy. Fruit this season fair, and looks as well as any sort whatever; has not before fruited in the State, excepting a few specimens.

Summer Apples.—Early Harvest and Bough are among the most common old sorts, and good in perfection.

Red Astrachan.—Hardy and very fair.

Duchess of Oldenburgh.—Same.

Autumn.—Gravenstein.—Hardy, and one of the best, if not *the* best autumn apple.

Porter.—Hardy and productive.

Many new sorts are in course of trial. Some cultivators can exhibit more than 100 named varieties, but their culture has not been extensive enough to speak with much confidence. Of *seedlings* there are many on trial in various parts of the State, and some believed to be fully equal to any known sorts.

PEARS.

The *White Doyenné* is the most common of old sorts, and is healthy in all parts of the State. Fruit fair.

Dearborn's Seedling.—Very hardy and productive.

Bartlett.—Grows well near the lake and warm parts of the State. Too tender for the colder portions.

Vicar of Winkfield.—Hardy, but requires too long a season for all parts of the State.

Seckel.—Very hardy.

Pears on Quince have only been cultivated a few years. Many are now planted yearly. They so far promise well, and have not been injured by winter. The various sorts of pears have not been sufficiently cultivated to speak with confidence of their comparative merits.

Large collections of both foreign and native sorts have been made, and many are bearing; and in a few years *reliable* notes may be taken. In no part of the country do they promise better than in many parts of this State, and *generally*, so far, no disease among them.

PLUMS.

Many parts of the State are *natural* places for plums I have

succeeded in growing every variety tried, (more than 50,) excepting the peach plum, which so far has proved too delicate for our climate.

GRAPES.

Miller's Burgundy and White Sweet Water are the most common foreign sorts, and ripen well. The *Isabella* requires favorable location. *Catawba*, hardy, but too late. The native grapes of New England are generally cultivated, and seedlings are every year increasing, some of which promise well.

There have been introduced within a few years pears and apples from every portion of the United States, which, with many seedlings, are in course of trial. Before another convention, reliable notes of a long number of pears and apples may be made, which, *with notes* of climate, will be of general interest.

C. GOODRICH.

BURLINGTON, *August* 26, 1852.

REPORT FROM NEW YORK.

A long residence in what is known as Western New York, (at Rochester,) enables me to give some of the early impressions relative to fruit trees, as well as the numerous fruit grown there, within 35 years last past in that location.

Coming from New Hampshire, a State which had hardly grown peaches, I remember with what zest I ate the first peach I ever saw at Rochester; and it is a fact worth remembrance, that 35 years ago, the Royal Kensington peach was grown in the virgin soil of Monroe, then Genesee county.

My father, in the year 1817, purchased the first dozen of peaches which he saw there, and, as he had just located what he deemed his home lot, he, with great care, kept and planted the *pits* of the peaches mentioned. From them seven fine, thrifty trees sprung up, which at their bearing proved identical with the peaches he bought, and which were the Royal Kensington variety. Those trees were moved to another lot and most of them lived 25 years, fine bearing trees; and the variety was generally propagated from them.

It is also within my recollection that a tree of the *Yellow Melacoton* variety was grown in a neighbor's yard, which produced the best fruit of that kind I have ever seen. That was also a seedling tree.

It is also well remembered that so spontaneously did the peach tree grow there, and so plenty was the fruit as early as 1821 to 1825, that growers many times have thrown their peaches from their market wagons into the river sooner than sell them for less than twenty cents per bushel.

It may be asked why peaches now command, in ordinary seasons at this point, from two to three dollars per basket? It is because a second planting of trees did not take place till very recently, and that the trees are more or less affected by the disease known as the *yellows*, and by the depredations of the *borer*, which all growers should know and exterminate from the roots.

The *curculio*, not satisfied with taking the cherries to some extent, as

well as the apricots and plums, does not mind the rough coat of the peach, but, with the daring of a dastardly enemy, punctures the peach, determined to keep himself alive to all generations.

A great deal has been said of him, but he is fearless of everything but being *drummed off the trees* and having his head *decapitated*, which is the only way to get rid of him, including the destruction of all the fruit that falls to the ground, *in which he seeks to perpetuate himself*.

I have cited the peach first, because it was one of the fruits most easily grown, and the trees come into bearing earlier than the apple.

To this day no fruit is more highly prized. And in no clime or latitude do better ones grow, both for size, beauty, and flavor.

Our seasons vary so much, and the country has been cleared of the forests to such an extent, (except in some locations,) that a good crop cannot at all times be depended upon. Near Lake Ontario, within a few miles of Rochester, in the light soil of that region, the best peaches are grown. This season, from the late spring and inclemency of the weather, in cold rains, &c., &c., the crop will prove a failure. The *heading-in system*, for the renewal of the trees, as recommended, is highly approved by all attentive observers, and carried out to a great extent.

I subjoin a list of varieties grown there for market as well as home purposes.

Early Ann, Large Early York, George the Fourth, Lemon Cling, Yellow Alberge, Crawford's Early, Royal Kensington, Grosse Mignonne, Morris's White, Old Mixon Freestone, Red Cheek Melacoton, Snow Peach, Crawford's Late Melacoton, Druid Hill.

Crawford's Late is raised mostly for market, and large quantities are sent to the Canadas and both east and west of us.

N. B. It is notorious that the "yellows" mentioned was first introduced there in trees imported from New Jersey.

Hard winters often injure the trees, and from different causes they are short-lived now in the latitude of Rochester, 43°.

CURRANTS.

All the different kinds of currants have been introduced by the nurserymen, and are generally cultivated.

Varieties grown.—Red Dutch, Red Knight's Sweet, Victoria, Cherry, (very large,) White Dutch, White Grape, Black English.

Currant wine is extensively made with it.

GOOSEBERRIES.

Red varieties.—Albion, Crown Bob, Echo, Haughton's Boggart, Ironmonger, Roaring Lion.

White.—Chorister, Queen Caroline, Smiling Beauty, White Murlin.

Green.—Chippendale, Green Mountain, Green Willow.

Houghton's Seedling, green and red, prove the best bearers, and are free from mildew.

STRAWBERRIES.

I feel assured that in no portion of our common country is more attention paid to the good qualities of this choice and valuable berry. It has been found that a light loam, well enriched, produces the best crop, and the fruit does not throw out the roots, causing their destruction in the spring. The placing litter of straw or leaves over the vines in the winter is a sure and necessary protection, and while growing the fruit the plan of placing *straw* under the vines not only answers the purpose of *mulching*, but keeps the fruit clean for market.

We have noticed this particularly this season in quantities brought for sale—the fruit was free from sand, and had a *lustre* upon it which the sun produces on well-ripened berries. The kinds mostly grown are—

Large Early Scarlet—very productive.

Boston Pine—a tolerable bearer and of fine flavor.

Burr's New Pine—esteemed as the best berry grown, and *very prolific*.

Hovey's Seedling—grows large in size but not always juicy, and not to be depended upon as a bearer; but should be in all collections.

Burr's Rival Hudson—much esteemed for preserving; bears well. and keeps well when preserved.

Bishop's Orange, *Black Prince*, *Jenney's Seedling*, and *Cushing* are grown somewhat, but not extensively.

A judicious committee have recommended *Burr's New Pine*, *Large Early Scarlet*, *Hovey's Seedling*, *Rival Hudson*, (late sorts,) and *Crimson Cone*. I would add, *Boston Pine* and *Cushing*.

Several new seedlings have been shown, but time will determine their merits.

It is conceded, and so acknowledged here, that *Burr's New Pine*, for all purposes, is the best; and it is the only berry sweet enough without the addition of sugar. A very extensive cultivation of them is being commenced, so that, when, *fully in the field*, consumers can be satisfied with this great delicacy of the season.

CHERRIES.

Perhaps no country has ever produced the cherry in greater perfection; and I believe the tree is free from disease, and is never known to be *bark-bound nor to crack*.

A great number, as many as forty varieties, were shown at the Horticultural Society's exhibition. In class No. 1 are the

Belle Magnifique.
Belle de Choisy.
Black Tartarian.
Black Eagle.
Black Heart.
Burr's Seedling.
Bigarreau, or Yellow Spanish.
Carnation.
Downer's Late Red.
Elton.
Elk Horn.
Napoleon Bigarreau.
May Duke.
Reine Hortense.
Sparhawk's Honey.

The last named, with *Belle de Choisy* and *Belle Magnifique*, may be put down as the very choicest.

Professor Kirtland's seedlings will, by the next season, be far enough advanced to be tested.

The *Belle Magnifique* I saw in large quantities on a tree at Ellwanger and Barry's, this day, (August 10.) The *cherry tree dwarfed* is one of the most ornamental for borders, and is the true way to cultivate them where a family supply only is wanted, and but a small piece of ground is cultivated.

Morello, (English,) for preserving, is one of the most desirable grown.

APRICOTS.

This fine fruit, when perfected there, is superior, and the trees thrive well under the same culture as the peach. Trained to a wall or on the south side of a house, is the most preferable way. The *curculio* is its enemy, and very much of the fruit is stung.

Varieties grown—

Breda.
Early Golden.
Large Early.
Moorpark.
Orange.
Peach.
Purple or Black.

PLUMS.

The plum tree has been affected to a great extent by a black fungus, which is evidently a disease, and *certain death* to the tree, although the trees sometimes live a long time after an attack. It destroys in a great measure the bearing properties; otherwise the plum does well, except some varieties, which are subject to rot while the fruit is maturing.

Varieties grown with us—

Bleecker's Gage.
Bolmar's Washington.
Duane's Purple.
Emerald Drop.
Early Orleans.
Green Gage.
Huling's Superb.
Imperial Gage.
Jefferson.
Reine Claude De Bavay.
Red and Yellow Magnum Bonum.
Smith's Orleans.
Winter or Late Damson.
Yellow Gage.

The *curculio* is particularly partial to the plum, and a half crop is as much as can ever be expected, in consequence of its ravages.

PEARS.

This delicious fruit is being extensively cultivated.

Large orchards are being planted, extending from what is known as Cayuga county, to the extreme western part of the State. Great attention is bestowed upon the tree.

Over-culture is of more danger to the tree than neglect, as it has been shown conclusively that a too rapid growth in the young branches makes the tree susceptible to *blight*.

When possible, trees should be planted running east and west, giving a free circulation of air. *Mulching* has been recommended, and all who have tried the plan agree in its utility. In garden culture, the pear tree *dwarfed* is one of ornament, and we know of no more beautiful sight than long borders of *dwarf pear trees* hanging with fruit.

Perhaps no one subject has baffled cultivators so much as the cause and remedy for the blight. Mr. Downing has stated that our soil, when too much enriched, gives the trees too rapid growth, and that the extreme heat of the sun during the season of growth produces the *blight* in its worst form. Mr. Barry is sanguine that it is disappearing. An inspection of E. Barry's pear trees, well fruited, has been to me a most interesting sight.

The foreign varieties found to thrive with us have been cultivated extensively, and to the nurserymen are all classes indebted for their introduction. While we claim that our native pears are not excelled (if equalled) by foreign ones, we think much interest, and sometimes profit, results from the growth of foreign kinds. The Seckel and Doyenné, the Bartlett and Swan's Orange, with the Oswego Beurré, ought to satisfy all, as they generally do.

Pears.—Summer varieties grown with us—

Bloodgood.
Canandaigua.
Dearborn's Seedling.
Doyenné d'Ete.
Madeleine.
Osband's Summer.
Tyson.

The *Canandaigua* is a New York pear, similar to the Bartlett, and nearly as large; ripens early. *Osband's Summer,* also a New York fruit, is kin to the Virgalieu or White Doyenné, a delicious and handsome fruit, and very juicy; ripens by 20th August.

Autumn Pears.

Buffum.
Beurré Bosc.
Beurré Diel.
Dix.
Napoleon.
Onondaga or Swan's Orange.
Stevens's Genesee.
Duchesse d'Angoulême.
Flemish Beauty.
Henry IV.
Louise Bonne de Jersey.
Seckel.
Oswego Beurré.
Van Mons Leon Le Clerc.

Oswego Beurré—a New York fruit, of medium size, juicy and fine flavored; one of the very best, of a russet brown color; productive.

Onondaga or *Swan's Osage*—a New York fruit, large, *vinous in flavor*, melting; one of the best. Trees productive.

Bartlett—Tree produces well; fruit highly prized; tree is one of the most thrifty in its growth, as well as beautiful in shape.

White Doyenné, Virgalieu, of New York; Butter, of Philadelphia; St. Michael's, of Boston, are growing in large quantities for market. Trees prolific; no pears rank higher.

APPLES.

This important and useful fruit is extensively grown with us, and is exported in large quantities to the eastern States. Perhaps it is safe to say that Monroe, Ontario, Livingston, and Orleans counties produce from two hundred to two hundred and fifty thousand barrels annually. Since horticulture has been made a study by the farmer, as it has more or less been, and by the influence exerted over the public by the aid of horticultural societies, the producers have found that consumers have become more particular about kinds. Now, when orchards are to be planted the choicest kinds of trees are required, and for market the Esopus Spitzenberg, Baldwin, Roxbury Russet, Rhode Island Greening, Swaar, Talman Sweeting, Seek-no-further, Pearmain, Twenty-ounce apple, and Vandevere are sought for.

Within a few years others than some of the old varieties have been originated, and a demand follows the growth of them. Of the new kinds, the Northern Spy and Norton's Melon, (winter varieties,) have been extensively introduced. The Northern Spy is a most important variety. The tree is a thrifty grower, and later, by two weeks, in its blossoming, than all other but the "Russet" apples, and thus escapes late frosts in spring. *It bears well*, needs good cultivation, and worthy, in all particulars, of all the attention bestowed upon it. The fruit attains *good size*, is a beautiful striped apple, high colored, and keeps as late as the 15th of June in perfection; commences to ripen in April, and firstrate for cooking, as well as dessert. Gentlemen who know the fruit have planted large quantities of the *trees*. Mr. Allen and Mr. Hodge, of Black Rock, have each put out six hundred of the trees, and are sanguine of success. When I tell this Congress that it commands from three to five dollars where the apple is produced in considerable quantities, and has been sold by the barrel this season, in the commercial emporium of our country, at *nine dollars* per barrel, for the use of the good livers at the "Astor House," it will not be disputed that there is some virtue in the apple.

When the fruit becomes plenty, as it probably will within two years more, as large orchards have been grafted with the kind, and when it, with the Canada Red, or Nonsuch, Norton's Melon, Pomme Grise, and Wagener, can be had plentifully, a new era will have arrived in apple culture and production—everything desirable will then be attained. I subjoin a list of the different kinds of their season, as grown with us:

Summer kinds.—Early Harvest, Williams's Favorite, Red Astrachan, Early Joe, Early Strawberry, Summer Rose.

Autumn varieties.—Alexander, Autumn Strawberry, Dyer, Fall Pippin, Hawley or Dowse, Maiden's Blush, Porter, Lowell, St. Lawrence, Gravenstein, Holland Pippin. The Hawley and St. Lawrence are two of the best fall apples, and should be in all collections.

Winter varieties.—Baldwin, Vandevere, Yellow Bell Flower, Blue Pearmain, Peck's Pleasant, Esopus Spitzenberg, Twenty-ounce apple, Swaar, Fameuse, Canada Red, Pomme Grise, Rhode Island Greening, Norton's Melon, Northern Spy, Winter Pearmain, Golden Russet, Newtown Pippin, Jonathan, Wagener, Cornish Gilliflower, Hubbardston Nonsuch, Rambo, Domine, Canada Reinette, and Roxbury Russet.

Sweet Apples.—Baily Sweeting, Green Sweeting, Talman Sweeting, Golden Sweet, and Early Sweet Bough.

The wheat lands, as well as the lighter soils near the lake shore, produce the apple in perfection. Disease seldom attacks the trees. Some seasons black blotches are seen upon the fruit, but generally it is fair.

QUINCES.

The Apple or Orange and Portugal are grown. Blight affects the trees occasionally, but good crops are had generally.

GRAPES.

In ordinary seasons the Isabella grapes with us ripen, but not so with the Catawba; both varieties, when well ripened, will compare with the best we have seen from Croton Point.

The Clinton is earlier than the others, and usually ripens here; dark in color, and highly flavored. The Sweet-water grows finely likewise.

Our nurserymen succeed well in cultivating the foreign varieties, and could have presented them vying with those on the tables to-day.

In closing my report, (which I have deemed a most important task to complete acceptably to the Congress,) I trust that any errors made may be attributed to inadvertence. If the cause of fruit culture shall in any way be promoted by my efforts, my ambition will be fully satisfied.

JAMES H. WATTS

III.

MISCELLANEOUS NOTICES AND INFORMATION.

Judging from all the returns that have reached the Patent Office, the farmers of Ohio produce not only more wheat in the aggregate than those of any other State, but more bushels per acre, on an average. Mr. J. F. Willis, of Fayette county, says that "wheat has been very good for three years; average, 20 bushels per acre. It is most commonly sown on corn grounds, and Timothy seed is also sown at the same time, to be followed by clover sown in March or April."

Fayette county produced 1,570,114 bushels of corn in 1851; which Mr. W. estimates at 25 cents a bushel, and the yield per acre at 45 bushels.

Mr. Wm. R. Van Arsdale of Monroe county, Missouri, writing under date of January 3, 1852, says: "The past season was unfavorable. There was too much rain from March till June, and more from early June till late in August. During the months of October and November there was a great quantify of rain again, which was very injurious to young wheat sown in September. Corn was also badly injured; the wet preventing the ears from drying."

Corn was so much damaged in extensive districts that it was difficult to obtain good seed for planting in the spring of 1852.

Mr. Van A. has favored the office with somewhat extended observations of a meteorological character, which a want of room excludes from this report.

Mr. Renel McArthur, of Wayne, Erie county, Pa., informs us that he has some "conclusive testimony" on the subject of wheat turning to chess, which is given in the following words: "Some years ago a neighbor of mine had a field of wheat in which there were small patches where wheat and chess grew on the same stalk and on the same head. The stems that bore chess came about midway out of the head of wheat, and grew from two to three inches in length, and hung full of chess. This strange fact has established the doctrine in this place, that wheat will turn to chess."

We have seen precisely such heads of wheat and chess as our correspondent describes, but instead of the wheat and chess having but a single stem, the latter was separated from the stem on which it grew, and its fine thread-like tendril was inserted into the head of wheat, not by the hand of man, but by the wind whipping the heads of chess and wheat together until by accident some part of the chess heads become entangled by their filaments round the rachis of wheat, and appear to grow there. The botanical difference between these two grasses is quite as marked, and incapable of such a monstrosity as our correspondent supposes, as would be the growth of heads of wheat on ears of corn, or ears of maize on wheat heads. Chess makes good hay, and its seed grows as well as oats or herdsgrass.

Mr. Smith, of Waldo county, Maine, says that farmers sow two bushels

of seed wheat per acre, and harvest twelve, which sells at a dollar and twenty-five cents per bushel. Hay is worth from $15 to $30 a ton, according to the season of the year and the scarcity of the article. Mr. Smith makes one valuable suggestion, which is that "colts should never be made to stand upon a bare floor until they have got their growth, or are old enough to be shod. Ninety-nine horses in one hundred that are lame in their fore feet become so by standing on a naked plank floor when colts." He remarks, "The practice of keeping manure under cover is believed to be far the best, and lime is used by most farmers."

Mr. Samuel Fithian, of Cumberland county, New Jersey, prepares land for wheat by ploughing in a crop of clover, and sowing 200 pounds of guano per acre, by which practice about 20 bushels of wheat are usually harvested per acre. Corn is one of their most profitable crops. Potatoes are extensively cultivated, but from some "cause unexplained," crops have decreased one half in three or four years. Five hundred and sixty pounds of corn (10 bushels) make 100 pounds of pork.

Mr. John H. Tarr, of Mount Vernon, Knox county, Ohio, says that—the average crops of wheat there range from 20 to 25 bushels per acre, although as high as 40 or 50 have been raised. He recommends summer fallowing and ploughing eight inches deep. Soil mostly sandy loam. That region has suffered both from Hessian flies and weevils; and Mr. T. knows no remedy. Potatoes have been nearly exempt from the rot, and where the ground is properly tilled yield from 250 to 300 bushels per acre.

Mr. J. A. Carpenter, of Waukesha, Wisconsin, says that wheat is less cultivated there now than a few years ago, and that "Canada chut wheat" is the most popular variety. Instead of ploughing over the whole farm, a considerable part of it is seeded and kept in meadows and pasturage.

Mr. Charles G. Goodrich, of Franklin county, Maine, regards the rearing of horses in that State as not particularly profitable. He estimates the expense of a colt, when three years old, at $60, which is nearly the average value of the animal at that age. A firstrate horse, at from six to ten years old, is worth from $150 to $200. The Messenger breed stands highest in the public estimation. Clover hay does not injure horses if properly cured; if allowed to become musty, it affects the lungs of the horse, and may bring on organic disease.

COTTON-CATERPILLAR, RUST, AND ROT.

The Hon. E. Ford, of Spring Cottage, Mississippi, says:

"After a respite of two years, planters are again assailed by the cotton-caterpillar, and also by rust and rot; but the damage to the present crops, (1852,) is not serious, as the infection was late in the season. I apprehend more injury next year, from my knowledge of the nature and history of the worm and rot, of which I can decide more conclusively at the close of this season, by comparing my experiments, observations, and notes of this year with those of an earlier date. The results of my researches I will send for your next Report.

The rust of this season is, I think, attributable to the peculiarity of

the season—irregular and partial showers of rain and cold east winds. I have observed it this season upon oats, rice, rye, corn, cotton and some shrubs; whereas it usually appears here only on wheat and cotton.

"The rot is of four kinds, or it may be traced to four different causes in cotton. First, the boll is injured by an insect, (what it is I have not yet discovered,) but the puncture is to the core of the boll, and looks as though it was done with a pin or needle; is done at night, by which the boll is poisoned, and rots in 24 to 48 hours in damp weather. Another kind of rot is produced by long-continued rains, and is called 'the wet rot.' A third kind is caused by the boll worm that eats into the boll. The most disastrous damage results from the piercing of the boll by the unknown insect first referred to, which during a rainy season assumes the form of an epidemic and destroys the whole crop, as was the case in the year 1818. The malady continued gradually to abate till 1824. The latter description of rot and caterpillar both made their appearance here on cotton in 1818. The worm disappeared in 1819, and reappeared in 1832. The former description of rot (fomenting I call it) appeared in 1818; continued to 1824; then disappeared, and reappeared in 1852. It has not done much damage this season, as it was late before it occurred.

"I see many correspondents of newspapers in diffe[illegible] oe country state that the rot is caused by the boll worm. It may be so in other districts, but the rot here is of the kind I have named, although a careless observer would not notice the difference."

ROTATION OF CROPS, AND PRACTICAL SUGGESTIONS.

Mr. John Young, of Richland county, Ohio, thus describes his system of rotation of crops: "My system of rotation of crops is to plough down as heavy a crop of clover and sow wheat; then plant corn; then sow oats, and with them four quarts of clover seed, mixed with two of Timothy. The field is in pasture or meadow till the third year, when a crop of clover is again turned in by the plough, to be followed by wheat. By this practice my land now produces much better than it did twenty years ago. The best preventive of the Hessian fly and yellow midge is to sow early; late seeding makes the plants feeble and increases the injury of insects."

Mr. Young sows turnip seed among corn at the last ploughing, and obtains a remunerating crop. The white flat turnip is the variety preferred for culture with corn. He properly remarks that the best fertilizer for meadows is to flood them where it is practicable. Irrigation by small streams and catches is worthy of far more attention than it receives. The meadows of Mr. Y. yield from two to three tons of hay per acre. Well-rotted barnyard manure and plaster are used as a top-dressing for meadows, and Timothy makes the most salable hay. Clover properly cured is regarded as more nutritious for farm stock. By crossing a French Merino ram with large native ewes, Mr. Young has obtained half bloods of good size, and valuable for mutton; while the fleeces are greatly improved in quality and increased in weight and value. He rears pigs in a way that gives a pound of meat for every day they live—killing them when from 300 to 400 days old.

PRACTICAL VALUE OF THE ANALYSIS OF SOILS.

BY PROF. JAMES C. BOOTH.

[Read before the Philadelphia Society for the Promotion of Agriculture, January 6, 1853.]

Having followed the path pursued by many chemists in Europe and America in analyzing soils, with a view to their bearing on the improvement of agriculture, I have become more and more convinced that chemistry has not yet advanced to such perfection that those analyses can have any immediate practical value. Having already dissuaded planters and farmers from having analyses executed under the expectation of an immediate benefit to be derived therefrom, and having freely expressed my views on the subject to members of the agricultural society of this city, I deem it advisable to present a concise expression of those views, and my reasons for holding them, in order to prevent any misunderstanding as to their nature and scope.

As chemistry advanced in analytical accuracy and extent of application to physiology, so the examination of minute constituents in the soil has progressed, and their importance to agriculture urgently insisted on. But since the field has widened before us, we find that our first physiological conclusions were replaced by others, and these again by some still better grounded; from which we may fairly infer that, although the science is progressing, it is still as an art of inferior practical value. The plain farmer, or even the enlightened agriculturist, cannot determine, with rigid accuracy, the exact amount of the constituents of a soil, and then proceed by weight and measure to apply the manures requisite to render that soil productive, because of the extreme difficulties attendant upon accurate analysis, and of our ignorance what precise individual constituent or constituents are requisite to impart fertility. If this cannot be done, the analysis of soils for immediate practical benefit is a manifest injury to the advance of the science of vegetable physiology, as well as its application to agriculture, because the necessary ill success attendant upon the application of changing theory will prejudice the mind of the practical man still further against the real value of theory, and eventually retard thereby the progress of true scientific agriculture. For this reason, in particular, I propose to give my views why the analysis of soils is, at the present time, of no immediate value to the farmer.

1. There is no little difficulty experienced by the chemist in obtaining a fair average of a soil in any single locality, in order to subject it to analysis, because the uppermost part of a soil differs from that subjacent to it by the intermixture of parts of plants and rootlets, and by the influence of greater culture and of atmospheric agents. A very large majority of plain farmers would find a difficulty in doing that which would demand considerable care and skill on the part of the chemist or more enlightened agriculturist. It would be much more difficult to obtain an average sample of the soil of a whole field, because to the above difficulties is often added that of a variation of soil in proximate localities.

Doubtless multiplied analyses of specimens from the same field might give us tolerably correct information in regard to the chemical composition of the soil, and these multiplied by the number of fields in a farm,

might enable us to form a fair opinion on the chemical character of the farm. But the difficulties of such analyses, and their cost, are serious objections, if there were no others, to their practical value to the farmer.

2. Of what value are detached analyses of soils a hundred miles apart, compared with a thorough local investigation of the same soil under very different circumstances of culture? With his usual shrewdness, Berzelius led the way in such an investigation by analyzing elaborately a naturally fertile soil, taken from beneath the action of the plough, and the same soil from above the former, where it had been subjected to years of tillage. The differences were tolerably well marked; but, since he did not present us with several analyses of each, we cannot certainly know whether culture alone had the effect indicated by his two single analyses. In a subject so little known, and fraught with difficulty, such elaborate analyses, multiplied a thousand-fold in different localities and under different circumstances, would establish theory on a firmer basis, and then allow of immediate practical benefit; but not till then. The cost of analyses is a serious objection to their practical benefit. If it were only required to determine the amounts of silica, alumina, oxide of iron, organic matter, and perhaps lime included, the analysis might be performed at a moderate cost, and the constitution of a whole farm determined; but the first three of these are precisely those which constitute the groundwork or base of the soil, not the more solvent or diluent of the potential constituents. These last are determined with difficulty, and at considerable cost of time; and since their accurate determination is necessary, the difficulty and expense of analysis increase in a greater ratio. Having stated that numerous accurate analyses would be necessary to ascertain the chemical constitution of a field or farm, it is evident that expense alone is an impassable bar at present to the wide-spread application of the analysis of soils.

3. The difficulty and uncertainty attendant upon the analysis of soils that has any pretensions to accuracy are such as to render it valueless. Those constituents believed to be of greatest value exist in exceedingly minute quantities in soils, and in an ordinary analysis they are liable to be either left out or grossly exaggerated; in either of which cases, the analysis is useless, because it tells an untruth, and forms an unsound or rather wholly unreliable basis for calculation. Let us examine more narrowly how far what may be called a tolerably correct analysis may be relied on. Alkali, lime, phosphoric, sulphuric and muriatic acids, ammonia, and organic matter, are generally regarded as the fertilizing constituents. Of these, sulphuric acid and lime (including magnesia) may be determined with sufficient accuracy, especially lime, which is often present to the extent of several per cent. The exact determination of chlorine (or muriatic acid) is often impeded from the accompanying organic matter and the volatility of chlorides during evaporation. I would regard inferences drawn from the data of sulphuric and muriatic acids as unsafe in sound farming practice. The precise amount of ammonia is ascertained with difficulty, and the amount given in analyses must be looked upon with some distrust, unless the quantity is unusually large, sufficient to overbalance the errors of analysis. We can ascertain with considerable nicety the amount of organic matter; but of what avail is that knowledge? Are the remaining half decomposed rootlets and organized portions those which give fertility to a soil? or is it that very

unknown humous body, soluble in alkali, and reprecipitable by an acid? This last idea being as yet a mere conjecture, we may summarily dismiss the determination of organic matter, as of no immediate practical utility to the farmer.

Of all the minute constituents in a soil, alkali, or potash, and phosphoric acid, are generally regarded as the greatest cause of fertility; and yet these two are precisely the most obstinate impediments to the accurate analysis of soils. Their precise estimation is attended with difficulty under nearly all circumstances, and peculiarly so where their total amount may fall below one per cent., as in soils. It may be fairly questioned whether the small fraction of one per cent. of phosphoric acid which is usually returned in soil analyses may not often be due to errors of analysis, or be far above or below the true amount. I will assert that no accurate and candid chemist can declare with confidence and truth that he has ever determined, in a soil, the exact amount of this pest of the analyst. Our means of determining it, when in conjunction with alumina, as it is most likely to be or to become in the analysis of soils, are still avowedly imperfect in the hands of the best analytical chemist. There is not much more confidence to be put in the precise estimation of potassa.

It would appear, then, that of all the fertilizing ingredients of a soil, lime can be estimated accurately, but that the precise amounts of the others cannot be given with confidence; while the determination of the most important is the least reliable of all. It is therefore not too strong a conclusion to say that the present practical value of the analysis of soils consists in ascertaining how much lime they contain. Since inferior analyses have been left out of view altogether, and only what may be termed good analyses held under consideration, their uselessness, or rather detriment, to the farmer cannot be too strongly depicted.

4. There is a confirmatory argument against the practical value of soil analyses, which has been so clearly set forth by Major J. F. Lee, of Washington, that I take the liberty of quoting his letter to me on the subject: "We know that on all poor land of proper texture, the application of 200 pounds of guano to the acre will produce fair crops of grain and roots; and this is the difference between a barren and a tolerably fertile soil. Now this guano applies only 6 pounds potash, 24 pounds phosphoric acid, and 34 pounds ammonia. But the acre contains 3,920,000 pounds of soil, (to the depth of a foot.) Can analysis now, or will it in any progress we may reasonably expect it to make, ascertain 1 part of potash in 600,000 parts of foreign matter; or 1 part of phosphoric acid in 150,000 parts of foreign matter; or 1 part of ammonia in 100,000?" It may be answered, without the slightest fear of contradiction, that such determinations are greatly beyond the present power of chemical analysis. Whether they will continue so, I will presently inquire; but the argument is strong against the present value of analysis as applied to soils.

5. Another and I fear a greater objection to the immediate value of soil analyses, is the difficulty of ascertaining how much or what part of a soil should be analyzed. Soil consists of mineral and organic matter in a more or less comminuted state. Suppose that an ultimate analysis were made upon a fair average of soil, ground to the finest powder, would it express the fertile value of the soil during the time we look for remu-

nerative crops? If, besides finely comminuted matter, it contained gravel or coarse sand, consisting of quartz, feldspar, greenstone, &c., how long a time will be required for the disintegration of the cohering mineral masses, so far as to allow plants to extract the alkali, &c., which they ask for? Even if we make a previous mechanical separation of the very fine from the coarse matter, and subject only the former to analysis, who would be so presumptuous as to predict how much of this fine matter would disintegrate and yield its rich stores to the husbandman in the course of one or more years, or even of a century? The farmer would, doubtless, prefer to know how much benefit he is to reap in his own lifetime, than to leave it to posterity in a future of uncertain length.

Guided by these considerations in the analysis of soils, I employed water, slightly acidulated with acid, to extract the fertilizing ingredients, supposing that my analysis would thereby express the now potential qualities of the soil. I am now, however, more thoroughly convinced that, in our present ignorance of the rate of decomposition of mineral aggregates from atmospheric influences and from culture, such assumptions, and, of course, their deduced inferences, are merely conjectural. The farmer has enough to contend with, in varying seasons, the depredations of insects, &c., without basing his practice upon conjecture.

6. Assuming that we could obtain a fair average of a soil from a field, that we could analyze it with accuracy and at little cost, and that we know the rate at which mineral aggregates would yield up their sources of fertility, would such knowledge assist us in determining how much of the several active ingredients is wanting to render that soil fertile? Can any one presume to assert, in the present state of our knowledge, how much each kind of plant demands to insure its luxuriance or productiveness? From the observed effects of guano, bones, ashes, lime, and green sand, as well as from the analyses of ashes of plants, it is fair to infer that ammonia, phosphoric acid, potassa, and lime, possess fertilizing qualities; but the numerical measure of their value is hypothetical, if not conjectural. Much of what we term our knowledge on this subject is an idea floating in the region of hypothesis, and until it alights upon the ground, and can be handled with some degree of certainty by weight and measure, the practical farmer would do well to keep to his well-trodden paths of practice, and rather be content with the accumulating experience of practical trials than depend upon the results of analysis. When lime is applied to land, why is it that one kind is found to produce much more than another? It is certainly not merely because magnesia is present in larger proportion in one than in another; for by far the greater portion of the lime applied to the soil in the United States contains notable quantities of magnesia. Is it because the land has already been saturated with lime? This has not yet been proved by facts. May it not be that one kind of limestone contains more alkali or phosphoric acid than another, although in exceedingly minute quantities? Their presence in limestone has been only recently demonstrated, and the question cannot, therefore, be answered positively. These questions are offered merely to show that we use lime from observation of its value, and not from an absolute knowledge of the cause of its fertilizing effects.

In wood ash, is it alkali, phosphoric or sulphuric acid, or lime, that constitutes its more active principle? In guano, does ammonia or phosphoric acid give its chief fertilizing character? Does phosphoric acid act without reference to the base with which it is united, whether potassa, lime, magnesia, or ammonia? Does sulphuric acid act with greater potency in combination with alkali or with lime? In general, is it of inferior moment in what combination a so-called fertilizing body is employed, or does it always act as a particular compound?

What duty does organic matter perform, and what is its most suitable condition? Does it enter by the rootlets or by the leaves, to fulfil its functions in the organized structure? Is it crenic or apocrenic, or humic acid, or perchance some condition as yet unknown to the chemist, that chiefly exerts its beneficial influence upon vegetation?

When these and numerous other like questions shall have been answered by a fair union and agreement of sound theory and long practice, then may we hope for numerical data for determining how much of each ingredient is required upon a soil. And when analysis shall become so far perfected as to determine with tolerable precision the quantities of the minute ingredients contained in a soil, then can we apply the required substances by weight and measure, and predict with measurable confidence the results of the application.

Lastly, it will be observed that in the preceding part of these remarks I have confined myself exclusively to the consideration of the practical uselessness of the analysis of soils at the present time. Can we look forward to a period when such analyses can be performed with such accuracy, expedition, and moderate cost as to be available to the art of agriculture? I am well satisfied that such an expectation is well founded. Our assay balances can now show the millionth part of the weight placed in them, and may be still further improved. Reasoning from the past, the methods of analysis admit of almost indefinite improvement; and it is highly probable that new analytic processes will be devised of much greater power, rapidity, and accuracy than those at present known, because every journal of chemical science conveys to us monthly, and even weekly, notices of the progress of chemical analyses. But although soil analyses may not be useful at present to the operative farmer, they may be made available for the advance of scientific agriculture; and for this purpose the enlightened agriculturist should lend his aid, by having analyses of soils most accurately performed; not one or two, but numerous analyses of the same soil under varying conditions. Such investigations keeping pace with the advance of vegetable physiology, will the sooner tend to deliver husbandry from the thraldom of empiricism, and place it under the dominion of a rational system. Besides the analysis of soils thus performed, the analysis of ashes of plants and of manures, by throwing light on vegetable physiology, will contribute to the progress of rational agriculture. Above all other things, frequent and carefully-conducted experiments on manures of known composition, and close and continued observation on their effects on various crops, will accumulate a treasure of experience from which sound theory will draw her data, which will then react most beneficially upon the culture of plants. Then may we look for a literal fulfilment of the expression, that "the desert shall blossom as the rose."

Remarks on the foregoing communication, by Daniel Lee.

Baron Liebig raised the expectations of farmers far above what the infancy of chemical science in its application to agriculture, and especially to the analysis of soils, would justify.

Now there is a strong tendency to run into the opposite extreme, and as greatly under-estimate the value of chemical researches as the distinguished Geisen professor prompted the public to over-estimate their importance. The truth lies between these extremes; and we will endeavor to come as near to it as possible in the suggestions that follow.

A few things in agricultural science may be regarded as settled; and taking these as our place of departure, we are to advance (if we can) from things known to such as are unknown, and thereby increase our present stock of scientific knowledge. It is known that solids in a soil do not, and probably cannot, pass through the walls of cells in plants to nourish them as water and gases do; and therefore all solids must be dissolved in water, or reduced to a gaseous condition, before they can enter the roots and circulate through the stems and leaves of vegetables. Without water to permeate every living cell in a growing germ until the plant reaches its full development and maturity, its organization is impossible. Now what is there to prevent a good chemist, familiar with soil analyses, from taking not one or two hundred grains of earth, but a million grains, and ascertaining what organic and inorganic substances rain-water, as it falls from the clouds upon the farmer's fields, will dissolve in three or four summer months, when the growth of plants is most rapid? Let us suppose that there is found only a tenth of a grain of gypsum. This may be separated after Boussingault's plan without difficulty; and the delicate balance used by Professor Booth in the United States mint, or a balance less delicate, will weigh the gypsum. In the case supposed, the quantity of available sulphate of lime in the soil is in the proportion of one part in *ten millions*, as determined in the most satisfactory manner.

Common rain-water contains many foreign bodies besides pure air, ammonia, and carbonic acid, and the presence of these may vitiate the ultimate analysis. The impurity of rain-water is governed in a great degree by the amount of volatile substances and fine dust diffused through the atmosphere in the neighborhood where the rain is precipitated.

M. Barruel, a distinguished French chemist, studied the foreign substances contained in rain-water as it fell in the last six months of the year 1851, in Paris, and found in a cubic metre the following bodies:

Nitrogen	8.36	grammes	= 129	graines.
Nitric acid	19.08	"	= 234	"
Ammonia	3.61	"	= 55.7	"
Chlorine	2.27	"	= 35	"
Lime	6.48	"	= 100	"
Magnesia	2.12	"	= 32.7	"

Allowing the rain to be only 24 inches in twelve months, there would fall 227 pounds of the substances named on an acre in a year. Of this matter 45½ would be nitrogen, 103 nitric acid, 19½ ammonia, 12½ chlorine, 35 lime, and 11 magnesia. Different localities will doubtless furnish unlike results; but the investigations of M. Barruel present a new feature in agricultural meteorology, and indicate the propriety of distilling water and charging it with pure carbonic acid for determining the soluble constituents of soils.

We entirely agree with Prof. Booth in the worthlessness of most analyses for practical purposes; but, by adopting a new line of observations, many new and valuable facts may be revealed and fully established. There are soils in Monroe county, in the valley of the Genesee, which yield so much carbonate of lime to rain-water, that, when it emerges in springs, and the carbonic acid which holds the mineral in solution escapes into the atmosphere, white *tufa* is deposited on the bottom and sides of the streams. In this way beds of marl are now being formed. These calcareous soils contain only from one to two per cent. of lime, as we have found by numerous analyses. All wells and natural springs abound in sulphates and chloride of lime and magnesia, and plaster beds are not uncommon.

We have never found a soil which contained so much as one per cent. of carbonate of lime that was benefited by liming. One per cent. gives forty tons per acre within twenty inches of the surface; and the roots of clover, maize, and other crops descend deeper than that under favorable circumstances. The least quantity of lime in a soil that will suffice for all useful purposes should be ascertained if possible. Lime goes much further on land that is well drained than on that which is sour from the lack of drainage. On land properly drained and limed by nature or art, stable manure and guano give much better returns than on soils equally well drained, but wanting the calcareous element. As suggested by Prof. Booth, some limestone contains more potash, magnesia, and phosphoric acid than other rocks apparently of equal quality. The elements of fertility, whether in green sand, apatite, marl, granite, and other rocks, manures, mould, or earth, have never been properly studied in this country, if in any other.

Nearly all of the objections to soil analyses urged by Prof. Booth may be obviated by operating on ounces and pounds of soil, instead of grains. No plant can extract a substance from a cubic foot of earth which is not there, and equally within the reach of a skilful analyst. Time, patience, and perseverance will attain the desired result. These researches, however, are too expensive and uncertain for ordinary farmers to pay for making them. They should be made by competent men, employed by the year at suitable educational institutions, or in private laboratories, with all needful apparatus and reagents. If we understand Prof. Booth aright, he is in favor of chemical investigations of this character, as promising beneficial returns for the labor expended. How much chemistry can do for agriculture, is a question to be decided in coming years, not at this time. A suggestion due to chemistry, and relating to lime and granite, may be worth repeating in this place. Carbonic acid is known to attack and decompose the insoluble silicate of potash, as it exists in primitive rocks, by which the alkali is eliminated in a soluble form. To effect this purpose, as well as to burn limestone, a common limekiln is filled with alternate layers of small fragments of granite and limestone, which are burnt in the usual way of burning lime. As the high heat expels carbonic acid from the limestone, it attacks the silicate of potash with increased intensity; and when water is poured over both granite and lime, the granite disintegrates freely, and

the farmer has both lime and potash for his fields, in an available condition. The resources of science are constantly increasing, and need no exaggeration to command popular favor. By promising too much, charlatans greatly retard the substantial progress of the interest which they profess to have so much at heart. If men of high attainments in science would labor more to apply professional knowledge to the advancement of the industrial arts, the vocation of quacks would be less injurious, and, perhaps, ultimately cease altogether. Communicate to educated agriculturists a knowledge of the principles of science in their application to the analysis of soils, manures, and agricultural plants, and they will be better able to separate truth from error, and escape imposition. Farmers should not be content with mere theories, however ingenious, like those of Baron Liebig, Dumas, and ohers, but should weigh all the facts and probabilities that bear upon the case. They must bring science and practice together, for experimental purposes, before the true value of science can be known. Science is young, while art is old. It is unjust, therefore, to expect in the infancy of the one more than is accomplished in the ripened experience of the other. It is not altogether improbable that the essential elements of crops may not be separated, by some cheap process, from soils, rocks, and sea-water, and become articles of commerce, like guano, bone-dust, gypsum, and common salt. The general use of guano extracted from the ocean, and of other commercial manures, is a new idea, and one that promises to be fruitful in great results. Careful experiments, performed by reliable men, will gradually demonstrate what is practicable in analytical science, and what is not. The suggestion of Major Lee, and apparently sustained by Professor Booth, to the effect that elements to the millionth part of the mass cannot be separated and weighed, is erroneous. By the skilful use of the solvent powers of acids and alkalies, aided by heat and pure water, and extending through weeks and months, much additional light may be thrown on the properties and capabilities of soils. The error has been in building theories prematurely, without sufficient data or facts to sustain them. Men of science should work more and theorize less.

QUANTITY OF MILK.

Quantity of milk a cow should give in a year.—In your paper of August 1st, I notice a letter from the clerk to the Carrick-on-Suir Board of Guardians, in which he assumes that 23 cows will yield 140,160 quarts of milk in the year, or over 6,000 quarts for each cow. Experienced farmers have informed me that about 2,000 quarts are a fair produce from a cow. I have the care of a dairy farm on which the cows are fed principally on green crops; the average ground for each cow was 1½ acre; and I annex a statement of the milk from each cow in one year.

Milk in one year measured in the cow-house, from the cows. (As the weeks closed on Saturday night, some months contain five weeks' account.)

	A.	B.	C.	D	E.	F.	G.
1850.	Quarts.	Quarts.	Quarts.	Quarts.	Quarts.	Quarts.	Quarts.
April........	226	240	10	90	116	145	218
May........	349	354	364	42	124	167	321
June........	191	203	212	....	55	64	189
July	234	256	261	223	157	2	197
August......	229	250	286	454	396		161
September...	182	220	223	354	325	 295	82
October	219	230	241	406	347	362	3
November ..	143	138	159	252	206	218	
December ...	119	119	129	191	148	166	
1851.							
January.....	159	140	154	207	191	191	403
February....	143	145	125	203	145	194	326
March......	166	157	115	221	187	220	318
Total..	2,361	2,463	2,279	2,643	2,397	2,024	2,218
Value of milk.	£ s. d. 11 18 1	£ s. d. 12 7 3	£ s. d. 11 2 6	£ s. d 13 7 6	£ s. d. 11 19 8	£ s. d. 10 14 0	£ s. d. 12 6 2

A and B were bought new milk in April; C calved in April; D calved in June; E slunk her calf in June; F calved in August; G calved in January. The new milk being sold in town, the cows producing most in winter paid proportionably better than others.—*J. F. Youghal, August 7, Dublin Farmers' Gazette.*

IV.

AGRICULTURAL CIRCULAR AND REPLIES.

AGRICULTURAL CIRCULAR.

UNITED STATES PATENT OFFICE,
Washington, August, 1852.

SIR: It being the duty of the undersigned annually to collect information on the various branches of agriculture, you are addressed with the view of eliciting such information as may be useful to embody in the Report for the present year. The questions are intended rather as hints or suggestions, than to be literally followed in shaping replies. Extending, as they do, over the agricultural products of the whole country, no one person can be expected to reply to all, but to such only as relate to subjects with which he is familiar.

The United States Census will furnish reliable data as to the quantity of grain and other crops, the number of domestic animals, &c., so that such questions are omitted in this Circular. But it is desired to obtain the experience of practical men in whatever relates to the cultivation of the staple crops, together with suggestions as to new processes of culture; the introduction of new varieties of grains, seeds, and plants; the improvements in machines and implements of husbandry; and all like topics of interest to the agriculturist.

The wide circulation given to the Patent Office Reports renders it desirable that all new facts and discoveries *of practical value* relating to American husbandry be recorded in them, and thus preserved in a permanent form, for the use of the public. It is confidently hoped that the efforts of this Bureau to collect such information will be seconded by the agricultural community.

Very respectfully,

THOMAS EWBANK, *Commissioner.*

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Information is respectfully solicited on the following and other points belonging to rural affairs:

Wheat.—Is guano used in the production of this crop? And if so, what is the gain in bushels per 100 pounds of the manure? What the average product per acre—time of seeding and of harvesting—preparation of seed, and quantity used per acre—how many times and how deep do you plough—is the yield per acre increasing or diminishing—your system of rotation in crops—best remedies for Hessian flies and weevils—average price at your nearest market in 1852? What kinds of grass seeds, if any, do you sow with your wheat, and when?

Corn.—Is guano used in the production of this crop? If so, in what way is it applied? What is the gain in bushels per 100 pounds of guano? State the average product per acre—cost of production per bushel—state the best system of culture—best method of feeding, whether whole or ground, cooked or raw. State, if you can, how much grain the manure formed by ten bushels of corn consumed by hogs will add to an acre, if carefully saved and skilfully applied at or before the time of planting. How do you prepare your ground for planting corn, and how far distant are your rows and stalks?

Oats, Barley, Rye, Peas, and Beans.—Average yield of these several crops per acre—quantity of seed used—which crop least exhausting to land—are peas cultivated as a renovating crop, and, if so, with what success?

Clover and Grasses.—Quantity of hay cut per acre—best fertilizers for meadows and pastures—the grass seeds preferred in laying down meadows—quantity sown per acre—cost of growing hay per ton. Does your experience show that red clover is injurious to horses?

Dairy Husbandry.—Average yearly produce of butter or cheese per cow—comparative cost per pound of making butter and cheese—treatment of milk and cream—mode of churning—of putting down butter for market—average price of butter and of cheese.

Neat Cattle.—Cost of rearing till three years old—usual price at that age—value of good dairy cows in spring and in fall—how many pounds of beef will 100 pounds of corn produce—will a given amount of food yield more meat in a Durham, Devon, or Hereford, than in a native animal? How do you break steers to the yoke?

Horses and Mules.—Is the growing of these animals profitable? What is the expense of rearing a colt or mule until three years old? How should brood mares and colts be treated? What is the best way to break young horses and mules for service?

Sheep and Wool.—Is wool-growing profitable—cost per pound of growing coarse or fine wool—are large or small sheep more profitable either for mutton or for their fleeces—how much more does it cost to produce a pound of fine Merino than of ordinary coarse wool? The proportion of lambs annually reared to the number of ewes.

Hogs.—What is the best breed—the cheapest method of producing pork and bacon—how many pounds of meat will 100 pounds of corn yield—the best method of putting up pork, and curing bacon and hams?

Cotton.—Average yield of clean cotton per acre—cost of production per pound—what crops best grown in rotation with cotton—best preventives against rust, army and boll worms—how deep do you usually plough for this crop—have you any experience in subsoiling or deep tillage for cotton—your experience in the use of cotton seed as a fertilizer—how can cotton lands best be improved without resting them? Is guano used, and, if so, with what result?

Sugar Cane.—Is the cane losing its vital force, and becoming more

subject to premature decay than formerly—Can you suggest any improvement in the cultivation of the cane, or the manufacture of sugar—cost of producing sugar per pound? Is guano used; and, if so, with what result?

Rice.—Can rice be successfully cultivated on upland—do you know of any varieties, decidedly superior to others, which deserve increased attention—can you suggest any improvement in the management of rice plantations? Quantity grown per acre.

Tobacco.—Average yield per acre—cost of production per hundred weight or hogshead—decribe any new process of cultivation or curing—crops best grown in rotation to maintain the fertility of tobacco land. Is guano used, and with what result?

Hemp.—Is the culture of hemp on the increase or decrease? Describe any new process of culture or preparation for market—average yield per acre—cost of production per pound.

Root Crops (Turnips, Carrots, Beets, &c.)—Is the cultivation of these roots, as a field crop, on the increase—can you suggest any improvement in preparing land, seeding, after tillage, and feeding? Average product per acre.

Potatoes (Irish and Sweet.)—Average yield per acre—cost of production per bushel—most prolific and profitable varieties—best system of planting, tillage, and manuring.

Fruit Culture.—Is the culture of fruit receiving increased attention—cannot apples enough be grown on an acre to render the crop a very profitable one to the farmer—comparative value of apples and potatoes for feeding hogs and catttle—what varieties best to keep for winter use, and for exportation—do you know any preventive or remedy for the "blight" on pear and apple trees, or the "yellows" on peach trees? The best method of transplanting, budding, grafting, &c. Make any suggestions on the culture of *Grapes* and other fruit, the manufacture of *Wine*, and on *Forest Culture*.

Manures.—What is regarded as the best plan of making and preserving manures from waste? Are *Lime* and *Plaster* used as fertilizers—if so, in what quantity, and how often applied? Is *Guano* used, and with what success? Quantity usually applied per acre.

NOTE.—Please to forward replies as early as convenient—if possible, before the 1st of January, 1853—giving the name, date, post office, county, and State.

WASHINGTON, D. C., *October*, 1852.

SIR: If I succeed in inducing even one of my fair countrywomen to turn her attention to the cultivation of flowers, I shall not think I have written in vain. I ought, perhaps, in addressing one so grave and scientific as yourself, write on the nature, cultivation, and qualities of plants; but nothing is farther from my thoughts. * * * * * * * * * * With me the love of flowers is a passion, and when I look around and see their refining influence even upon the uneducated, I can but worship the hand that has placed within the reach of the humblest individual so delightful a pastime as the cultivation of flowers. Look at the most ordinary and common-place dwellings covered with climbing plants, and the enclosure embellished with flowers, and it immediately becomes a beautiful object to gaze upon, and involuntarily we suppose the occupants to be refined and educated people. Does a writer wish to excite your interest for a cottage scene, he entwines the lattice with eglantine, and wreathes the door with jassamine and roses; and if he goes still further, he places a fair girl in close contact with the flowers. This is not romance; it is sentiment. Those who have had the good fortune to have a mother who had a fondness for flowers, how, even when she is in the grave, the sight of a flower, or the fragrance borne on the wind from some favorite shrub, will recall the lost one, and stir up pleasing recollections. I would thus have thoughts of me, when in the grave, to steal over the senses of my child. I believe in the moral influence this would exercise over a man struggling and battling with this rough world. There is a strong affinity between the cultivation of perennial and immortal plants, which must lead a thinking mind to a deeper interest. The same sun, the same air and water, are all essentials to the physical growth of both, and the pruning and training are necessary for the grace and beauty of each. The heat of the sun excites the activity of the plants; it increases the disposition of some of their constituent parts for new attractions and combination to obtain substances as may be requisite and proper for new growth; it likewise causes them to reject such matter as would be hurtful to them. Plants have an independent heat of their own; but all physiologists have found it as difficult to account for the spontaneous production of heat in the vegetable as in the animal kingdom. Oxygen gas, one of the constituent parts of atmospheric air, is as necessary to the respiration of man as to the plant; the latter consumes nitrogen, but returns the oxygen for the use of man. How beautiful the designs of Providence, thus to make the different parts of creation contribute to the support of each! Many plants live and bloom independent of the soil—water, sun, and air having been found sufficient for their growth—as the hyacinth and other bulbous plants. We, as a nation, should adopt a national flower, and not be behind England, Ireland, Scotland, or France, in sentiment. And surely from our world of flowers one could be found suitable.

Respectfully,

MARY B. THROCKMORTON.

NEAR TRINITY, LA., *November* 14, 1852.

SIR: Having received two of the Patent Office "Circulars," I cannot but think that it is my duty to give some sort of an answer. I have come to the conclusion that it is not for me to decide, as I was but too willing to do, that I could say nothing that would be of any worth; that is especially your province; and without further preface I proceed to contribute my "mite," if it should prove even a mite, to the knowledge of the country on the subject of cotton. I shall try to answer a few of your questions—those only about which I believe that I may know something. Judicious cultivators on the bottom lands of Black river, in Louisiana, obtain an average product in a series of years of 2,000 pounds of seed cotton to the acre, about 30 per cent. of which is clean marketable

cotton. Its cost of production, according to my calculation, is at least, per pound, 7⅜ cents.

The only crop grown here in rotation with cotton is Indian corn, and we find that it is beneficial.

People here, who have ideas of cleanliness and propriety, get rid of their cotton-seed by speading it on their corn lands; but it is done in a hurry and without method, so that its actual result, though known generally to be favorable, is not precisely ascertained. As a fertilizer, I believe in its great power from experience years back, when I cultivated on the hills where manure was needed for corn. My habit then was to list my corn land with as deep a furrow as I could accomplish very early in January, half fill it with sound cotton-seed, and throw a furrow from each side upon it; afterwards finish the ridges as I had time.

About the 25th of February my corn was planted, opening with a plough not quite down to the cotton-seed, then in a state of decomposition. With such a practice I have produced an average of 60 bushels to the acre; while a neighbor, on land of the same character, has obtained but from 15 to 20 busels. My theory on the subject—and why should not I have a theory, as every body else has in these days?—is, that the carbon evolved in the decomposition (and there are few things that contain more of it than cotton-seed) is, to a great extent, absorbed and retained in the earth. As the season advances, it is gradually extracted, affording a constant supply of necessary food to the plant.

I am confirmed in this view by an experiment on Irish potatoes, which is constantly made here, in consequence of a remark of Liebig's, that humus, from the quantity of carbon which it yielded, was the best manure for potatoes, making them mealy, while stable manure rendered them waxy. The result is always exceedingly well marked, though it must be used very sparingly with potatoes in this warm latitude, too much overwhelming the plant, and producing premature decay, as it does with man here when taken in the form of fat meat and whiskey.

We try to plough here 6 inches deep; and some people say that they always go 7 inches in depth, but with such men the moon is always at full. We do not average much, if anything, over 5 inches.

I am, sir, respectfully, your obedient servant,

H. W. HUNTINGTON.

To the COMMISSIONER OF PATENTS.

SPRING COTTAGE,
Marion County, Mississippi, May 24, 1852.

SIR: In view of the value of the Patent Office Report to the agricultural community of this county, as also to many other interests, I deem it a duty of those who have been solicited to contribute to the work, to report or submit, from time to time, such observations, experiments, and improvements as may be made; the value of which may be determined by you, and published, or not, as you may decide.

Under this view, I will now submit an experiment upon growing peas with or under corn, not only as a profitable crop, but to renovate land by a rotation of crops, as stated in my letter of November, 1850, (Report of 1850–'51.)

Peas.—I am well satisfied by my own observation and experience, as also by the reports of analyses by scientific men, that the pea vine is as rich in the necessary qualities to improve old lands as anything that the land will produce, and should be preferred under corn for several other reasons: first, that the pea vine more effectually shades the land against the rays of the sun, after the blade is taken off the corn, than anything else would; and secondly, the pea-crop is very important to the farmer for stock, and, if well managed, is equal to half the corn the same land produces. In 1850, I gathered two hundred and forty bushels clean peas (under corn) on twenty acres of land, and did not get near all, as all were not ripe at the time of picking. That was an average of twelve bushels to the acre under corn.

Some farmers complain of peas killing their stock. That is the result of inattention or carelessness; stock should not be let into a pea field hungry. There is danger in letting a hungry horse or ox into a corn-field, or to a trough full of corn, rice, or potatoes; but first feed, salt and water them, and then turn them into the field, and there is no danger, provided water is convenient and that they are frequently salted; they may remain in the pea field until the peas are consumed; then horses should be taken off the field, as they will then eat the dry vine, the bark of which will clog them.

Seed peas may be securely kept, as against the weevil, by putting them up in old pork or other barrels, or boxes that have contained salt shortly before. Peas or any kind of grain may be kept perfectly secure against weevils by setting it in barrels or boxes in the smoke-house. The moth or weevil is driven off by smoke or salt.

There is great complaint by correspondents of the weevil, but no particular course recommended by any as a preventive. I do not know whether they can be entirely avoided in the keeping of large quantities of grain; but the damage may be avoided to a considerable extent, in gathering, putting up, and keeping corn, by pursuing the following course: First, a week or two before housing corn, remove from the barn all remains of the old crop of corn, shucks, cobs, and everything of the kind, some distance from the barn, to some out-house, or other house for the purpose; then throw the windows and doors all open, and sweep it out as clean as possible; then throw cold water over the floors and walls, and let it stand open several days; and, on the day you commence housing new corn, wet the floor and walls with salt water, or smoke the barn thoroughly; and, when done housing corn, sprinkle salt water over the top of bulk. Corn should be put up in the shuck, and the ears that chance to be shucked in gathering from the field should be sorted out and placed where they may be first used. I have pursued this course for the last ten years, and my corn has been very little damaged by the weevil in the round of the year.

Sheep.—In my letter, of Report 1850–'51, I stated that sheep would surely do as well in the pine region (as then designated) as perhaps in any other country. I last summer kept thirty two head of sheep on a crab grass pasture; in the fall and early part of the winter in the forest, on the herbs and shrubbery of the forest; and then fed them a little, in the months of January and February, on turnips, cabbage leaves, and peas. I now have sixty-two head of sheep, they having nearly doubled the number by natural increase. About one third of the ewes brought and raised two lambs. No effort has been made here to grow wool for

market as yet, though it could surely be profitably done; the only effort made is to grow wool for family use or consumption, and some mutton for market.

Pasture.—It has been very clearly demonstrated by many efforts and experiments, that none of the Northern grasses will flourish in the South. Then the Southern farmer should endeavor to cultivate and improve the native grasses, crop grass, for summer grazing, and preserve reed, cane, and rye, for winter grazing. Nature has furnished the South with all that is necessary to the support in winter and summer of almost innumerable herds of buffalo, deer, and many other kinds of game. We have yet in many parts of the country the same material, that may be preserved and improved by care and attention.

The *Crop Grass.*—If this be cultivated, manured, and given the same attention South that is given clover and other grasses North, it would be as valuable for hay and grazing South as the clover and other grasses North. This grass is the best that can be cultivated South for summer grazing, beyond doubt. Let those that may doubt it try it with the same care and attention that is given the Northern grasses, and they will be satisfied. Rye constitutes an excellent winter pasture for sheep and calves; but the native cane and reed is invaluable as a winter pasture. No Southerner is aware of its value until he is without it.

To preserve and make a good cane pasture, it should be well fenced before the cane is too much broken or exhausted by stock running upon it, winter and summer. After being fenced, all stock should be kept off through the summer months; and if the cane, when fenced, should be old, large, and tall, it should be burned or cut down, and the following winter put on stock enough to feed off the leaf and break down pretty much all the young cane that has shot up. That will make it a bush or shrub cane, from the root of which a new stock springs up every summer.

I have a cane pasture, grown principally from the seed, of about 200 acres. The cane seeded here in the spring of 1829, and the old cane, all dried and fell, and the root all rotted and failed to shoot up the rattoon, or mutton cane, as called by some; but the seed, which in every respect resembled the largest kinds of wheat, fell on and literally covered the ground. The season being favorable, it came up as thick as it could stand on the ground; soon after which I fenced it, to prevent the hogs from rooting it up, and destroying it thereby. It was pastured or fed off every winter by horses and cattle, and would grow out again in the spring and summer. At about 1840 it commenced shooting up from the joint of the root, (the rattoon cane,) and was thereby fully reinstated to primitive maturity. This pasture now sustains 100 head of stock (horses, mules, and cattle) for me through the winter yearly. They are fed—that is, horses and mules—once a week with corn, and all given salt once or twice a week, and they come out in the spring in as fine and good condition as my stock that are fed through the winter. I last fall let some of my stock glean the corn-fields after the crop was gathered, and then turned them on the cane until some time in February. I then sent those to the Mobile market, and they sold as well as the best stall-fed cattle—cows at $20 per head, and steers at $40 per head.

As before said, this pasture will sustain, through the winter months, 100 head of stock, and is worth to me annually from $500 to $1,000, (five dollars per acre.) It would surely cost an average of five dollars per head to feed stock through the winter, three months, and keep them in good order. I have been offered ten dollars per head to pasture mules and horses through the winter. There is a very great difference between pasturing stock on cane in the winter only and letting stock run upon it in summer and winter. If stock run upon cane in the summer, they will break it entirely by consuming the rattoon cane as it springs up; (hence the necessity of fencing it;) and if they did not destroy it by feeding it down in summer, they would in summer consume the rattoon, and young, tender, luxuriant growth that they need in winter. Reed is as valuable for pasture as cane, and very much the same nature in every respect; but reed flourishes only on low, wet swamps, while the cane does best on the highest ranges of river-bottom lands. I have discovered, by observation and experiment, that it requires ten years for cane grown from the seed to attain full maturity in point of size. How long until it will seed again I know not. It has seeded generally here but once since the year 1810. I have known occasional stalks bloom frequently, but to fill and mature well but once.

I have also discovered that the chain root of the cane may be successfully transplanted, and, though it would be somewhat tedious, would pay well in many instances, as it spreads rapidly by shooting up from the joints of the root, and shooting out other chain-roots at the foot of the new stalks, from which the rattoon springs up at each joint as the chain-root extends itself.

All landholders that have cane upon their lands, though it may be sparse or scattering, will do well to fence and preserve it before it is entirely destroyed, as it will soon reinstate itself when there is stubble or roots. In most of the densely-settled portions of the country the cane is now entirely broken; but in sparsely-settled sections, there may yet be valuable pastures preserved by fencing. I have treated thus lengthily of this subject that others may profit by my observations if they choose so to do.

Very respectfully submitted:

EBEN'R FORD.

EDWARDS, MISSISSIPPI,
November 20, 1852.

SIR: Finding it not possible for me to devote the usual time to the Agricultural Report of your Office which I believe I have uniformly done, yet, desiring to aid in making the Report acceptable, I propose saying all I can in one article on what I hope will be interesting to the Southern planter, viz: hog-raising, and a fault or two in cotton culture.

1st. *On Hog-raising.*—If the owner will provide grass and green food all the year, with an abundance of water, he may count certain upon raising his own meat, provided he keeps them away from peas and cotton seed, and keeps negroes away from them; yet one who has been raising hogs 30 years, * * * * the China crosses the Byfield, the grazier crosses the white Berkshire, the Berkshire the Woburn, (an English hog imported into this State,) as also a stock called Northumberland, from Pennsylvania, and a stock from a butcher in Cincinnati, Ohio, asks permission to say a good stock is all-important, and my preference

is decidedly the Berkshire. I admit my specimens of the Woburn and Berkshire were not good, and the Northumberland I never got to raise from. They went astray during an absence, whereby twenty was a clear loss. My object is to advise making a good selection; then to be careful and select for breeders the most thrifty pigs from a sow which carries a large udder, and becomes thinner in flesh whilst nursing; to spay off old sows that are the reverse; keep no breeders over three years; keep boar up, if possible; not permitted to serve too many sows; and should ten or twelve be on hand at once, turn one into him at a time; permit once serving and turn her out. I have stood by and proved this by taking notes as a record. Boars may be worn down, so that pigs will be feeble. Procure crosses every two or three years. Provide winter grazing by sowing down oats, rye, or barley. Provide summer pasture by setting out Bermuda, and having a good crab-grass pasture. Have an oats-field to turn hogs on in June and July, and as at this date hogs will much need extra keeping, if enough, an oats-field with the crab grass which follows; will take bacon hogs to the pea field, potato, and pindar patches; thence to the fattening pen and pickle tub.

At this time the writer is feeding off 73 hogs as follows: either ten bushels of sweet potatoes are boiled until done, then 1½ bushel of meal is well stirred in and boiled; feed when cold; or three bushels of meal made into hasty pudding, with pumpkins, and half bushel of cotton seed, or raw potatoes, or raw corn. These are varied, having the cooked food seasoned with salt. I have different food given each day, but making potatoes my main food. I believe my hog account for the 22 years I have been planting would show that I had sold more meat, by a handsome little amount, than I have had to expend upon fancy stock and fancy prices for meat, viz: 10½ cents this year.

2d. *The Errors in Cotton Culture.*—Why is it that cotton planters, seeing for a whole lifetime that the best crops are always made in a very dry season, and yet they continue to plant on plat beds and plough them down before June? Why is it that planters will require clean cotton picked from the field, at 100 pounds per hand, say, when they know that their neighbor's cotton, sold by the same merchant, though picked only ordinary brings as much money? The writer, though an advocate for level culture in corn, yet holds to high ridges for cotton, and the ridges to be kept up all the year. It is very true that the land he cultivates will admit high ridges better than thin land; yet, if my first proposition, contained in first query, is true, it seems reasonable that high ridges are best upon thin land. It is also true that the writer is more particular in breaking up than one in a hundred, making it a point to break up every inch, and to do so 6 inches deep if practicable. I have had 9 furrows run in a 4½ feet row, with two good mules to a plough—say a large one-horse plough, or two medium mules to a small one-horse plough. I may yet believe my per acre yield to quality of land will compare favorably with that of any neighbor. The present year I have gathered an average of 1,850 pounds for 20 acres, together with enough left to claim 2,000 pounds; but this is not my full yield, as the rot was awful. I have made 2,400 measured, a field of 40 acres, which I have been (12 years ago) ridiculed for planting when I owned rich land. My last field has now produced 495 pounds; with 8 acres left as yet not picked over, last time—fully 12 or 14 paid thereon—these two pieces in Banana, and both ridges up high, even such

years as this and last year. Last year I gathered an average of 1,000, and only picked over twice—first in August, and last in November. This year picked over five times. These facts warrant me in advocating deep tilth and high ridges. As to the second query, I have been told, in days gone by, how to make a No. 1 sample; and I have tried it, but was never paid. For a few years I have gone in for full weight; exclude as much trash as possible, but care not for a few hulls. This season my head picker averaged 290 pounds every day he picked, up to the first part of November, except one. He was sick nearly all day, and another when it rained at 8 o'clock, and no more picking. His two best days' picking were 529 and 609. The first of these days 10 hands, racing, averaged over 460; and the second day 11 averaged 475, 8 of whom were raised by me. This cotton sold in Vicksburg at 9½, and no neighbor sold a bale at the same time over 9¾. In New Orleans I doubt if there would have been any difference at all. Commission merchants make a very needless talk about clean cotton. I have seen cotton on large plantations on the Mississippi, when on the scaffold, which would show the pieces of bolt cover 100 yards, and some say enough to rattle when poured out of the sack into the basket, and yet they sell at about the same price. I dislike too much leaf, but I would never waste time to make it clean. I have fully tested it; besides, a full crop admits no such work. A small crop will not permit, if improvements, manures, &c., are not neglected.

I am, sir, yours, &c.,

M. W. PHILIPS.

EDWARDS, MISSISSIPI, *August* 31, 1852.

SIR: The increased and increasing interest felt in the cause of agriculture induces me to hope and to ask for a much larger edition of the Agricultural Report from the Patent Office than has yet been issued, and that it may contain articles more valuable to the general interests of these United States and less of some things which are of no sort of consequence to at least the Southern portion, and only advantageous to a small portion elsewhere.

I tender you an article upon the hackneyed subject—corn culture; not that I have any new ideas to advance, nor that I have the vain hope of turning men from their errors, after reading what others have written; but I offer this from what I believe to be facts, which may induce examination, and a consequent attention. I believe I have adopted the true principle in the culture of corn, which my fellow-citizens—South, at least—have not. It is true, I might well hide what I believe is the cause; but if I can do any service to my race I will be well content. There are many readers who examine what I write to know what new theory or humbug I have taken up, from being curious. Thus may I be of use.

Having recently travelled through ten counties of this State, principally north of this, (Hinds,) and seen much of the growing crop, with more acres per hand in corn generally than since I have known this country—twenty-two years—heard much and saw more of corn culture than usual, I trust I may be permitted to speak of corn culture.

And, first, I would allude to the one hundred acres here, which were in corn last and this year. The seasons were very similar up to June, the advantage being in favor of 1852, because in February and March the land was in much better condition than in 1851, and the ploughing done better; the stand was better than in 1851, and rains set in earlier; yet the present crop was more injured by the drought, and consequently will yield an average of at least five bushels less, I think. The reason, in my humble opinion: last year my driver obeyed instructions; this year my overseer, though a very excellent man otherwise, thinks he is not bound to obey instructions, and that he will lose reputation by following a plan which "every body and the rest of mankind" have long known to be wrong. Last year the plough was only used, and very shallow, to cover peas, in May; this year, even two horses were used to the sweep, and the plough used once or twice besides, I think.

I will be concise, and I hope full enough for any planter to fully comprehend. I make it a special matter to personally attend to the breaking up of the land intended for corn, unless I have an overseer. I see that all land is broken out, that there be no "cut and cover," that the gearing and rigging of the plough be not changed after once getting the right depth, endeavoring to run them six inches deep. With this intent I put, if ordinary mules or horses, two to one of your one-horse ploughs, and two best to the smallest two-horse, or a large one-horse plough. I break all land into thirty-two feet beds, so that, by running off four-feet rows, the row will not fall in a water-furrow; beginning to plough late enough in February, so as to finish by or about the 1st of March, desiring to have land as freshly ploughed as possible and as late as can be; so that I plant early in March, thereby avoiding the February rains, as much as can be; I *will not plough wet lands*. I lay off rows with a shovel-plough, drop or drill corn about one bushel to two or three acres, and cover always with a harrow, and no board before the hinder teeth, as was done this year—putting in corn enough for birds and a crop too.

Sometimes, when up—that is, when land has not been beaten by rains to become impacted and run together—I run an iron tooth over corn, so as to stir the earth and clean the row, when with three or four blades I run around with a bull-tongue, nicely mould the corn, and, when old enough to bear pulling up, the grain being rotted and birds left the field, I thin, if possible, by hand—provided a rain to soften earth—leaving on the land as many stalks, counting one hundred to the bushel, as will make the crop I count for on the land; thus, if I expect forty bushels, I leave four thousand stalks per acre. I do not like to thin with the hoe, and do it not when I can avoid. Soon after this I pass the harrow once on each side of corn, as near as possible, and, if grass be appearing again, in the middle; and thus I continue until the corn begins to "bunch" for the tassel, when I press up all work to sow peas and "lay by" the corn. I use the shovel-plough when the land becomes impacted by heavy rain, and strive to brush over it before the earth gets quite dry, starting my ploughs and all I can run so soon after the rain as the corn begins to crack. I use sweeps, too, and even turning-ploughs, but only when stormy or wet weather and the harrow will not pulverize the land in time to prevent grass from taking root. The object to prevent turning over land is to kill grass.

Very deep tilth, shallow planting, early and shallow and frequent culture, is my idea of corn culture in this county, which I fearlessly recommend to all my brethren.

Yours, with respect,

M. W. PHILIPS.

TALLADEGA P. O., TALLADEGA COUNTY, ALABAMA.

SIR: Alabama never was blessed with so abundant a crop as this year. In wheat, much more was made than last year—an increase of a fourth, though the quality is not so good. The variety sown most successfully is Orleans. Another variety has lately been introduced by Colonel George Hill, of this county, which is considered by good farmers to be a more desirable wheat than Orleans in several particulars, viz: a stiffer stem—not subject to fall or lodge; makes equally as fair a flour, yields more per acre, and is some eight or ten days earlier in maturing, and of course, a better wheat. It takes the name of its founder, and is called the *Hill wheat*. The greatest yields are from twenty to twenty-five bushels per acre this year in this county.

The manner of preparing land for wheat will differ as the soil and climates differ. The skilful farmer will study the nature of his soil, and take into consideration, at the same time, the balminess or rigor of the climate in which his wheat crop is about to be located.

The best manure applied to wheat, in this county, is cotton-seed, which is applied in different ways. The best manner, however, is, after the wheat has taken good root, and is about to leave the ground, in its upward growth, to haul out your cotton-seed. After having it heated by bulking, so that the principle of vegetation is destroyed, sow it broadcast on the wheat at the rate of thirty or more bushels per acre. Talladega has not heretofore needed much manure; consequently, manure-making has not claimed the attention that it deserves. A few practical farmers are turning their attention that way, and with the aid of the Selma and Tennessee River railroad, great and important changes are destined to take place in our farming operations. At the head of flat-boat navigation, on the Tennessee river, are inexhaustible banks of plaster of Paris, which can be boated down to the railroad terminus at Guntersville, and then transported down the road to the different depôts throughout the length of the road. The guano can be brought up from the seaports in the same way; the lime we have already; and with plaster, guano, cotton seed, and stable and barn-yard manure, our valley can be made anything conceivable in an agricultural point of view. Our farmers have come to the conclusion that they can make more corn, cotton, and wheat, than they have been in the habit of making. No railroad in the history of railroads will equal the Selma and Tennessee River railroad, embracing so many diversified points of interest—not excepting the far-famed Liverpool and Manchester railroad, in England; and no railroad has been prosecuted towards completion with greater energy. The crop of Indian corn has increased at least one-third this year; many farmers making enough to last them two years. Several varieties are grown in the county—the white gourd-seed, yellow flint, red-blaze, shoe-peg, &c. My preference, for early maturing, standing drought

well, yielding most upon thin soil, and least exhausting to land, is obtained by blending the raspberry and yellow flint, or shoe-peg and yellow flint; a sample of which I will forward to the Office. The Patent Office, in absence of an agricultural bureau, should be the national deposite for all improvements, designs, seeds, &c. The rationale of blending these varieties is simply this: No corn has yet equalled the shoe-peg for shelling more to the measure; no corn can equal the yellow flint for yielding meal to the bushel—both being very nutritive. Now blend their properties and you have a very desirable corn. I never plough corn but twice after planting, believing that I would injure corn and land both; and I make as heavy corn as one ever obtains. I endeavor to prepare the land well before planting, and when planted, I consider the corn crop half done. I will make one or two illustrations: In a corn crop in the hill, for instance, lay off your rows three feet apart, (after having the field well subsoiled each way;) this gives 4,840 hills or stalks to the acre; each stalk is expected to have, at least, one ear; sixty ears will more than fill a bushel. Now divide 4,840 by 60, and you have 80 or more bushels per acre. Corn drilled will make more than that. I will give another illustration where the yield can be considerably increased; but take your soil into consideration: In an acre of ground there are 43,560 square feet; now, lay off the rows, giving four square feet to every stalk in the drill, and one foot by subsoiling, making five feet of soil to every stalk—and we think that five feet of soil ought to produce one ear of corn, at least. 43,560 divided by 4 gives 10,890 stalks to the acre—60 ears to the bushel. Divide 10,890 ears by 60, and you have over 181 bushels per acre. I tried this last plan upon a small scale, and succeeded; each stalk brought an ear—on some were two. Your correspondents, speaking of so much hoeing and ploughing corn, certainly make nothing else. How do they have time? And certainly they plough badly, for corn does not require so much, if once well done; it costs too much labor. A small fine ought to be laid on the farmer that habitually buys corn-pork and bacon. Oats, barley, rye, peas, and beans claim our attention. The first writer on agriculture that came under my observation, was the Poet Virgil, and, when speaking of oats, reported unfavorably as to its being a renovating crop. All observing farmers agree, at this day, that oats are an exhausting crop, and not a fertilizing one. A great many oats, however, are grown in this county. The largest yield that has come under my observation, was made by Colonel George Hill, with black or winter oats, producing over 75 bushels per acre.

Perhaps I ought to say something of root-crops before I proceed further. Sweet potatoes and Irish have increased by one-third, at least.

Beets.—I was shown by Colonel McElderry a beat measuring 27 inches round, and a radish measuring 27½ inches round. I considered them by far the largest I had ever seen. The crops of peas and pumpkins have increased in the same ratio. Col. McElderry weighed one pumpkin for the purpose of ascertaining its weight—they appeared so large, and lay so thick on a thirty-acre field of corn—and it weighed 85 pounds. I consider it a mammoth of its species.

Barley draws largely upon the soil, but is a rich and valuable winter pasture. Not cultivated to any extent in Talladega.

Rye is considered by farmers a renovating crop. For stock, it affords an excellent winter pasture; the grain, when chopped and fed to stock, is good food; and when stock, particularly hogs, are turned upon a field of rye, it will make them grow and fatten well. The straw broken down on the field, and ploughed under, makes a tolerably fair manure.

Peas are considered the clover of the South—the cow-pea, I mean. It grows kindly; poor land will produce peas finely, and, if the vine is allowed to remain upon the soil, and ploughed under, it is a great renovator. The pea is good for stock; nothing superior to it in nutritive matter. Beans not cultivated in our county as a field crop. Clover is cultivated by but few in this county; it is receiving more attention now than formerly, and the few who have tried it say that they have every reason to believe that it will succeed well in the valley, as well as farther north. I obtained the seed of the Alfalfa or Chilian clover from Governor Brown, of Florida, last year, and planted it as he directed me, and I find it to grow luxuriantly and vigorously in the hottest and driest weather we have here. It may do for extensive cultivation after we experiment with it a little. Our country, here in Alabama, is naturally intended for the growing of wool. If Scotland ever was, or will be, a wool-growing country, ours will certainly be. Bordering on our valleys are hills or mountain knobs, considerable elevations in places that afford the finest sheep walks and summer pasturage for sheep imaginable. If England can, or Scotland, or Saxony, or even our own countryman, Mr. Cockrill, of Nashville, raise sheep and grow wool upon lands worth fifty dollars per acre, what princely fortunes cannot the Talladega wool-grower realize when sheep-walks and summer pasturage can be had gratis? Our enterprising countryman, Mr. Cockrill, of Nashville, has proved, to the satisfaction of all unprejudiced minds, that the South is the place to grow wool profitably, and the place to grow fine wool. The mildness of our winters, compared with more northern latitudes, will place the advantages of wool-growing always on the side of the Southerner, even if other things were equal; but when we take into consideration the other advantages of the Talladega wool-grower, no comparison can fairly be instituted—the fineness of his wool, the mildness of winter, and cheapness of wintering, and the finest walks and richest summer pastures gratis. What comparison, I say, can be instituted between him and any wool-grower on earth? Between him and a princely fortune, no barrier stands! The question may intrude itself, Why do not the Talladega farmers turn their attention that way; their capital, &c.? The only answer I can make to the inquiry is, cotton, the great Southern staple, has blinded us to what is much more profitable; and, strange to say, wool is grown only for domestic purposes in Talladega county. The next thing that claims the attention of the farmer is his hogs; and the best breed is the native hog, such as we found among the *Indians*. By judicious selection of breeders, any sort of a hog may be raised from the native stock. The manner of putting up pork, and curing bacon and hams, will differ according to climate. We will leave that subject to the Buckeyes of Ohio, and notify them at the same time, that if they even attempt to cure bacon and hams in Talladega, they will have to alter their plan according to climate, or they will save nothing but the skulls and feet, and that by "sousing." With cotton and

rice, the Southern staples, come associated the slavery question. In the cultivation of wheat, corn, rye, barley, oats, and the grasses, slave labor is not so profitable. If the Southern slave-holder realizes any profit at all, it is in a cotton and rice climate exclusively—a land of few enjoyments.

The *cotton crop* of this county will be greater this year than last. The average production has always been considered 1,000 pounds per acre; and some claim more than that.

Every kind of crop succeeds well after cotton. In preparing the land for a cotton crop, it should be subsoiled, and the cultivation light. Cotton lands can be improved by scraping up decayed leaves, limbs, and the mould where these are rotting, and imbedding them in the ridge upon which the cotton is planted. Continue the process, and the land will improve in the production of cotton; and the reason is, these leaves, sticks, limbs, and mould abound in alkalies, and consequently are the very food adapted to the cotton plant. Nothing, we think, has destroyed more land than the cultivation of cotton, the cultivation being pretty much a surface affair. It exposes the land to the exhausting heats of summer, and keeps it in a condition to wash with every rain; and cotton requires later cultivation than any other crop, leaving the farmer no time to prepare manures, or improve his farm as he would desire. Therefore, I say, cotton has destroyed more land than earthquakes, eruptions of burning volcanic mountains, or anything else. Witness the red hills of Georgia and South Carolina, that have produced cotton till the last dying gasp of the soil forbid any further attempt at cultivation, and the land turned out to nature, reminding the traveller, as he views the dilapidated condition of the country, of the ruins of Greece. Rice can be successfully cultivated upon upland. I once made an experiment upon upland rice, an account of which I gave in last Report. An error, however, occured in that Report respecting the quantity of ground. The piece of ground was 60 *yards* by 20, in place of *feet*.

A gentleman of this county has made more by planting a quarter of an acre than I expected. He made 40 bushels of rice; which will make 160 bushels' yield per acre. Rice at four cents per pound (the bushel weighing 30 pounds) makes an income of $192 per acre; surpassing any crop the Southern farmer may plant by a vast majority, if he could get a market and cheap transportation. We look forward to the time when our Selma and Tennessee River railroad will afford us cheap transportation, together with the other advantages we have been endeavoring to enumerate; and then, with the blessings of health, and the advantages resulting from well-conducted schools, we hope to be able to show to the world that we are not outside Barbarians.

Fruit culture is beginning to receive attention. I was shown an apple tree by Mr. Samuel Graham, of Coosa county, found by him in the woods when small, which he removed to his orchard. Its growth was rapid, being now very large, and not more than six years since he removed it to his orchard; we might almost consider it a native tree. Its deep green foliage made it appear as indigenous as the oak in the wood. The fruit possessed very little acid when growing, even in May, but considerable aroma; it is a fall or winter apple, never having born fruit

until this year. Duncan Brown, esq., of this county, has several apple trees of the same variety, obtained by grafts from Mr. Graham's tree.

The fruit should undergo, I think, a chemical analysis. It may possess properties that would be valuable in medical combinations. Nutritive, tonic, and astringent properties may belong to it.

I have written to some length, and will bring this report to a close.

Yours, respectfully,

T. A. BROWN.

To the COMMISSIONER OF PATENTS.

BOLIVAR, JACKSON COUNTY, ALABAMA,
December, 1852.

SIR: Your Agricultural Circular of August, 1852, has come to hand, and in answer thereto I submit the following:

Wheat.—Guano is not used in the production of wheat, nor is it yet *used* or known here, only by name. Wheat, however, is grown to some extent in this part of the State, but nothing can be expected in the way of information to the agricultural community by experiments made in the growing of the wheat crop here, as the production is limited (not enough for home consumption.)

Corn is, and will long continue, the principal crop in this part of the State; and my letter of last year contains all the information that I can give on the subject of cultivating it. This year (1852) has been a good corn year, and corn has eared well. Corn is worth here now only 20 cents per bushel. The manure formed by hogs and from hog-pens, is worth more than I had any knowledge of, until I experimented with it last spring. It will pay well if taken care of and applied to the growing of the Irish potato.

Oats are a good crop, and pay as well as anything committed to the bosom of the earth. I think it a great error in the notion that oats are an exhauster of the soil; my experience is quite the opposite.

Peas are not yet cultivated as a renovating crop; but, doubtless, they soon will be. Peas are a great crop, and no farmer should plant without them.

Clover and grasses are not much grown hereabouts. The experiments are only tolerably satisfactory in the growing of clover. I do not think that red clover is in any way injurious to horses.

Dairy.—Our great distance from market has cut us off from the dairy business so far. But the dawn of better times is now opening, and doubtless some of our best planters will turn their attention to that very profitable branch of rural industry.

Neat Cattle.—The cost of raising a cow until 3 years old is about four dollars, and at that age *now* one is worth *nine* dollars, owing to our chance at the market of the railroad now being constructed in our county.

Horses and Mules.—The growing of these animals is the most profitable business of the farmer—especially mules. They pay well, are always in good demand, easily reared, and soon brought into market; worth, at two years old, from $75 to $100.

Sheep and Wool.—No person has tried the experiment here to any considerable extent. I have no doubt but that wool-growing might be made profitable even here, when the time comes, as come it will, that our people will have to divide labor.

Hogs.—We have some experience in raising hogs here. The Berkshire and Grazier, and some other breeds, have been tried, and seemed to do well at first; but, for the want of pasture, and a thorough knowledge of the animal, they have rather declined; and, with our present opportunities for rearing hogs, the common stock does best; or a slight cross may be profitably kept up. In fattening hogs we have no process, only feeding in the ear—the corn hitherto not being an object.

Cotton is raised to some extent this far north; but this is *now* no great cotton county. We count on from six to eight hundred pounds of seed cotton per acre. Any and all crops grow well after cotton. Nothing that we use in this county exceeds cotton-seed as a fertilizer. Guano is not used here at all.

Fruit, sugar, rice, and tobacco are only raised in very inconsiderable quantities. More attention is now being paid to raising fruit.

Potatoes (both Irish and sweet) grow well here. All modes of planting the sweet are practised, and all do well—as for the best way, I cannot say; every one seems to think his way is sufficient for him. The Irish potato has done well this year; every person has the best in the world—all well pleased with the quality and quantity. Cotton seed, yard manure, or fine litter from a wood yard, if well rotted, rotten straw, or leaves, are all good manures to put in with the Irish potato; worth 75 cents per bushel. White London Lady preferable; Long Johnny most prolific, and best for winter use.

Manures.—No very considerable attention has yet been paid to the collecting or using of manures of any description; but some are beginning to look to that quarter now. I am happy to be able to say that I live in the midst of an honest, industrious, intelligent, and enterprising people—all alive to their own interest and the good of society.

We are now within one day, or less, of Nashville, Tennessee; half-a-day of Chattanooga. Corn is now worth 20 cents per bushel and privilege of market. Good times here. This county could sell this year one hundred and fifty thousand bushels of corn, and have enough left for home consumption. This has been, altogether, a good crop year (1852) for everything, and very much desired, for the last two crops were short—very short; but we are now safe—peace and plenty are now our lot.

I remain your obedient, humble servant,

JAMES WILLIAMS.

Hon. Thos. Ewbank,

Commissioner of Patents, Washington D. C.

Oak Bowery, Alabama, *January* 2, 1853.

Sir: I received your Agricultural Circular too late to send my reply by the time desired; and, in addition to such replies as my own observation suggested, I take the liberty of sending an unpublished essay on hill-side ditching.

The system set forth in the enclosed essay has proved itself eminently successful; and as there is great anxiety manifested by the planting community to adopt some safe system, I have presumed to send mine for your consideration, believing that it will be acceptable to most planters.

Yours, respectfully,

JAMES H. FORMAN.

Wheat is subject to disease and disaster—the fly, the smut, and the rust. Here it is not a staple crop, the yield not averaging more than 8 or 9 bushels per acre. It is generally sown after corn or cotton, in November, on the unprepared land, and slightly ploughed in or covered. No grass seed is sown with the wheat, nor is it necessary, as the crop of crab grass is produced in great abundance, and spontaneously; affords an excellent pasture, is well adapted to hay-making or soiling, and is a good fertilizer.

Oats are more extensively raised; they are sown in January or February by a process similar to wheat-sowing, and yield 25 or 30 bushels per acre; but, owing to the great yield, they exhaust the land, which requires a fallow before it will again remunerate the husbandman's labor.

Rye and barley are only sown for early grazing and a supply of seed.

Peas are extensively cultivated by planting or sowing broadcast among corn at its last ploughing. They are an excellent fertilizer, besides furnishing a most exuberant fall and winter pasture.

Horses and Mules.—The rearing of these animals demands, and is receiving, increased attention. The expense of raising a colt to three years old does not exceed $30. Brood mares and colts require good pasturage in summer and fall, and nourishing food in winter and spring; an occasional change of diet, shelter from the cold and rain, kind treatment, and frequent handling, to make and keep them gentle. In teaching a young horse or mule of your own raising to labor, it is not necessary to break him, but first to convince him by kind treatment that you do not intend to injure him. When satisfied of this, he will not be afraid of you. Your voice will soothe him under all circumstances, and he will readily become accustomed to whatever he sees you handle; hence he will take the saddle or harness without fear, and will learn to draw quietly as soon as the muscles of his shoulders become accommodated to the collar. When restiveness is exhibited, it must be overcome by firmness and patience. Never inflict punishment except for viciousness, and never allow a young animal to be so much fatigued as to become disgusted with his labor, or his strength so much overtasked as to discourage him. Thus treated, your colt comes to his work with all the docility of a pet, and with all the spirit of his unbroken nature. He will be safer, more durable, and more valuable every way. Mules are quite as docile as horses when treated with kindness. The best time to commence with them is as soon as they stand upon their feet; but if their early education has been neglected, it will be found much the best plan to tame them thoroughly before attempting to work them.

Sheep are not profitable; very few are kept.

Hogs.—Increased attention is being directed to the rearing and fatten-

ing of these animals; but we are still too far behind our neighbors of Tennessee and Kentucky to make a paragraph interesting on this subject.

Cotton.—The average yield of cotton in this vicinity is about 200 pounds per acre, and cost of production 7 cents per pound. Level land will sustain a succession of cotton crops, while hilly land becomes injured by washing, owing to its shallow and late culture. It is improved by alternating with peas. I have no experience in regard to rust; and the best preventive I am acquainted with for the worms, is winter ploughing, thorough burning of all trash which affords a lodgment for the eggs, and a strictly observed treaty of amity and peace with the little birds.

Our cotton culture is from 3 to 4 inches deep, on a thin stratum of soil, supported by a stiff, arid subsoil of red clay. Deep culture will only do where the soil is rich and abundant in alkali; else the little fertilizing matter will be so diffused through the broken subsoil that the cotton roots will not be able to collect it. Hence we see deep culture without manure produce large stalks, with late and imperfectly matured seed; while shallow culture produces small stalks, with better and earlier developed seed—owing, probably, to the greater concentration of the alkaline matter of the soil, and consequent readier collection and absorption by the roots. We are, therefore, impelled to the conclusion that, however necessary subsoiling may be, it will be advisable on thin soils to attain it gradually—say an inch or two in a season, until the desired depth is reached. I speak of matured seed as being the great desideratum in raising cotton, as every one of the millions of fibres of a boll of cotton is attached to and elaborated by the seed; and we are as certain of a good coat of lint on a perfect seed as we are to see a good coat of hair or wool on a well-conditioned animal.

Rice I have never seen growing on upland, nor do I see the utility of appropriating good corn and cotton land to a production that does as well in mud or under water. Rice, in its rough state, is an excellent alterative for horses.

Root Crops.—Several efforts have been made to introduce the culture of beets, carrots, rutabagas, &c.; but experimenters have generally abandoned them, under the conviction that the sweet potato, besides requiring less culture, is superior in yield and in nutriment, and much more palatable than any root raised here. Each variety has its admirers, and each is best adapted to some peculiar soil. The usual mode of planting is in hills three feet apart each way, with a potato planted or a vine set out in the apex of each. The cultivation consists in keeping them clear of grass and weeds until the vines cover the ground. Yield from 300 to 600 bushels per acre.

Fruit culture is in its infancy; but I am satisfied of the great fattening properties of sweet apples, and also of the fine alterative and renovating effect that peaches and Chickasaw plums exert on the animal system, particularly of swine.

Manures.—Lime, gypsum, and guano are hardly known as manures, and the saving and making of this article is, as yet, a matter of experiment; and results are not known with sufficient certainty to enable me to make a reliable statement as regards the best process, quality, quantity used, &c.

Hill-side Ditching.

Our soils consist of humus, clay, and sand, the clay generally preponderating. Our subsoil is a fine, close clay, which resists the action of water, but when saturated retains it with great tenacity. Humus absorbs water in large quantities, and rapidly; clay, pulverized, in less quantities, and more slowly; sand in still less quantity, but rapidly. Hence, our soils are well adapted to absorb and retain water; and, wherever there is not a sufficiency of clay for the purpose, the subsoil may be made to furnish the necessary quantity.

An ordinary shower gives about half an inch in depth of rain; a hard shower, about one inch; and a hard day's rain, about two inches. The average annual fall of rain is computed at 45 inches. Our soil, well broken and pulverized, will absorb one-fourth of its bulk of water. Hence, if we could keep our land thoroughly pulverized to the depth of eight or nine inches, it would seldom wash, always absorbing any but an unusual amount of rain as fast as it falls; but, as this is impracticable, it becomes necessary to adopt some plan by which the unabsorbed water can be conveyed off, so that it shall not settle upon and drown the flats, or collect in such quantities while on its way to the branch as to carry the soil with it.

To prevent this, that system of surface-draining called hill-side ditching has been applied; and, although it has in many instances been condemned as worthless, yet we believe that it is the only practical remedy; and we further believe that the cause of every failure has been attributable either to defective location or construction, or neglected repair. We are confirmed in this belief by observing many applications of the system eminently successful. We therefore recommend that these drains should never be more than 250 or 300 yards long without an outlet; and also to increase their capacity, either in dimensions or grade, to accommodate the accumulation of water. Where the subsoil is firm and tenacious, we recommend the latter, and submit a formula, viz: Let the first fifty yards of your ditch (counting from the summit) have a grade of one-fourth inch to the yard; the second fifty yards, one-half; and so on, increasing the grade one-fourth of an inch every fifty yards. In constructing the ditch thus located, the subsoil should be excavated three or four inches. This gives a channel for the escape of ordinary showers without wearing away the embankments, and also furnishes material for strengthening said embankments; but where the subsoil is light and porous, the increase of capacity must be in width. In adhesive soils the ditches may be sixty or seventy yards apart; but in light soils, not more than forty or fifty.

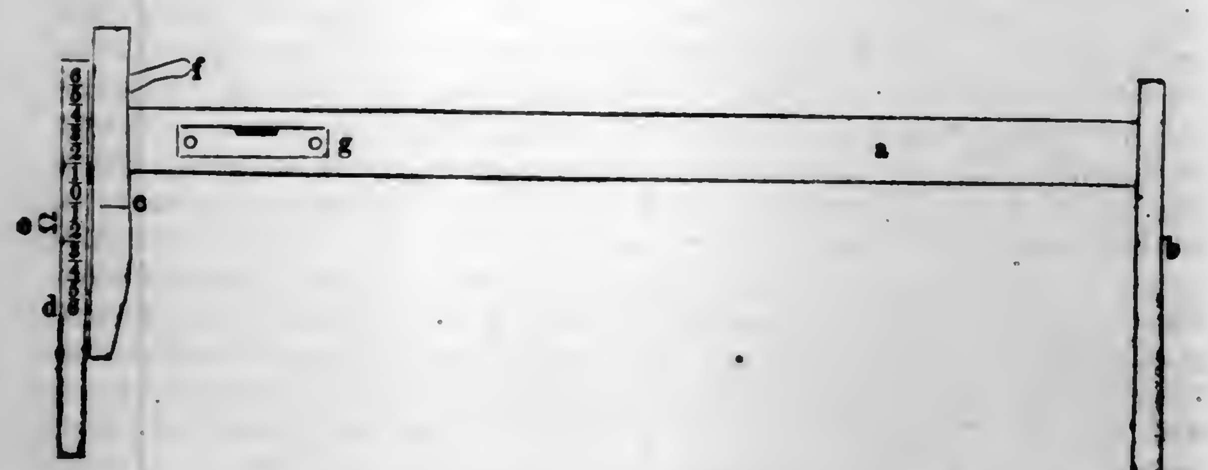
In locating, use the spirit-level, as it is obvious that a defect in this operation is incurable. For the description and manner of using a convenient and cheap instrument of this sort, we refer you to the drawing.

The inequalities of surface incidental to cultivated land will exhibit a great many abrupt turns in your location; and moving it a little, either up or down, always remembering not to move more than two contiguous stakes to the same side, and to strengthen the embankment where it is moved down, or to deepen the ditch where it is moved up—by these means the general grade is preserved; and these short turns, that are so objectionable, by projecting the water against the embankment and

wearing it away, and by affording lodgments to the floating trash, and by the difficulty of adjusting your rows to them, are all obviated, while it gives the work a much more graceful and regular appearance. Another fruitful source of failure in this system is suffered by laying of the rows so that they cross or abut against the embankments, thereby causing them to be trodden down by the horse in ploughing. This may be, and ought to be, obviated by laying off the first row in each space of land close to, and parallel with, the embankments, and every succeeding one parallel to it, until your space to the next ditch below is all laid off. By this arrangement, the horse, in ploughing, will never be required to step on or over the embankment, and your rows will be as well, if not better, situated to facilitate the process of cultivation and draining than by any other means.

We are confident, from observation and experience, that the plan here indicated, if properly executed, will succeed with a very little attention, after construction, as the ditches will keep themselves clean. It will only be necessary to clear them of such rocks, limbs, or large trash, as cannot float off. We are also satisfied, from experience, that the alluvium deposited by these ditches is an effectual reclaimer of our barren glades, and by directing them to such points, the land thus reclaimed will more than compensate for that occupied by the ditches.

An expeditious way to make these drains is to open your way with a turning plough, and follow with coulters; and again with a turning plough; and then clear out with hoes.



The above sketch represents an instrument used for locating hill-side ditches.

a is a lath, one inch by four, and twelve feet long.

b is the hinder leg, one and a half or two inches square, three feet long, and securely fastened to the lath.

c is the fore leg, one and a half or two inches square, two and a half feet long, and securely fastened to the opposite end of the lath.

d is the sliding leg, one and a half or two inches square, and three feet long; it is graduated and numbered from zero, six inches up and down, and by means of a slit and the thumb-screw.

e may be moved and secured to any required grade, there being a mark on the fore leg that coincides with the zero mark on the sliding leg, when the instrument is adjusted to a level.

f is a handle, to carry and hold the instrument by.

g is a small spirit level, securely fastened to the lath by two screws.

In using the instrument let the operator provide himself with a number of small stakes, eight or ten inches long, and an assistant (a small boy will do) to carry the hinder end. Then let him determine his starting point and put down a stake, directing his assistant to place the hinder leg against it; then let him determine the grade he wishes to run, and whether up or down, and adjust the instrument accordingly; then move the fore leg to the right or left until the bubble indicates a level, and put down another stake against the foot of the sliding leg, and proceed as before, directing his assistant to place the hinder foot in the precise spot occupied by the fore one. It will be seen that the instrument can be adjusted to any change of grade that may be required, in a few seconds.

JAMES H. FORMAN.

CHUNENUGGEE, ALA., *January* 17, 1853.

SIR: I had the honor some weeks since to receive from the United States Patent Office the Annual Agricultural Circular, to which I should have done myself the pleasure of responding at an earlier period but for ill health, and circumstances quite beyond my control. I shall not attempt an elaborate reply to each interrogatory contained in the Circular, supposing the information sought in relation to the husbandry and agriculture of the country should be confined to the locality where certain articles are grown, and then practical, reliable information may be obtained. Were I to discourse about hemp, sugar, and tobacco culture, it would all be theoretical, for I live in a famous cotton region, where that great staple is more certain, and subject to fewer casualties, than in any portion of the Union with which I am acquainted, for there has been no failure, and my neighbors have made good average crops uniformly for the last fifteen years. Hence, cotton is the all-absorbing idea; but little attention is paid to anything else; consequently, we are the most dependent people in the whole Union, although nature has scattered her bounties and blessings with a more lavish hand here than upon any portion of the habitable globe. Could we subsist on cotton, could it be metamorphosed into an article of diet, then would we be the most independent people in all Christendom. But not being able to do either, how unwise, how absurd, is our system of agriculture? In a country where the Cereals attain the greatest perfection, with the most prolific soil, yielding in its natural state, viz: without any fertilizer, from 40 to 60 bushels of corn, from 15 to 20 bushels of wheat, and from 30 to 50 bushels of oats—yet with these great advantages for stock-raising, nine-tenths of our planters depend alone on the West for their meat, mules, and horses, and even their flour. "No State in the Union possesses, in a greater degree, materials for a proud independence than does Alabama. These materials, however, are yet in a crude state, and nothing but a strong decoction of Northern fanaticism will ever bring to light their wealth and beauties."

We should have learned, long ere this, that depending on the North and West for our supplies, tends more and more to impoverish us and

increase our vassalage, destroying all rivalry or competition. The great desideratum with the cotton-planter should be the power to manufacture, to some extent, with the force that makes it a portion of his cotton crop. Were the spinning machinery a little more simplified, so as to be propelled or carried by horse-power, and enable the planter during the winter and spring to convert the raw material into coarse No. 4 yarns, he would then realize from 16 to 18 cents for his cotton, instead of from 6 to 9. Each hand upon a good cotton plantation would clean from six to eight hundred dollars, thereby rendering a cotton plantation of far greater value than the richest placer or gold mine of California or Australia. That such will be the result, I entertain not the smallest doubt; and when accomplished, Alabama will be the most brilliant star in the galaxy of States, without entering into competition with Pennsylvania in the coal and iron trade, with which her mountains abound.

These calculations may seem extravagant to those who have not investigated the subject. I feel assured the estimate is low. A friend of mine, largely interested in manufacturing as well as planting, informed me his cotton yielded him a net profit of from 15 to 16 cents, when the raw material was worth only 7 or 8 cents. Now is it not apparent, where a hand make eight bales of cotton, (and they frequently make ten,) that at 15 cents, his labor would be worth $600? At the hazard of being thought egotistical, I will venture to allude to my agricultural operations, with which I have great cause to be satisfied, believing that but few farms, for the last ten years, have been more profitable than mine. I farm as well as plant; while my neighbors plant two-thirds of their best land in cotton, I appropriate more than two-thirds of mine to the Cereals and vegetables, raising large crops of potatoes, peas, turnips, &c. Besides raising my own meat, I usually break a fine team of mules every spring, from mares that aid in ploughing the crop; and from the sale of surplus grain, the expenses of the farm are well nigh defrayed, leaving the cotton crop clear for other investments. Though so large a grain-grower, cultivating between seven and eight hundred acres in corn, and between three and four hundred in small grain, yet I have uniformly made more cotton than we could gather before February. By this system I have been a large stock-raiser; my people have lived comfortably, not being greatly exposed; have been very prolific, which is no small item on a farm where there is an increase of ten or a dozen annually.

But to the Circular. *Wheat*, in this portion of South Alabama, is regarded as rather an uncertain crop, subject to many disasters—such as rust, black blast, &c., &c.: consequently, it is not grown to any great extent. Judicious planters raise enough for home consumption. By sowing the forward kind about the middle of October, there would rarely be a failure, as the crop generally matures before the heavy rains of the latter part of May and first of June, which induce rust, blast, &c. I know of no experiments with guano in that way; it has been used very successfully by our horticulturists.

Corn.—I only know one planter who has used guano in connexion with the corn crop. The result of his experiment I have not learned. The principal manure used by our planters is cotton-seed, with a good supply of which our thinnest land may be made to yield a fair crop of corn. In a proper state of decomposition, cotton-seed exerts a wonderful influence, not only on the growth of corn and cotton, to which it is usually applied, but as a general fertilizer. The most skilful corn planters

are governed in their mode of planting by surrounding circumstances—the quality of the soil, the manner in which it lies, whether flat or rolling. Upon exhausted lands, or where the soil is thin, planting in hills at four feet distance, leaving only one stalk, is the surest mode, and, if well cultivated, seldom fails to yield an average crop; but on our slough lands and creek bottoms, bedding with the turn, ploughing and drilling the corn upon a high bed, leaving the rows from five to five and a half feet wide, and leaving the stalks from twelve to fifteen inches apart in the drill. Corn planted in this way on our black lime lands, with good cultivation, ordinary season, will yield from forty to sixty bushels.

Oats, Rye, Peas, and Beans.—Oats, with us, are becoming a very important crop; nothing is surer, and our lime lands yield them in great abundance, supplying in a great degree the place of corn, of which our farmers are generally scarce, always straitened in the latter part of summer, appropriating, as they do, all their best land to the growth of the long staple; indeed, they only plant with the view of making a scant supply, and, if they run short, and the river keeps up, they can get a few sacks from New Orleans, and, although heated and sour, they will try to make out with it. The horses can do upon oats, and the negroes upon potatoes and peas—a fine system of rural economy, but such is the husbandry of South Alabama.

Rye.—Our climate is less adapted to the successful culture of rye than any of the Cereals. It is only cultivated for grazing purposes, and is valuable as a green pasture for stock during winter, especially for milch cows, sheep, colts, &c.

Peas are cultivated by most of our planters. They renovate the soil and fatten the stock, and would be of great value but for their mysterious *modus operandi, occasionally*, of killing all the hogs and cows upon the farm, as has occurred with my neighbor, Captain Arnold Seale, the past and present season. I say mysterious, for I have been in the habit of raising peas and fattening my stock upon them with perfect impunity for the last twenty years, and I am not aware of ever having lost a pig or yearling by their use. *Beans* are only planted for table use, being a fine, wholesome vegetable.

Clover and Grasses.—But little attention has been paid to exotic or foreign grasses. Our summers are too long and hot, it is supposed, though I have at this time a small patch of the red clover growing on my prairie plantation that looks flourishing and fine; and it shall have a fair trial. Our native, or spontaneous grasses, with proper care and attention, would prove an invaluable treasure. The experiments of Major Seymour Powell fully demonstrate the correctness of this impression, and prove most conclusively that the crop of crab-grass grown on a prairie field after the corn is laid by, if well saved, would be worth more than the corn. To test the matter, he measured several acres. Off the first acre he gathered thirty bushels of corn, which, at the market price, 75 cents, brought $22 50. Off the same acre he saved 2,675 pounds nice hay, worth from $1 to $1 25 per cwt.—say $26 75. The second acre yielded 3,780 pounds hay, worth $37 80, and —— bushels of corn, worth $28 40.

Foreign or imported hay is now selling in Montgomery and Mobile at $1 25, and our citizens are paying thousands of dollars annually for

hay inferior to that growing spontaneously over all our fields. Things far-fetched and dear-bought *only* suit the South.

Dairy Husbandry.—But little attention paid to that. Some few improved breeds have been brought to the country, but have not received sufficient attention. But few make butter for market, and many buy Goshen butter.

Horses and Mules.—Very few attempt to raise horses or mules here. They look to the West, and from the West they get them, or do without.

Sheep and Wool.—Very little attention is paid to sheep-raising. Had we a market for the wool, and the canine race destroyed, sheep-raising would be a profitable business—they do well in this climate.

Cotton.—So much has been said and written upon the subject of cotton that I fear it would be a work of supererogation for me to enter into details in relation to its mode of cultivation. I am sensible of the fact that the seasons have more to do with the crop than any system of culture. I have never failed to make a fine crop when the summer was dry. The average crop in the lime lands is about one thousand pounds, though as much as two thousand, and even two thousand five hundred pounds, are frequently gathered off an acre of hammock or slough land. I will not trespass further upon your time, and only regret that I am not able to make a better report of our stewardship as agriculturists in a country so highly favored by a kind and beneficent Providence.

Respectfully, your obedient servant,

N. B. POWELL.

CLARKSVILLE, HABERSHAM COUNTY, GEORGIA,
November 20, 1852.

DEAR SIR: Below I have endeavored to answer your Circular of interrogatories in as condensed and correct a manner as the nature of the inquiries will permit, although there must be some allowance made for differences of the opinions of different individuals with whom I have conversed upon the subjects embraced; and with the view of giving the most reliable and correct information, I have taken the average opinions upon the questions propounded, and have little doubt as to their general accuracy.

Wheat.—No guano has ever been used for any purpose in this county. The average product per acre is not more than eight bushels, although, with proper cultivation, over twenty bushels per acre have been raised. The seed is usually prepared by soaking it twenty-four hours in a solution of sulphate of copper, (blue-stone,) as a preventive for smut, and with the most perfect success. About one bushel of seed per acre is the usual quantity sown. The usual method is to sow upon land which has been cultivated in corn, and plough it in with a one-horse turning-plough, all which is done in a very slovenly and imperfect manner. The yield, I think, is increasing, as occasionally some one individual prepares his ground as it should be, and is rewarded well for his labor in a good yield, which has its influence upon his neighbors. The best preventive for the ravages of the Hessian fly is to kill all the grass before sowing by early and good ploughing, and also not to locate the field

intended to be sown alongside or contiguous to a grass field. Best and absolute remedy for weevil is to expose the grain, after being threshed, two or three days to the sun by spreading it on a scaffold prepared for the purpose. Average price 87½ cents per bushel.

Corn.—The average product per acre in this county does not exceed twenty bushels, although there are some lands which produce from eighty to one hundred bushels. Major Edward Williams, of Naucoochee valley, in this county, has succeeded, by judiciously manuring a field of twenty-five acres, twice in raising it from twenty bushels per acre to eighty-one bushels, which was the largest yield of upland corn exhibited at our State fair for the year 1852. The cost of production is probably about twenty cents per bushel. The best system of culture is to manure well, during the winter, the land intended to be planted, and to deposit the manure in small heaps upon it and cover them with earth until the time of ploughing arrives; cultivate by ploughing once, and afterwards pass through from time to time with a cultivator, to kill the young grass and weeds.

The best method of feeding is to have the grain both ground and cooked. I should suppose the manure from ten bushels corn, fed to hogs, and properly applied to the land, would, before being expended, add ten bushels to the crops raised upon the ground to which it was applied, over and above what it would have produced without it. The ground is generally prepared by ploughing once with a one-horse plough; but our farmers are beginning to plough deeper than formerly, and some of them to subsoil plough with great advantage. The usual distance between the rows is from four and a half to five feet, and two feet in the drill.

Oats.—Average yield per acre, probably about thirty bushels; quantity of seed sown per acre, one bushel; considered an exhausting crop.

Barley.—None raised.

Rye.—Average yield per acre, about ten bushels; quantity of seed used, about one bushel per acre; not considered an exhausting crop.

Peas are cultivated as a renovating crop by some, and with very evident beneficial results. It may be called, as a renovator, the clover of the South, as it serves the same purpose here that clover does at the North, both for hay and manure.

Dairy Husbandry.—Very little attention paid to the business as regards the improvement of cattle, or the making of butter or cheese; cost of raising cattle to the age of three years, probably about four dollars per head. The usual price at that age is about ten dollars per head. Our cattle are generally turned into the mountain range in April, where they remain and provide for themselves until the 1st of December. I am unable to give any information as regards blooded cattle from personal experience.

Horses and Mules.—The raising of mules would, beyond doubt, prove very profitable, as they can be raised in the mountains as easily as cattle, and with as little care and cost as regards feeding. Mules and young horses are usually broken to labor by harnessing them by the side of a gentle old horse or mule for a day or two, when, with gentle and careful treatment, they will work kindly afterwards.

Wool-growing.—A number of gentlemen in this county are commencing the raising of fine-woolled sheep with a fair prospect of its proving

profitable. I am unable to give the cost of producing it—necessarily must be very little as regards current expenses. It costs no more, and probably less, to produce fine than coarse wool, as the French Merino is hardier than the native. I have heard it said that 100 ewes would raise 99 lambs in a year; or, in other words, they scarcely ever lose one. The country is admirably adapted to the raising of sheep, as the climate is very uniform in temperature.

Hogs.—Very little attention paid to raising and improving the breeds of hogs. A mixture of the Grazier and Berkshires is supposed to be the favorite cross.

Cotton.—None raised.

Sugar Cane.—None raised.

Rice.—It can, I am informed, be successfully grown upon upland, and yields, with fair attention, 50 bushels per acre. I cannot give any information in regard to the best methods of cultivation.

Tobacco.—This county is admirably adapted, in the character of soil, to the production of tobacco, which is on the increase; almost every variety grows well, and yields a fair remuneration to the cultivator. There is nothing new or interesting practised in its production, and probably it is best to alternate the crop with that of wheat or other small grain.

Potatoes.—Both Irish and sweet potatoes succeed well in the lands here. A fair crop of the former is about one hundred and fifty bushels per acre; and of the latter, from one hundred to three hundred bushels; cost of production, about ten cents per bushel. There is but little of the rot known here.

Fruit Culture.—The cultivation of fruit is receiving much attention at this time; more attention is being paid to it throughout the State than there is in any other; the varieties of seedling apples and peaches are very numerous and fine. At the last exhibition of our State fair some sixty varieties of native apples were presented, and amongst the number many desirable kinds were found. A committee of three competent gentlemen were appointed by the executive committee of the Southern Central Agricultural Society, to clasify, name, and reject, those of an indifferent character, and recommend those found worthy of a more extended cultivation. From the character of those presented, I do not hesitate in saying that, in the space of ten or fifteen years, the trade in apples will be from Georgia to the Northern States, instead of as at present, from the North to the South. Apples grow larger and fairer here than in New York State, and a decided preference is given to Southern seedlings, many desirable kinds of which have originated with the Cherokee Indians in this and the adjoining States, and who were acquainted with no other means of propagation than by planting the seeds. Northern varieties of apples grow as well here as at the North, but generally ripen too early for preserving or transportation to market.

The justly vaunted Early Harvest, Newtown Pippin, and Esopus Spitzenberg, will not compare for size, flavor, and beauty combined, with our Julien Summerour and Cullasaja. The committee above alluded to expect to extend their examinations another season to that of peaches and other fruits, as well as to that of apples, to which it was necessarily confined this season. Pears grow admirably here, and are becoming more and more extended each year. I have practised cutting away the diseased portions of the bark in case of attack of blight, (as it is easily

discovered on the trunk and larger limbs previous to its affecting the foliage,) and then applying a mixture of common lye, or soft soap, and an equal part, by measure, of spirits of turpentine. This mixture I apply with a painter's brush to the entire trunk and larger limbs, and in every instance of attack previous to its use the trees have recovered from it, and those which had not been attacked by it have thus far escaped. Those grafted upon quince stocks appear most liable to the disease, and the quince tree itself here usually dies with it in from eight to twelve years, and frequently sooner. *Query.* Have we not poisoned the almost entire race of pears by working them upon quince stocks, and then, by grafting from them again upon pear stocks, communicated it to them? This disease appears almost to be a constitutional one with the quince, and if, upon experiment, it be found so, it had best be abandoned as a stock for grafting pears upon. The yellows is a disease peach trees are not subject to here, but, instead, we are annoyed with the depredations of the curculio, for which no effectual remedy has been found. Neither are our apple trees subject to the blight, as is said to be the case in the Northern States.

Grapes grow kindly here; many of the foreign varieties do very well yet, although they have not been cultivated many years, nor to any extent. The kinds most generally grown are the Scuppernong, Isabella, and the Warren, Segar Box, or Miller, of N. C., which, I am informed, are identical and indigenous in Georgia. The Catawba also succeeds well, in addition to those mentioned, and is a desirable variety here for general cultivation. The finer cherries, when grafted upon the Mazzard stock, do not succeed, as the bark of the trunk invariably splits, causing its death in a few years after transplanting.

The growing of fruit will, beyond question, prove profitable to Southern planters and farmers, and I have scarce a doubt that the apple can be grown, by proper care and culture, in every portion of the State.

Yours, respectfully,

J. VAN BUREN.

NEAR BLAKELY, GEORGIA,
November 2, 1852.

SIR: In reply to the inquiries contained in your Circular, a brief statement will give the requisite views of the agricultural operations of this county—indeed, of most or all of Southwestern Georgia.

Indian corn and the *cotton plant* are grown on a large part of almost every plantation. Next to these, the oat crop is the most important; but wheat, rye, and barley grow well, and are produced as crops of secondary value, on which very little care or skilful husbandry is bestowed. Excellent crops—such as sweet and Irish potatoes, cabbages, beets, and most other productions of kitchen gardens—are grown in requisite abundance for domestic use; as also, rice, sugar-cane, and ground-nuts, most of which are consumed on the plantation.

Indian corn—very large fields of which are cultivated for the subsistence of horses, mules, and hogs, as well as for bread—is produced in

quantities per acre varying from ten bushels to forty; fifteen or eighteen may be assumed as the average for the county.

Cotton is by far the most important crop we have, and yields, per acre, from two hundred to five hundred pounds of marketable wool, according to soil, season, and tillage. Though seldom or never a total failure, this production is greatly curtailed by wet weather during the season of fructification—say from the middle of July to the middle of September. It is asserted by many observant cotton-planters, that, if from falling rains the inside of the bloom or blossom once becomes thoroughly wet, the fruit is inevitably blasted, and doubtless long spells of rainy weather at that warm season favor the generation of worms, which destroy the young bolls—sometimes to the extent of fifty per cent., or more. We have even remarked that dry summers are highly favorable to heavy cotton crops and the good health of the inhabitants. The customary pitch of crops in this county is about twelve acres in cotton and eight in Indian corn for each able-bodied hand or laborer, white or black; besides this, however, two or three acres to the hand in oats or other winter grain, and half an acre or more in sweet potatoes, with garden productions for family use.

The customary allowance of food to negroes, in bacon or meat of equal value, is three pounds and a half weekly, and as much corn-meal as may be needed, (about a peck,) with unstinted access to the turnip patch, and the fields in which pumpkins and peas or beans are grown. Each family of negroes is also permitted to cultivate for its own use a sufficient garden spot, and to raise chickens. These provisions, so far as my acquaintance extends, are common; but some masters of slaves allow more, and some less. The sweet potato crop is a valuable one, and might, beneficially to the country, be much extended, as this choice esculent can be kept in good condition from one harvest to another, though it is generally eaten up by or before midsummer.

What we call the corn-field pea—of which several varieties are abundantly grown in all our corn-fields, especially on fresh lands—seems to keep our live stock of all kinds fat, during the fall and part of winter. It is for the most part eaten off the ground on which it is grown, none being gathered except for seed, and a few bushels for table use.

Some cotton planters do not raise meat for their own consumption, but buy it of those who have it for sale, chiefly the dealers in pork and bacon at New Orleans and other seaboard markets. They are, of course, able to cultivate much larger crops of cotton; but the usage in this county generally is to make plenty of provisions and less cotton—a course of farming that is probably more economical, at all events attended with less trouble and risk, and I doubt not secures the better feeding of both men and beasts.

So many acres of cotton, corn, oats, and other crops could not be cultivated without an extraordinary use of the plough; so in fact it will be found that no country on earth keeps and feeds so many plough-beasts, horses and mules, as the cotton-growing regions of the South. They are a costly part of our plantation stock, and were it not practicable to raise sufficient forage on the place, and as much cotton as may be housed by Christmas, our system of agriculture could not be sustained; at any rate, the profits would greatly decline.

Thousands of mules are driven from the valley of the Mississippi, and

sold in this and other cotton-producing States. Western mules are chiefly relied on; of late, however, our planters seem determined to diminish this reliance, by raising these animals on the plantation where they are intended to work.

Very respectfully, &c.,

E. CRAWFORD.

To the COMMISSIONER OF PATENTS.

WACCAMAW BEACH, NEAR GEORGETOWN, S. C.,
November 8, 1852.

SIR: In replying to your queries respecting rice this year, I will begin by stating the results of the trade in that staple, showing the amount of the crop of last year. I extract from a commercial journal of the city of Charleston, September 1, 1852:

The exports of rice from September 1, 1851, to August 31, 1852, were one hundred and twenty-six thousand seven hundred and seventy-seven tierces.* Of this crop were exported—

	Tierces.	
To Great Britain, about 67 per cent. in paddy	12,889	
France...... about 26.... do....do	4,299	
N. of Europe, about 36.... do....do	27,295	
West Indies	20,770	
Total foreign exports		62,253
To Boston....about 9 per cent. in paddy	4,101	
New York, about 6.....do....do	31,506	
Rhode Island	20	
Philadelphia	5,041	
Baltimore	3,563	
New Orleans and Mobile	17,274	
Other ports	19	
Total coastwise exports		61,524
Grand total exports		126,777

In addition to this amount of rice exported we have the quantity consumed in the city and the accidental losses to be considered, also; which will make the total consumption and exportation, between the periods

* City consumption	12,000 tierces	126,777	Exports.
Less stock on hand September 1, 1851	1,474		
		10,526	
Burned 30—and stock on hand September 1, 1852—164		194	
Rice crop of 1851-'52		137,497	tierces.

already designated, one hundred and thirty-eight thousand eight hundred and seven tierces, thus:

	Tierces.	
Total exports	126,777	
Consumption of city of Charleston	12,000	
Burnt	30	
Total consumption		138,807

Taking the supply for the same period, we have received—

Clean rice	115,469	
Rough rice, paddy, (462,590 bushels)	22,028	
Total receipts	137,497	
Stock on hand September 1, 1851	1,474	
Total supply		138,971
Leaving a stock on hand September 1, 1852		164

By these statistics it will be seen that the entire crop of the last year, as denoted by the receipts, was one hundred and thirty-seven thousand four hundred and ninety-seven tierces, while the total consumption was one hundred and thirty-eight thousand eight hundred and seven tierces, or exceeding the receipts by one thousand three hundred and ten tierces, which was supplied from stock on hand September 1, 1851.

This year (1852) the weather was favorable to the growth of rice until the latter part of August, as will be seen somewhat from the following statement, showing the number of wet days, and the quantity of rain which fell:

			Inches.
In January, there were	5	days of rain	1.42
In February	do	10 do	2.08
In March	do	8 do	4.04
In April	do	9 do	3.81
In May	do	7 do	3.64
In June	do	10 do	6.03
In July	do	17 do	8.01
In August	do	15 do	3.20
In September	do	11 do	12.48
In October	do	7 do	5.16

On the 11th and 12th September 6.14 inches of rain fell. Snow and sleet fell in January and March.

In the earlier part of August the coast was visited by a severe storm of very general extent, accompanied by unusually heavy rains, in the interior of Carolina. The consequence was a destructive freshet in all the rivers in the State. The growing crop of rice, then nearly ready for the sickle, was submerged in many places on the Savannah, the Santee, the Wee Nee, and the Pee Dee. Nearly all the planters, not thus overflowed, were delayed in their harvest by a long continuance of east winds backing up the river-water, and producing a succession of high tides. The harvest in this neighborhood, which ought to have been commenced on the 9th to 12th, was not fairly begun until the middle of September, and then under many disadvantages. The season was so wet that much of the rice was imperfectly cured. The rice was over-ripe when eventually reaped, and wasted very much in the handling. Another storm, on the 9th October, overtook the harvest, still unfinished, and added, of course, by its effects, to the damage previously sustained by the crop.

From the foregoing statement I infer that the crop of rice, though it may not be inferior, in the number of bushels, to that of an ordinary season, yet in the number of barrels of clean rice for export, it will be less. We may suppose that very prime parcels will be the more highly estimated, owing to the scarcity of such.

In respect to improvements, I am inclined to think that the draining of rice-fields might be improved, and the harvest somewhat facilitated, if we could be furnished with a flood-gate of the nature and for the uses of a tide-lock, but not so expensive. Rice-flour is believed to be the best manure which has been used thus far, stronger and more diffusible than either chaff or rice-straw, though more costly.

The cheapest of all manures, however, is the sediment deposited upon the fields themselves by our great rivers in their occasional overflow. A remarkable instance of this deposit occurred on North Santee, in the year 1845, I think. I examined the crust of deposit on Mr. Andrew Johnstone's plantation the year after, of which I preserved a specimen, over two inches in thickness. I caused to be sown in April last a small sample each of four varieties (the best of near twenty, which were furnished me by Mr. Lawton, the active president of the South Carolina Institute) of foreign rice, the product of which I have not yet examined. The opinion of my overseer is that they are all inferior to our own seed.

I am, very respectfully,

ROBT. F. W. ALLSTON.

To the Commissioner of Patents.

Laurensville, South Carolina,
September 27, 1852.

Sir: In reply to your inquiries on points belonging to "rural affairs," I take pleasure in answering as follows:

Wheat.—Guano has not been used in the production of this crop, within my knowledge. The average product per acre, from seven to ten bushels. November the time for seeding, and June the time for harvesting. Soak the seed in blue stone solution—about one pound for every five bushels, which is almost universally regarded as an effectual remedy for smut; about three pecks to one bushel of seed per acre. Plough, generally, only once; the yield increasing. Wheat after cotton; corn after wheat; sow early—best remedy for Hessian flies. Sun well, and put up while hot, to prevent the injury by the weevil. Average price in 1852, $1 25. No grass-seed sown with wheat.

Corn.—Guano is not used, within my knowledge, in the production of this crop. Average crop, about fifteen bushels per acre. Best system. Plant in drill rows 4½ feet apart, and 18 inches in drill. Plough four times—first and second times deep, last two shallow; the ground to be subsoiled nine or ten inches deep before planting. Ground food is best, and given cooked.

Oats, Barley, Rye, Peas, and Beans.—The first yields about thirty bushels per acre; the second, about sixty; the third, about five or ten; the fourth and fifth may be made to yield from forty to fifty if planted alone, but not the half of that if planted as is usually done, with corn. The first takes, per acre in seed, about 1¼ bushel; the second, about the same; the third, about 3 pecks; the fourth and fifth, if planted with corn, about 10 bushels for 100 acres. Peas and beans least exhausting; oats most. Peas are regarded as the clover of the South as a renovator.

Clover and Grasses.—No experience with clover or grasses except for small grazing lots.

Dairy Husbandry.—Make none for market, except for village consumption. No cheese; butter now 15 cents per pound—usually 12½.

Neat Cattle.—Usual price, 4 cents per pound; grass-fed dairy cows worth from $10 to $20.

Horses and Mules.—The growing profitable when there is good pasturage.

Sheep and Wool.—No experience, only for home consumption. Farmers do not generally succeed well with them here.

Hogs.—The tall English, mixed with Berkshire or Woburn. To cure hams, salt down the pork about two weeks; take up and resalt with one teaspoonful of saltpetre to every ham, and three pounds of brown-sugar for every 100 pounds of hams; pack down for two weeks more; then take up, wash the hams in warm water, and put them in clean sacks of coarse white cloth; stop the meshes with a solution of lime or hickory ashes; then hang and smoke for three or four weeks, letting them hang all the balance of the season until wanted for the table.

Cotton.—Average yield of cotton in the seed, per acre, about 600 pounds. Cotton after wheat. Know of no preventive against rust, army, or boll-worm; seldom annoyed by any in this part of the country. A low bed or ridge is the universal preparation for cotton; the after-culture not very deep. The seed is one of the best fertilizers for any and everything grown in the earth. The cotton lands may be improved by seeding once in two or three years and ploughing horizontally; and, if the land is hilly, hill-side ditches are indispensable. I have no experience with guano.

Sugar cane.—None.

Rice seldom grown; a few grow the upland rice for home consumption.

Tobacco.—None.

Hemp.—None.

Root crops not grown as a field crop.

Potatoes not grown, except for table use.

Fruit culture receiving increased attention. Now that railroads are affording greater facilities for transportation, apples might be profitably grown. Sweet-potatoes are better than apples by far for hogs and cattle. None will keep well here during the winter. I know of no remedy for *blight* in trees. From experience, they propagate fruit trees by the cleft-graft in February and by budding in June.

Manures.—Our common plan is to collect forest leaves into the barn yard, and, after being trod for a few weeks, put up in pens and litter again. Neither lime nor plaster is much used, though both are thought to be good fertilizers.

With my best wishes for the laudable object designed by the questions propounded, the above, though ever so imperfect, is respectfully submitted.

Respectfully,

JOHN W. SIMPSON.

P. S.—Many of the citizens of our district have recently organized themselves into an agricultural society, of which I have the honor of being president. In their behalf, therefore, I would be pleased to receive a part of the many seeds, &c., which are deposited in the Patent Office for distribution.

J. W. S.

LAKE SWAMP, HORRY DISTRICT, S. C.,
June 22, 1852.

SIR: On the 15th of November, 1851, I received your kind favor of a half pint of Troy wheat. On the 19th I planted it on ground measuring 36 by 30 feet in drills two feet apart. It stood the freeze of winter remarkably well, which was one of the coldest we have had for many years. The 19th March last we had a very heavy snow. The wheat had commenced jointing; the snow injured it very perceptibly. On the 15th of June I harvested it, and the yield was one hundred and four fold—that is, 26 quarts—being 104 times the amount of seed planted. Had it not been for the injury by the snow, which caused the bottom blades to die, and a very dry spring, I think the yield would have been one-third more. I am well pleased with it, and purpose giving a fair trial this fall. Most of the straw grew five and a half feet high, and I have heads of it saved from five to six and a fourth inches long. Permit me to return you my warmest thanks for the two Patent Office Reports you sent me. I view them as a great blessing to the farmer.

Very respectfully, yours,

THOS. A. BEATY.

GREENVILLE COURT HOUSE, S. C.,
September 29, 1852.

SIR: In reply to your Circular, which I received a few days since, I will endeavor to give you my experience in the raising of clover, that other planters in the South may be encouraged to try effectually the culture of some of those grasses that flourish so well here, and particularly that of clover, which I find to be one of the very best crops used in agricultural economy—one that grows luxuriantly, and comes in at the scarcest season of the year. It affords more nourishment than any other hay crop I have ever tried. All kinds of stock are particularly fond of it. I know that some planters in the South have been discouraged entirely from growing clover, thinking that it will not grow in this latitude,

35° 10′ N.; but I have seen beautiful crops south of this; and perhaps the experience of one who has grown it successfully for twenty years may be an encouragement to others.

I commenced with clover in 1832; the seed I think was old. It was sown the first day of April, (rather late for this climate,) on rich alluvial bottom land, without manure or lime. I put only one gallon of seed per acre.* Oats were first sown—a light crop—and ploughed in close; the clover-seed was then sown and brushed in smooth. The spring was dry, and the clover-seed did not come up until about eleven months afterward—being the first of March the next year. I waited, however, with great patience, and kept off all kinds of stock, and in the winter had the weeds and stubble taken off, that I could have the clover cut close to the earth; and by the 24th of May it was from two to three feet high, and yielded more than three tons of hay per acre the first cutting; and two crops in the year are common, though the second is not so good for horses, although it is fine for cattle if well saved. The proper time for cutting it is when in full bloom, by which time the oldest blossoms will turn black. To secure the full benefit from this hay, it must be cut when the clover is dry; and, after laying two or three hours in the sun, it is then in the best state for feeding. But when it is necessary to take off the entire crop in a few days, turn the hay over the third hour after cutting; this prevents the leaves from falling off. Cock it up before the dew falls on it. The next day, with one hour's airing, it will keep in an open loft, spread thin; but if it heats in the bulk, after the first night, it will sour and "funk;" then it is not so good for food, as in this state it often salivates a horse. If it is too old or wet when it is cut, stock are not so fond of it; but the great avidity with which they devour it when properly cured fully compensates for all the care necessary to be taken; and therefore we must always keep it sweet; for when sour it will salivate a horse or mule severely: and this is one reason that persons have supposed that it was injurious to horses. And one other way it will injure horses, as will any other hay or corn blades, is this: when it heats in curing, by being bulked too soon, it gets mouldy and dusty, and if fed to a horse in this state, it will produce a cough, and finally bellows, or phthisic, as some farriers call it; but in no other way does it injure any stock. It matures at a season when work animals need such food more than at any other, and seems to be exactly suited to their wants, and is a great saving of grain.

I find in this climate that clover does better sown in the fall with wheat or rye, in the same way it is sown with oats in the spring. If the land has produced a crop of peas before sowing it is better. Land that contains a good portion of lime is best for clover, and on land that is deficient in lime the clover crop may be very much improved by applying fine slacked lime, at the rate of ten bushels per acre, when the clover is about five inches high. It is best to apply it as regular as possible; and to do this I have taken a carryall, laden with ten bushels of lime, on the land that was staked off into squares of one acre, and then with a wire sieve, shaken the lime through it on the land, taking a swarth four feet wide across the acre. It is best to do this in damp weather when the mist is falling in the spring; then the lime is carried down regularly

* Five quarts of seed are better.

on the land. If you apply lime to wheat in this way in the spring, it will produce a most luxuriant growth; but this produces so much sap in the straw that it is almost sure to take the rust and be destroyed. In this way I lost entirely the most promising piece of wheat that I ever saw.

To prepare land for wheat, it is best to apply lime, ashes, or other manure, to the preceding crop, and raise peas on the land with corn, for the two years' shift, which is common in this State. I have found orchard grass to yield very abundant crops. It will grow four feet high on good soil, and yields a large amount of fodder. I have sown about three pecks per acre, with oats in the spring. All grasses have to be sown with small grain to protect them from the heat of the sun, which will kill out almost any kind when young and tender. The crop of small grain will come off the first summer, and grass the following spring, although both are sown at the same time of seeding.

Herdsgrass may be sown at the rate of one bushel per acre; it grows best in low, moist land, and does well for grazing; but the crops of hay are light. I have got but one crop in a season. It holds to the soil with great tenacity, and is difficult to eradicate. All grass, for hay, ought to yield two or three crops per annum. I have cut clover three times, and gamma grass, also, when the land is very rich and supplied with good top-dressing, and the spring is seasonable. To sow grass for grazing it is best to sow two or three kinds together—clover and Timothy, clover and herdsgrass. Clover will grow with almost any other kind of grass and do well; but where land is scarce and the climate hot, it is far better to soil them by cutting every day, or twice a day—it is then fresh, sweet, and healthy; but if the weather is likely to be bad it is wise to lay up some for a rainy day; and it may be kept in an open loft almost green for two or three days, when scattered thin. But to cure hay well requires some experience and close observation. And, first, to have it good, cut it before the seed matures, when in full-bloom and free from dew. If the crop is heavy it is economy to have square sheets made of coarse cotton cloth, as nearly water-proof as possible, to throw over the piles of hay in case of a shower of rain or a storm; a good brick tied fast to each corner will hold it down to the earth. One cutting of hay will pay for the cloth, and a single rain will spoil that; but if the cloths are well taken care of they will last twenty years, and pay for themselves ten times over. But if, in a season like the present, the grass and weeds are about to overrun the clover, cut all off together in the fall for hay, and the clover will continue to grow through the winter, and the others will be destroyed.

I have thrown these ideas together in such a crude shape that I fear they will fail to have the effect which truth is entitled to, and will be read only by those who may desire to practise upon them.

With consideration of respect, your obedient servant,

HENRY M. EARLE.

WELSH'S MILLS POST OFFICE, CABARRAS COUNTY, N. C.,
November 15, 1852.

SIR: I received your Circular last week, and herewith send you some information in reply to the questions annexed to it.

Wheat.—This year's crop is abundant in all directions, as far as I have heard from. We have the Mediterranean, the blue-stem, bearded, and red spring wheat; but the May wheat is the best for this county; it comes early, and the stem is strong and not easily blown down. The time of seeding is the month of November, and time of harvest from the 1st to the 10th of June.

Whilst all other varieties were in cultivation, and finally run out, we had to turn to the May wheat that had been kept alive for a quarter of a century; the average yield, about ten bushels per acre; from two and a half to three pecks is a plenty to sow per acre. No objection can be raised against it, only the late frosts in the spring, that sometimes overtake it.

Corn.—The white corn is most esteemed and mostly raised in this county. This year the crop is abundant in every direction. There was no lack of rain from planting-time until corn was thoroughly made. The average yield, I think, must be about thirty bushels on upland, and on bottoms forty bushels, in my humble opinion. There was more corn raised this year than in 1850 and 1851. The time of planting from the first to the thirtieth of April. The mode of cultivation is, to break up the ground well, plough deep, and plant the rows four and a half feet apart each way; thin out to two stalks in the hill, and, if the land is thin, leave one stalk only.

The best mode of raising peas is to plant, when the corn is planted, two and three to a hill, and if some of them do get overlaid in working, the balance will mature sooner and bear larger vines and larger pods than if sown broadcast or otherwise planted. There are but few farmers that raise peas for market.

I will remark that I counted from one ear of corn this season 1,220 grains; the average price of corn in the nearest market is thirty cents per bushel.

Cotton.—This is the great crop of the county; the season has been favorable from the commencement; there was, generally, a good stand on the ground. No other crop is so faithfully attended to as the cotton. There is a great crop this year, and I would say that there will be, on an average, 400 pounds clean cotton to the acre.

For the mode of cultivation, I would recommend to knock down all old pods, branches, leaves, and the like, early in the spring, between the old rows; then turn the furrows on this, with a plough drawn by two horses, from four to six weeks before planting, giving time for the ground to settle; then split the ridge with a narrow plough; drop the seed, and cover with a light harrow drawn by one horse.

Most farmers keep a field constantly in cotton from year to year, and, by adding a little manure, improve their cotton land. This fall has been excellent for gathering; no frost to kill up to the 10th inst. The average price in the nearest market is $8 50. Farmers are improving in their cultivation of cotton, &c.

Oats could be raised with fine success; but the best ground must go for cotton, next best for corn, and the third quality for oats. But if oats had the ground cotton gets, the yield would be twenty-five and thirty bushels per acre.

This was a fine season for oats; and they are a fine feed for horses. The weight is about thirty-three pounds per bushel, and price twenty-five cents per bushel.

Rye.—None raised in this section of country.

Barley.—None raised, but would yield well.

Tobacco.—None raised in the southern counties of North Carolina.

Hemp.—None cultivated in this region.

Clover.—None raised for horse or pasture.

Sugar-cane.—None raised in this part of North Carolina.

I cheerfully submit my remarks to you; and if you think them worthy of a place in your excellent Patent Office Report, they are at your disposal.

Yours, with respect,

JOSHUA HARRIS.

To the Commissioner of Patents.

Jefferson County, Va.,
December 22, 1852.

Sir: Having received a copy of the Circular addressed from the Patent Office to the agriculturists of the United States, I feel prompted to comply with the request it contains, to give such information as I may be able to do of the condition of the agriculture of this district, although it is quite probable I shall not be able to communicate "new facts or discoveries of practical value to American husbandry." The particular portion of the "valley of Virginia" of which I now write, lies in latitude about 39° 15′, bordered on the southeast and east by the Shenandoah river, which runs along the western base of the Blue Ridge mountain. The soil and climate have been long esteemed particularly adapted to the culture of wheat, which has for many years been regarded as the staple crop; corn having been generally raised only for home consumption, and field culture confined to these two varieties of product, besides clover, which is universally cultivated as a fertilizer. The soil is what is generally termed limestone—that being the principal mineral product of this district, and the waters being strongly impregnated with the carbonate of lime. But there is, notwithstanding, considerable diversity in chemical and physical composition, and in fertility; the surface in some places presenting a slaty structure—in some abounding in fragments of silicious stone, varying in size from that of a hat to that of a pea; in many presenting a deep and rich alluvial mould—in others many fragments of sandstone, and generally a large proportion of yellow clay—this last being the character of the subsoil.

The price of farming land here varies from forty to sixty dollars per acre, depending upon location and improvements. The usual mode of cultivating wheat is to plough a clover field, which has been well grazed during the summer, in the month of August, to the depth of about five or six inches, harrow once, lay off in lands of 16 feet, and from the 25th of September to the 15th October, but three weeks earlier for Mediterranean wheat, sow broadcast 1¾ bushel to the acre of every variety except Mediterranean, and 2 bushels of that. The ground in corn is usually at the same time sown, without any preparation; the

corn frequently still standing upon the stalk in the field as it grew; the wheat covered, in the fallow-field, by the harrow being passed twice over it, and in the corn ground by the single or double shovel plough, or sometimes, when the corn has been cut and shocked, by the harrow alone; but little difference, if any, being observable in the result. The corn-ground wheat usually receives clover seed in the following March at the rate of one gallon to the acre, sown broadcast, and plaster of Paris either at that time or the preceding fall, at the rate of a bushel per acre. I have also applied the harrow to wheat in the spring when I sowed clover seed, with, at the time, apparent injury, but decided ultimate benefit.

Our harvest commences ordinarily about the middle of the last week in June, and lasts ten or twelve days; being usually over by the close of the first week in July. Cradling is still the prevailing mode of reaping, three to four acres, carefully cut, to the cradle, being accounted a fair day's work; but the reaper has been for several years used by some farmers—the preference having been generally given to Hussey's; but in that I think public sentiment is undergoing a change in consequence of the very great advantage of McCormick's of depositing the wheat to one side, thus avoiding the loss of time at that busy period resulting from occasional failure to get the wheat out of the way, and enabling a small force to accomplish a decidedly greater amount of work. It is understood, also, that McCormick's reaper is less liable to choke, from whatever cause. The variety of wheat preferred for strong land, or fallow land generally, is a red wheat called the Zimmerman; for corn or thin land generally, the Mediterranean or white wheats. The drill is rapidly taking the place of the broadcast in seeding; Demmock's being decidedly preferred to any other yet used here.

An average crop from corn-ground and fallow, for a period of ten or twelve successive years, actually saved, threshed, and delivered into the mill or to the merchant, from good land, well cultivated, does not exceed, I think, fifteen bushels to the acre; but the yield varies very much, from 25 to 30 bushels down, a fair prospect being sometimes blighted by rust or fly.

In the former of these evils, no preventive or palliation even is known; for the latter, grazing by sheep is, by some, esteemed a remedy or preventive, the habit of the close grazing of wheat, particularly the Mediterranean, having latterly decidedly increased.

The greater part of the wheat raised here is sold to the miller in the neighborhood, ground, and sent as flour to Baltimore; the price being regulated by the price of flour in Washington, deducting the cost of transportation, about 45 cents per barrel. I obtained for my wheat from the year 1837 to the year 1847, an average of one dollar per bushel; since that the average has been considerably less. Five bushels of wheat are allowed for a barrel of flour, which is believed to be rather an excess; the offal usually offsetting the cost of the barrel. This year the price has varied from 80 cents in the summer to $1 in December.

Many persons prefer to apply their manure as a top-dressing, either in the shape of unrotted straw or of muck, to the wheat in the fall or winter; others plough it under for the corn crop in the spring; twenty four-horse wagon-loads being considered a good dressing in the latter case, and half that in the former. I have applied guano to wheat, at the time of seeding, at the rate of 300 pounds per acre, with decided benefit, but

doubtful profit; the cost per ton on my farm having been about $60. Having tried both methods, I found it advisable to mix a bushel of plaster per acre with the guano. I have found, when smut existed in my seed wheat, soaking it in a solution of salt or blue-stone, and afterwards rolling it whilst wet in slacked lime, an effectual remedy. The hand screen—an implement introduced here within three or four years, and costing about $10—has been exceedingly effectual in removing cockle, scarcely a grain remaining. Weevils are scarcely known here. The fallow wheat is succeeded the following year by corn. For this crop the ground is broken up as early as it is in a proper condition to be ploughed in the spring, beginning usually with the middle or the latter part of March, when the ploughs will break about an acre and a half each per day. The plough used is the three-horse bar-share. Should it be meadow ground, however, it is broken the previous fall as soon as practicable after seeding, in order that the sod may be completely rotted and merely harrowed and laid off in the spring. The laying-off furrows cross each other at right angles, four feet apart each way; some persons using for the purpose only the single shovel plough, and others preferring to use the bar-share, with two horses, in crossing, as affording a better bed for the seed. Corn-planting usually occurs between the 20th of April and 10th of May; sometimes, however, commencing a few days earlier, and occasionally continuing till late in May; the latter-planted corn, not unfrequently, with propitious seasons, equalling, and sometimes outstripping the early. About six grains are dropped to the hill, which are thinned to two or three when the corn is six or eight inches high; the corn is covered with the hoe. The cultivation of this crop once with the harrow, and repeatedly with the single and double shovel ploughs, occupies our agricultural labor uninterruptedly, with the exception of a few days immediately after planting, devoted to the repairs and making of fences, till hay making and harvest; the former commencing about the middle of June. Plaster is sometimes applied to the hill after the corn comes up, and sometimes omitted. If any improvement has been lately introduced in the cultivation of corn, it is probably in running a furrow with the single shovel plough, midway between the rows, in one or both directions, before harrowing, and very soon after the corn comes up; this advances the tillage, and the harrow acts more effectually; the roller is sometimes used with much benefit at this stage. A fair average crop of corn in a series of years from good land, well tilled, is from 25 to 30 bushels per acre; the price about 50 cents, varying from 40 to 60. The corn is usually ripe enough to cut up by the 20th of September, and is shocked and housed during the fall and winter; sometimes not completely till spring. The common white and yellow varieties are cultivated; that known as the Dutton has been tried and abandoned as unproductive.

I have the honor to be, sir, most respectfully, your obedient servant,

G. W. TURNER.

To the Commissioner of Patents.

GLEN WELBY, FAUQUIER COUNTY, VIRGINIA,
Near Rectortown P. O., December 16, 1852.

SIR: A Circular from your department, requesting information upon various subjects connected with the agricultural interests of our county, was handed me a short time since by my neighbor, J. S. Balthrope, esq., requesting that I would answer some of the questions therein proposed. In obedience to his wishes, and actuated by a desire to contribute such aid as I can to a cause so important, I have penned the following remarks, relative to the crops most attended to in this portion of the State, of which you are at liberty to make such disposition as you think proper.

In reference to the wheat crop, I will state, that for the past three years we have been using guano in its production; previous to that time it had been used in very small quantities, in the way of experiments, the result of which led to its use by almost every one who could spare the money for its purchase, or could procure it on credit. The gain per 100 pounds of guano is about five bushels of wheat. In every instance within my own experience or under my own observation, it has paid a better profit on old and exhausted than on well and partially-improved lands. The kind of soil which appears best adapted to its use is the cold glade, or what we call white oak soil; though it shows its effects upon every kind of soil in which I have known it tried, except in one instance—and that was on a field of red, and very loose or chaffy land.

Our usual time of commencing to seed is about the 20th of September, and of finishing about the 20th of October, varying of course slightly, as the season and weather may dictate. This season very few began earlier than 1st of October, and those who did, suffered from the attacks of the Hessian fly. No preparation of the seed is practised generally, except to get it as clean as possible of rye, cockle, and chess; for which purpose, the fan, and in some cases a revolving screen, are used; which last machine no farmer who is animated by a laudable pride for the appearance of his wheat fields should be without.

The quantity sown per acre is from one and a half to two bushels. My experience is in favor of the largest quantity named; and, invariably, when I have lessened the quantity from that, my crop has been affected thereby. We plough but once previous to sowing; a second ploughing makes the land too light; and, consequently, the wheat is more liable to be thrown up by the winter.

We plough from six to nine inches in depth, and, where there is any turf to be turned over, find the old-fashioned bar-share plough the best; in light or stubble land, the McCormick, or some of the lighter cast-iron ploughs, will answer. The quantity of wheat raised per acre, without guano, on the fallow fields in this part of the county—I mean on those lands tolerably well improved—will average about twenty bushels per acre, and the corn-land about from twelve to sixteen bushels. This applies, of course, to years when the wheat crop has not been afflicted with any serious disaster, which sometimes is the case. The use of guano—150 pounds per acre—will increase these yields at least seven and a half bushels per acre. It will also facilitate the ripening of the wheat, rendering it less liable to *rust*, (in my opinion the greatest enemy to the crop in this region,) and will also produce a luxuriant growth of clover; which alone, if not grazed off closely, and is suffered to decompose on

the land, will fully pay for the cost of the guano in the greatly improved condition of the land. Previous to the use of guano, the usual practice was to succeed the fallow wheat with a crop of corn, and succeed the corn with wheat the ensuing spring, and while in corn-land wheat, sow clover-seed, and the fall after the clover matures, which is eighteen months from the time the clover-seed was sown, again fallow and put in wheat. The conviction, however, that clover, either with or without Timothy, should always be sown when guano has been used, has led, in most cases, to a change in this system; and few, if any, will be so injudicious as to fail to sow grass-seeds after guano; clover alone is generally sown, it being considered a much greater improvement of the soil than Timothy; though where the land is flat or glady, Timothy should always be, and generally is, mixed with the clover seed. The time of sowing grass-seeds is from 20th March to 1st April. I have sown as early as 1st March, with success; Timothy seed usually does better if sown in the fall of the year, when the wheat is sown.

The drill for seeding wheat is used by many, and is much liked; it is thought to save seed and labor, and the wheat is less apt to be winter-killed. It requires, however, that the land should be in fine order and clear of stone and clods, in order to do good work. I do not think the roller of any advantage, except to break the clods, and in most instances the harrow will accomplish that as well; and when it is designed to sow clover-seed in the spring, I think the smooth and somewhat compressed and hard surface left by the roller is unfavorable to the taking of the clover.

When the ground is well turned over, and has been gradually settled by the rains, the best mode, in my opinion, of seeding wheat is, to lay off the land diagonally across the ploughing about 16 or 18 feet in breadth, sow the wheat and guano on the rough, and then cover it with the large three-horse harrow, lapping about half way, so as to make it a double harrow when done. The practice of some, of cross-harrowing, I am opposed to, as I think much wheat which had been covered by the first harrowing is uncovered; such, certainly, is the opinion I have formed from personal observation. If the land requires harrowing before seeding, the wheat should be put in with cultivators, which I greatly prefer to ploughs, either single or double shovel, from the fact that if there is much or any blue-grass, it is less disturbed by the former than by the latter, and a better surface is left to the field, which renders it easier to save the crop.

In reference to the yield of wheat per acre, as before mentioned, I deem it proper to add that in some instances, both as it respects the fallow and corn land, the yield is much greater, even as high as thirty bushels and more for fallow, and twenty and upwards for corn land; though the instances are not sufficiently numerous to affect the average, as before stated.

In regard to the corn crop, which is scarcely, if at all, inferior in importance to the farmer in this region, the result of the use of guano has been beneficial to this crop, from the fact before stated—that no judicious farmer will now immediately succeed his fallow wheat with corn; but, if guano has been used by him on his wheat, he will also sow grass-seeds, which he will suffer to grow to maturity; and, after the rest of about two years, will then plough it up for corn. Some experiments have been made with guano in the hill with the corn, and although for

the first few weeks after the corn comes up the effect is perceptible in the growth and color of the plant, after a short time that difference ceases, and it is probable that in a very dry season the guano will tend to fire the corn. I have seen one instance this season, in the adjoining county of Fairfax, where about 250 pounds of guano per acre had been ploughed in, and the result was a good crop of corn; the land is naturally very poor, and of a light gravelly character, and, without guano, would perhaps have produced a very light crop. If applied to corn at all, it should certainly be ploughed in at least six inches. This season was exceedingly wet, and, of course, prevented the guano from firing the corn; it would require a dry season to test it effectually.

My plan is to plough no field for corn that has not rested in grass at least two or three years; and five years I prefer. I plough it in the spring with the bar-share plough to the depth of about eight inches; harrow it well—twice, if necessary; lay it off each way in rows three and a half feet apart, and drop the corn well rolled in plaster—six or seven grains, and often more, in the hill; and, whether I am late or early in planting, I always cover it deep, either with hoes or the corn coverer—an implement recently introduced into this neighborhood, very simple in its construction, and well adapted to its purpose. I prefer a good number of grains in the hills for the following reasons: That the combined force of the germinating grains, when a good many are together, more easily breaks through the crust, which is apt to form on the surface, and suffers the plant to come through, and if attacked by the cut, or bud worm, or the *ant*, there is greater probability of a sufficient number of stalks escaping. The deep covering prevents the corn from rotting in the ground if planted early, and the ground should be wet and cold; and, if very dry, it will come up better, from the fact that it has more moisture than it would have if covered shallow. In support of the correctness of my opinion in this particular, I will state that I have practised upon it for ten years, and have not, I think, used two bushels of corn in the whole time for replanting.

As soon as my corn attains sufficient size I go over it with the three-tooth cultivator, running as near as practicable to the corn, and also running the way the ground was first laid off, which last-named mode renders the corn less liable to be covered by the dirt and clods. If I have sufficient force, I follow the cultivator with the hoe, carefully uncovering any that requires it, and stirring the earth around such hills as have not been approached sufficiently near with the cultivator. After going over it in this manner, I again commence with the cultivator, and go over it the opposite way, following with the thinners, leaving two stalks generally, and in the richer spots three stalks, in the hill. The next cultivation is with what I call the rooters, being narrow plates three inches wide, and not less than 18 or 20 inches long, and fastened to the mould-board [?] of the plough, either with an eye or a bolt and lap; with these I run very close to the corn without covering it up, and very deep, which, at this stage of the crop, is highly essential; for if the season should prove a dry one, the increased depth to which the roots of the plant have been invited will prevent its being very greatly affected by the drought; and, if a wet season, it will cause the water to sink more easily, and not remain on the surface, or wash in gulleys, as frequently happens. I split out the middle in this cultivation, either with the rooters or with the long and sharp single shovel plough. My last cultivation is with a single shovel plough, next to the corn, not very long, which throws the dirt up to the corn, and furnishes some support against the winds, which sometimes prostrate the stalks, and either injure the crop quite seriously or render it more difficult to secure. In this cultivation I split the middle with the cultivator; these leave a smooth and beautiful surface to seed on; and it avoids leaving a furrow in the middle of the row, which is the case when the plough is used in the last cultivation, and is the cause of the corn-fields being so often washed into gulleys.

The foregoing has been my method of cultivating corn for the last ten years, during which time we have had two excessive droughts—one in 1845 and the other in 1849; and my crop has never been less than eight barrels of corn per acre. In 1850, it was upwards of ten barrels; and this year, so far as gathered, it exceeds ten barrels per acre. I have finished one small field of twenty acres, and have measured up two hundred and three barrels, exclusive of offal corn, of which, however, there is not much. (A barrel is five bushels.)

The usual time of planting is from 20th April to 1st of May; in some cases rather earlier in beginning, and sometimes rather later in finishing. I have twice, in the last ten years, begun as early as 6th April, and on both occasions succeeded. Those seasons were, however, very forward.

The length to which I have unintentionally extended these remarks prevents my saying anything respecting the results of my experiments in the use of plaster on wheat and grass.

I have the honor to be, very respectfully, your obedient servant,

RICHARD H. CARTER.

The Commissioner of Patents.

Salem, Fauquier County, Va.,
December 8, 1852.

Sir: Your Circular, desiring information on the various branches of agriculture, was duly received. I now proceed to answer some of the interrogatories contained therein.

Your first and second inquiries relate to the production of wheat and corn. By request, Mr. R. H. Carter, who is more systematic in his farming operations than myself, has stated in full his mode of culture, and the general result is a decided approval of his system of operations.

Your next relates to the production of oats, barley, peas, and beans. For the oat crop, I usually set apart a portion of the poorer or rougher sort of my stock land; plough as early in the spring as the frost and wet will allow; sow on the rough one and a half bushel of seed to the acre, put in with the harrow. If the application of grass-seed or plaster is designed, it is well to lay off the ground again in lands eighteen feet apart for a guide. A top-dressing of plaster will greatly promote the growth. Average yield, twenty-five bushels per acre. The crop is an exhausting one. Barley not raised with us. Peas and beans usually planted with the corn; generally not beyond the amount required for table use at home. If we have a few surplus bushels, they will command a dollar a bushel, if white.

In reference to the quantity of hay cut from an acre, I have never correctly tested it; but from our usual way of estimating it, by the load or stack, we hear that good meadow land will produce more than two tons. In laying down our meadow land, if the soil is rolling we generally use equal quantities of Timothy and clover; sow at the rate of a bushel to six acres. In most cases, the seed is sown with wheat or oats, without any extra preparation, except to apply manure, if necessary, and harrow to a smooth surface. On wet or clayey land we use Timothy, or a mixture of Timothy and red-top grass. It may be sown with wheat or oats, as above stated; but to insure success I think it is best to fallow the land, harrow it down as evenly as possible, lay off on lands sixteen feet apart, sow in August or September, as the season may dictate, at the rate of a bushel to five acres, and lightly harrow it in.

Cost of producing Hay.—Good meadow land well set in grass is worth fifty dollars per acre.

Interest thereon	$3 00
Cutting and stacking, one hand 2 days	2 60
Team and stacker, ½ day	3 00
Fencing stack	1 50
	10 10

Hay in stacks upon the meadow is usually worth from $7 50 to $8 per ton. When delivered in our villages it will bring from 40 to 50 cents per hundred. The fall pasture will amply pay for keeping the fencing and ditches in order, and snubbing, if necessary. Suppose an acre to produce two tons, it will leave the net cost of producing hay $5 05 per ton.

In reference to red clover being injurious to horses, so far as my experience and observation go, it is a preferable grass for rearing colts—will perhaps produce a more rapid growth than any other; but work horses cannot endure heat or fatigue when running on red clover. If the season is wet, I have found it to be decidedly injurious to horses, either in or out of use; but as an improver it is preferred to any other grass. The application of plaster will greatly promote the growth, and thereby enable it to impart more strength to the soil. On most of our lands blue-grass will come spontaneously, and affords an excellent grazing for work horses, and beef or dairy cattle.

Dairy husbandry has received but little attention as a business, though most farmers make a surplus of butter, which, at this time, will bring 25 cents per pound. This, however, is more than we have usually realized, owing, perhaps, to the cheap and quick transportation by the Manassy Gap railroad—an improvement just completed through our section of country.

Neat Cattle.—Cost of a good calf at weaning, three-and-a-half dollars; first year's keeping, four dollars; second year, five dollars; third year, seven dollars; which would bring the animal to a little more than three years, at a cost of nineteen dollars and fifty cents; average value at that age—for heifers, twenty-five dollars; steers, thirty. I have never ascertained how much beef one hundred pounds of corn would produce. In reference to the difference between a Durham, Devon, or native animal, if they are furnished with plenty of choice food, there is no doubt the blooded animal will improve the fastest; if the food is rougher, and the supply scanty, the native animal will get the advantage.

My plan to break steers to the yoke: When I have selected two of a neat, sprightly appearance, I confine them side by side in a stable or some convenient place; fasten the yoke securely, to avoid accidents. It is well to confine their tails, also. This can best be done by interplaiting the hair, and roping it with wax and cord. Let them out in a meadow or a field that is clear of obstruction. When they have wearied themselves down by running, as they will be certain to do, approach them frequently, and pat them. When they become a little pinched with hunger, they will take food out of the hand. With this treatment, in a few days they will become pretty tame; then hook them to a light draught of no value. Let them drag it for several days. After they have learned to master the draught conveniently, and become well accustomed to the yoke, they may then be put to work without any difficulty, taking care to load them light at first, and increase the load according to their strength and ambition.

Horses and Mules.—The latter are not raised with us. The growing of the former is profitable on farms that are remote from market, and well adapted to grazing and hay. The cost of rearing a colt until three years old: A good colt, at weaning—say four months—is worth twenty-eight dollars; first year's keeping, twelve dollars; second year, fifteen dollars; next twelve months, fifteen; which will bring the colt to three years, at a cost of seventy dollars. Average value at that age, ninety dollars. Treatment of brood mares: Having owned a stallion for several years, I have observed that mares are much surer to prove in foal when not suffered to run on red clover, or any sappy grass; if the season is wet it is best to keep them on dry food until the time of the horse's service has past. There is no objection to their being used, but they should always be used with a great deal of care, never overdone with heat or fatigue. When they have gone some eight or nine months, they should be kept apart from other horses, or at least see that they are not kicked or jammed by them; and when they are within a few weeks of foaling, it is well to turn them on a meadow or grass lot that is clear of ditches or abrupt streams, as mares are naturally inclined to foal near a stream of water; and I have more than once known colts to be lost by being dropped in, or so near a branch that they have fallen in before they were fully able to walk. In reference to the best way to break young horses to service: I am a poor hand to break a horse for the saddle; but, having been my own teamster for several years, my plan to break a colt to harness is to put him in a team with other horses, selecting a time when I am not compelled to load heavy. It is best to put on such loads as the team can manage with or without the assistance of the colt. Let him draw or walk at his ease. By indulging him a few days in this way, he will come to the draught as a matter of choice. In most cases this treatment will avoid making what we call balking or false horses, which often happens by trying to force the horses to drag draughts before they are able or know how to manage their loads.

Wool-growing.—I have but little experience in wool-growing. I believe it to be profitable in localities remote from market, and upon large ranges of good pasture.

Hogs.—Best breed, a cross of the Berkshire with the native. Cheapest plan to produce pork is to keep the pigs fat from the outset, or at least give them a sufficiency of food to keep them in a growing condition. I do not believe the growing of pork to be profitable beyond the number of hogs required to consume the stubble slops, waste apples, or such food as cannot coveniently or profitably be consumed by other stock.

Cotton, *sugar*, *rice*, *tobacco*, and *hemp* are not raised with us.

Root-crops, turnips, &c.—I sowed this year, as near as I could measure it by steps, two acres of poor land; applied four hundred pounds of guano; sowed the last of August; raised upwards of four hundred bushels. I believe if I had sowed the first of August, I should have raised a larger crop. I am now feeding them to my stock. I believe it to be the most valuable crop that could have been raised upon the land at the same cost of labor and manure. I also sowed turnips with my potatoes, at the last ploughing, in the latter part of June. They grew to fine size, but were unfit for table use. Land designed for the turnip crop should be broken up early in the summer, and cross-ploughed several times at intervals sufficiently near to keep down any weeds that may be inclined to grow on it. The ground will also become completely pulverized and retain the moisture much nearer the surface than land that has just been broken up; and, in case of drought, which often happens about seeding time, this treatment will insure a crop when a failure will ensue upon land that is fresh broken.

Potatoes, Irish.—I planted twenty bushels on about three acres of ground. They were of a variety that I do not know any name for. We call them the common white potato. I raised about one hundred bushels to the acre of a good sound quality. I also planted one bushel of the Mercer upon about an eighth of an acre. I harvested thirty-five bushels, and supposed I left ten bushels that were affected with the disease, (they were not worth gathering;) which would have made a yield of three hundred and forty bushels. I believe if I had planted upon the same land double the quantity of seed, the yield would have been much greater. If the Mercer had escaped the disease as well as the other variety, the crop would have been a very profitable one. Potatoes can be grown at a cost of twenty-five cents per bushel; and the time is not far distant when the crop will occupy an important place on most farms that have means of a cheap and direct transportation to market.

Yours, respectfully,

J. L. BALTHROPE.

BUCKINGHAM COUNTY, VA.,
December, 1852.

SIR: I will now endeavor to reply to your Circular requiring my opinion upon the various branches of agriculture in this (Piedmont) section of Virginia. The wheat crop used to be a secondary crop compared with the tobacco crop; but, since the use of Peruvian guano, the wheat crop is greatly enlarged by the use of it upon our old exhausted grain fields, and will make the yield double when 200 pounds is applied to the acre.

That amount seems generally admitted to be the right quantity, upon the principle both of profit and economy. I have strewn it broadcast, and ploughed it under, seven, eight, and nine inches, which was recommended by the first experimenters, believing it was putting it unnecessarily deep. I have, this fall, fallowed all my wheat-land the same depth, sowed the wheat and guano the same day and hour, harrowed both in together, and I never had wheat to come up better. It is a mistaken notion that, if the wheat and guano be sown together, the causticity of the guano will injure the sprout of the wheat. Smut in wheat this season has partially prevailed in this region; as a remedy, I washed my seed in strong brine that would bear an egg, then rolled in lime. As an experiment, I added guano to one bushel—literally every grain was coated over with lime and guano; sowed it so, and fully one half failed to vegetate. This experiment proved a failure. This washing in brine and rolling in lime was pursued till I procured blue-stone, in which I had more confidence; one pound of which was dissolved in about 15 gallons of water, in which I put five bushels of wheat, stirring and washing it well, skimming off with a cullender the false grain and chess. This process was done the day preceding, to get a supply of seed for the next day, remaining in pickle about eight hours; longer will not injure. When taken out, drain it well over the pickle barrel to prevent waste, then spread upon the barn floor to drip and dry; the wheat will absorb near half the pickle; add water to supply the deficiency, and half a pound more of the blue-stone for the next five bushels. The kinds of wheat cultivated in this section are various—say Mediterranean, dark grain, bearded, weak straw, and upon good land, apt to fall; Etrurian, white bearded, New York, white flint, early white, and red purple straw much approved. Smooth heads not liable to fall. For uplands the blue-stem, or, more proper, Polish, which was distributed from the Patent Office. White, a large grain, smooth head, stands well, and very productive. I never cultivate bearded wheat; it is bad to handle, shatters badly, the straw is coarser than beardless wheat, and the chaff unfit for feeding. I estimate the chaff of 1,500 bushels of wheat, for feed and manure, worth $75. I grind my stock corn to a fine meal, giving to each horse and mule two quarts in the morning, two quarts at midday, and three quarts at night, well wet and mixed with a bushel basketful either of chaff or cut-straw, which will keep farm-horses in good plight. The wheat crop the present year is of good quality, except smut and damage by the joint worm, partially. The estimated average upon corn-land, 10 bushels to the acre; upon low ground and tobacco land, 20 to 25 per acre. Our common time of seeding, and for several years past, has been early in September; much too early. Thirty to forty years ago, seeding was delayed until October, to pass the egging season of the fly. In a few years they were nearly destroyed for want of the wheat upon which to deposit their eggs. The few flies remaining made their attack in the spring, which is much less destructive than an autumnal attack.

Finally, from the great diminution of the fly, and scarcely a complaint of their damage, many good farmers thought they could seed wheat earlier, and commenced in September. I have seen it sown the 4th day of September in this county, and heard the fly had destroyed it; the Sep-

tember seeding has greatly augmented the fly by giving them a hot bed to deposit their eggs upon. The most unscrupulous will find that they must fall back to October seeding, or be subject to great damage by the fly. Late seeding and making the land rich, is the best remedy. Wheat is now selling in our market (Richmond) $1 10 for red, $1 15 for white, four months' credit, and our millers are trading upon the farmers' capital. Corn is planted from the 1st of April to the 1st of June, and is safe to cut and put in stooks of 100 stalks together as soon as the grain is glazed, about the 15th of September. My mode of planting is in rows four feet, ranging north and south, dropping four grains every two feet. Seed corn always selected from stalks bearing two good ears; I believe it is a peculiar kind, and will more generally bear double ears. Six quarts of tar is dissolved in 10 or 12 gallons of boiling water, with two pounds of copperas; when cold add the seed corn, which stands 48 hours. When taken out it will be dyed black, and very sticky from the tar; it is then rolled in gypsum, which adheres well, and planted. The copperas makes it offensive to birds and quickens vegetation. I break the land with a four-horse bar share eight to nine inches; a subsoil plough following, furrow by furrow, which breaks the hard pan and leaves no clay over to mix with the soil. The corn is dropped in that furrow upon the clay, and covered by soil about two inches, reserving the ploughed soil to be applied to the corn in cultivation, rather than place it below. Corn requires as much moisture as any plant in the vegetable kingdom; therefore, plant it deep, when it will seek and obtain moisture, and be rendered much less liable to tumble in storms. Our corn (or maize) is of many kinds. The distinctive names are white and yellow; a mixture of the old gourd seed and Tuscarora. The white makes the best bread; the yellow best stock corn, being a little richer.

I am happy to inform you that great and zealous efforts are now in progress for renovating our exhausted fields, from the Chesapeake bay, including the Piedmont part of Virginia, to the Blue Ridge mountains, by deep ploughing and subsoiling, the first and most important step in improvement; also, making and applying more home-made manure, the great auxiliary, clover and plaster, pea fallow, guano, lime, marl, and ashes. Our trans-Alleghany country, naturally rich, and as yet a young country, well adapted to grass and raising stock, has very little exhausted lands. Agricultural implements: first, the plough, the most valuable tool that ever entered mother earth; the kind most approved, and in general use, is called the Livingston, made entirely of cast-iron, and so ingeniously put together that there is but one screw, and that at the tail of the beam. I use No. 4, which is easily drawn by three mules. When the points are well chilled, and the land not too gravelly, they last very well, and are a cheaper plough than wrought-iron when the farmer has to pay for strapping and pointing. The points, when worn out, can be pointed by breaking it off square, making a steel point to fit the breast of the plough, drilling two small holes, and rivetted on. They are, in every particular, superior to any other kind I ever used.

We have a wheat fan, of recent manufacture, by a Mr. Burnet, of the town of Staunton, for construction and power of execution, separating the false wheat and chess better and more perfectly than any other kind

I have ever used. No barley is cultivated. Multicole rye is sown to some extent near the mountains, and said to be very productive. The long and round potato succeeds well, and generally cultivated; no complaint of rot in the latter. Turnips, beets, parsnips, and carrots are only raised for family consumption; so, also, as to the pulse tribe.

In my communication, which is in your Report of 1851, I was very lengthy on the process of curing bacon and tobacco, which I prefer to refer to, rather than swell this communication to a greater length. Also, in that Report, to your inquiring what increased weight will 100 pounds of corn meal make in a stall beef, it reads "five pounds," to which you very properly made a note. I ask now to correct it, and make it *fifteen pounds*, which is a lower estimate than is generally made; which by many is carried up to twenty-five pounds. Their estimates are very indefinite; much depends upon the plight of the animal when stall-feeding is commenced. I hazard the opinion that no man ever received a fair return for his grain in stall-feeding a poor broken-down ox, which ought to be grazed two summers before stall-feeding. We are careless in raising grass. There are very few meadows. Those we have are generally laid down with herdsgrass and clover. Yield of hay, one and a half to two tons per acre. The usual top-dressing is gypsum and ashes; February considered the best time of application. The second crop of clover will salivate; even the first crop of wet seasons, and too old when cut, with mould, and dried leaves near the ground. The rearing of sheep is increasing. In the western part of the State, where lands are cheap and kind to grass, I hear of many large sheep walks. We have but few regular dairies. I know of but one: Doctor Laburn, near Lexington, Rockbridge county, has a very extensive one, of seventy or eighty cows, and makes cheese fully equal to the best Goshen cheese.

Your Report is the most valuable document circulated by Congress. It is sought after by the people, and read with pleasure and instruction.

All which is respectfully submitted:

CHAS. YANCEY.

To the Commissioner of Patents.

Hickory Hill, near Forest Oak Post Office,
Montgomery county, Maryland, August 17, 1852.

Sir: I have been a constant recipient and reader of the annual Report of the Patent Office for several years, and I hope it will not be considered presumption in me to make one or two suggestions in regard to it. The information elicited by it is certainly very important to the agricultural community, and every effort should be made to increase its value that could be resorted to. I therefore respectfully suggest, that, among the other inquiries found in the "Circular," it would be well to add one or two in regard to the *character* of the land in the various selections of each State, and also the price (minimum and maximum) of the same. In this age of improvement, the soil seems to receive its full share of attention; and I am satisfied that many of the advantages belonging to particular sections of the country, and not known out of those localities,

would, by being brought to the notice of other sections, be taken hold of, and thus their value be fully developed.

To illustrate the above more fully, I will state, that in the State of Maryland the character and price of land varies from $1 20 to $2 per acre, owing to the various circumstances which attend its peculiar location, &c. Now, there are many persons who own land that would command the extreme price above mentioned, who have never dreamed that land, every way or easily cultivated and brought to an equal degree of fertility, can be purchased in the same State for a sum 98⅓ per cent. [less?] Whereas, if this information could be diffused over the whole country, it might be the means of introducing enterprise and capital into those sections which need them so much, from others, where there is hardly room for their useful investment.

Very respectfully, your obedient servant,

GEO. C. PATTERSON.

To the Commissioner of Patents.

Dover, Delaware, *December* 23, 1852.

Sir: In reply to the interrogatories contained in your Agricultural Circular of August, 1852, I have the honor to communicate the following information: Adopting the order of the Circular, I begin with

Wheat.—Guano is extensively used in this (Kent) county in the production of this crop. Generally speaking, the soil of the county was originally well adapted to the cultivation of wheat, but, by reason of hard tillage, without any return to the land in the way of manuring, it has, for the most part, been worn out for forty or fifty years; so much so, that the average yield of farms before the introduction of guano, some six or eight years ago, did not exceed, if it equalled, five bushels per acre. When I say that the average, eight years ago, did not exceed five bushels, I simply include such land as was then seeded, for a great portion of arable land in this county would not bring any wheat if seeded, without help. If all the arable land in the county had, ten years ago, been seeded in wheat—good, bad, and indifferent—I do not believe it would have averaged two bushels, or certainly not more than three bushels per acre, and of corn not exceeding eight bushels. Indeed, many farmers had almost entirely abandoned the cultivation of wheat. When I was a boy, I have frequently heard farmers in my neighborhood say they had not raised as much as they sowed. The quantity of land now seeded is, I feel very sure, more than twice as great as that sown ten years ago. The average product per acre of our land treated with 300 pounds of guano, is about fifteen bushels; without guano, about five bushels; so that the gain per 100 pounds of this manure may be set down at three and one-third bushels. The time of seeding with us varies considerably. If we sow on fallow, which is mostly used of late years, we commence about the 10th of September, and the fallow-land is generally all seeded by the middle of October. The time for seeding stalk-ground commences with the latter part of October, and lasts until the 5th or 10th of November, and, in some instances, even later. I have harvested wheat on the 15th of June, but our harvest usually commences about the 23d. The quantity seeded per acre is gov-

erned by the quality and strength of the soil and the time of sowing. If we sow early, less seed is required in the same ground than if sown late, and a stiff clay soil seems to require more seed than a light soil of equal richness, because the former will throw more wheat out in the winter season; but this last remark is not applicable to land seeded with the drill. The minimum quantity seeded is one bushel per acre; the maximum is two and a half bushels. We plough, generally, but once, and to the "yellow dirt," as the ploughman terms it, which varies in depth from four to nine inches. The yield per acre is constantly increasing in proportion as guano is more generally used. We know of no remedy for Hessian flies or weevils, though many expedients have been tried. We never suffer from the fly, however, except in a very warm, dry autumn or spring. The average price at our nearest market, in 1852, has been about one dollar. We generally sow clover on the wheat in the months of February and March; sometimes Timothy; and of late some farmers have commenced mixing rye-grass with their clover.

Corn.—Guano is also used in the production of this crop, and it is thought to pay much better on corn than on wheat or oats. The approved method of applying it is broadcast, and turned under to the "yellow dirt," the same as for wheat. The gain in bushels per one hundred pounds of guano is about five or six. I presume the average product per acre in this county is about twenty bushels. The cost of production per bushel, and carrying to market, cannot be less than twenty-five cents. The most approved system of culture with us is the following: Take a clover-sward and turn under deep, early in the month of October; then treat with fifty bushels quicklime; let the land lie in this way till about the middle of April; then cover with a good dressing of rich compost or barn-yard manure, and turn under some four inches with a small plough, in ridges or double furrows thrown together, each ridge being about four feet wide; then sign out or cross the ridges with furrows four feet wide, and drop five grains in each hill—this about the 1st of May. As soon as the corn gets up, the ridges, which should have been levelled at planting with a roller, are torn to pieces with a cultivator or harrow. At the same time, the replanting of the corn is begun. In about two weeks more, the cultivator and hoes are again used. In another fortnight, or thereabouts, the small plough is used for throwing furrows upon the hills, the corn being thinned or succored by lads going before the plough and pulling out all but two or three stalks, according to the strength of the ground. In every ten days the corn will want the cultivator again, until it shall have made the tassel. Care should be taken not to work the ground when it is wet, and to keep it worked rapidly when it is dry. We begin to "save fodder," as we term it, as soon as the corn has lost its milk, by cutting off the tops at the joint above the ear and stripping off the blades below the ear. Some persons believe that by cutting all off near the ground the corn is improved in weight; but I always "save fodder," and my corn always weighs fifty-six pounds, and frequently fifty-eight. I believe the best method of feeding horses and work-cattle is with chopped stuff-fodder, or straw mixed with meal made by grinding the broken ears of corn-cobs and grain together, especially if the farmer will keep his own mill.

Oats, Barley, Rye, Peas, and Beans.—These crops, except oats, are not much cultivated in this locality; and oats are growing into disfavor more and more every year, because of their exhausting the soil. I have seen but one crop of barley here for twenty years, and that was only a small lot. Rye is only sown on what we call marsh lands, which, though prolific for corn and rye, will not bring wheat. Peas and beans are seldom planted, except in small patches, for family use, and to supply the places of corn-hills that have been destroyed by insects at a time when it is too late to re-plant with corn.

Clover and Grasses.—There is very little hay grown with us on high ground, except clover hay, and sometimes clover and Timothy or rye grass mixed. Timothy and herdsgrass are grown for hay on our meadows or fresh marshes. The average yield of hay cut per acre on upland is about one and a half ton; some of the meadows will yield three tons per acre. The best fertilizers for meadows and pastures are ashes and bone-dust. Guano is the best for setting the meadow or pasture in grass. The quantity of red clover-seed sown per acre is about one-sixth of a bushel; of rye grass, one peck; of Timothy, one gallon. The cost of growing and saving hay per ton will average about five dollars. I cannot say that my experience shows that red clover is injurious to horses; but it seems to be the prevailing belief in this locality that constant feeding with red clover seriously affects the wind of a horse, whether he be used for the road or the plough.

Dairy Husbandry.—I do not know of a single dairy farmer in this county. Our practice here, from time immemorial, has been, for the farmer to eat what he wants first, and then sell the surplus, if he has any. Every householder, almost, whether in the villages or on the farm, keeps a sufficient number of cows to supply his family with butter and milk. Some farmers keep more, and thus are enabled to sell weekly a few pounds of butter to the storekeepers in the villages. We have not a market-house in this county; the merchant of the village is the grain-buyer, the fishmonger, the huckster, and general factor and caterer for his customers.

Neat Cattle.—The cost of rearing neat cattle till three years old is about twelve dollars, and the usual price at that age is about fifteen to eighteen dollars per head. The value of a good dairy cow is about twenty-five dollars in the spring, and thirty dollars in the fall, if fresh in milk. We have never tried any of the imported breeds of cattle in this neighborhood, except the Durham, until recently. Our experience is, that Durham stock will make rather more meat from the same quantity of food, but they are not so good for milk or for work cattle as our native stock. The Devon stock are now taking the place of the Durham. The oxen of this stock are better than the native for heavy draught; but where speed is required our well reared natives are far superior. We generally break our steers to the yoke by gearing an old one and young one together, having their tails well plaited together and tied with thongs. After coupling and working in this manner for a few days, the young ones are placed in the same yoke and fastened ahead of the old ones to the same draught; or, what is better, placed between two yoke of old steers. Care is always to be taken to unfasten their tails before taking off the yoke, when ungearing the young oxen. If our

steers are well grown, we generally begin to work them a little at two years old, so as to accustom them to the yoke.

Horses and Mules.—Until within the last five or six years it has not been considered profitable to grow these animals here, because we could buy them at four years old from the Western drover rather cheaper than we could raise them. Since the Mexican war, however, these Western animals have become about thirty per cent. dearer, and it is now considered cheaper to raise our own stock. The cost of raising a horse-colt till three years old is about sixty dollars, and a mule about forty; the price at that age will vary materially, according to the blood. Ordinary stock will bring about seventy dollars; but blooded colts and large mules will generally bring at three years old but little less than one hundred, and frequently one hundred and twenty-five dollars. The only difference in the cost of rearing common and blooded colts is in the siring and the loss of service of the dam for the first six months after foaling. A mare should be bred early in the season and while she is thin of flesh, and as soon as she has refused the horse she should be put in good condition and groomed with care and exercised nearly every day with moderate work; never strained or driven hard or very far in one day. We generally use our brood-mares in this way until a few days, or perhaps a fortnight, before foaling-time, when they are turned out upon the pasture during the day and kept at night with a good bed of salt hay in a large stall—say seven or eight feet wide. After foaling, the dam and colt are permitted to run together in the pasture until the colt is about six months old, and fed together morning and night in the same stall. By this time the colt has learned to eat grain and hay, and is taken from the dam and generally fed with all the hay he can eat in the winter and a quart of oats or three or four ears of corn night and morning. He gets but little more grain than this daily allowance until the winter preceding the spring he is to be broken. He is then allowed about double the quantity of grain, and should be groomed with as much care as a regular work-horse. From the time he is taken from the dam the colt should be accustomed to the halter and bridle, and when it is in contemplation to break him he should first have the collar put on his neck, and that suffered to remain upon him day and night. He should then have a surcingle put around him, and his head and neck should be set up by means of the bridle, bradoon, martingale, and surcingle. He should be treated with these for several weeks before being invested with the harness complete. His harness should be kept at the foot of his stall and thrown gently on him three or four times a day for ten days before he is to be geared up. If these preparatory measures are taken you may expect your colt to go off kindly and smoothly the first time he is hitched up with a gentle horse in double harness. After a few drives in double harness, which should always be so short and to so light a vehicle as not to weary the colt, he may then be tried in single harness to a light buggy. Care should always be taken to have the harness to fit in all points, and light draughts and short drives for the first season, so as to prevent the colt from getting into the habit of stumbling—that most provoking of all tricks of which a horse can be guilty.

Sheep and Wool.—I can give no information on these subjects.

Hogs.—Our farmers all agree that the best breed of hogs we have ever had in this section of country is a cross between the Berkshire and what

we call the Chester county breed; which last was brought here from Chester county, Pennsylvania, some eight or ten years ago. The raising of hogs here is a matter of convenience, and not of economy, as we can usually purchase our bacon in Philadelphia cheaper than we can raise it. For this reason few farmers raise any for sale.

If you will, for every hundred pounds of pork, take eight pounds of alum salt, five pounds of sugar, four ounces of saltpetre, and one ounce of red pepper in the pod, and make it into a pickle strong enough to bear an egg, and pour it cold on your pork, the hams and shoulders being at the bottom, you will have it well pickled; then let it remain for six or seven weeks, when it should be taken out and the hock-ends of the hams and shoulders, and the parts where the bones protrude on the fleshy side, lightly covered with red pepper. Let it then be carefully hung up and smoked every day for two or three weeks, with half-seasoned sassafras wood, and you will have as good hams as are found this side of Westphalia.

Cotton, sugar-cane, rice, tobacco, and hemp are not grown with us.

Root crops (turnips, carrots, beets, &c.) are not much cultivated as field crops.

Potatoes (Irish and Sweet.)—The average yield per acre on our land (which does not seem very well adapted to the Irish potato) is about 125 bushels of Irish and 150 of sweet potatoes. The cost of production and getting to market is about 18 cents per bushel. The most prolific and profitable sweet potato we raise is what is called the "Poplar root," which name describes the appearance of the potato. This variety frequently weighs from two to three pounds. The Mercer is generally esteemed with us the most prolific and profitable variety of Irish potatoes; but we have a variety called the "Pink-eye," which is decidedly better than the Mercer for table use.

Fruit Culture.—The culture of fruit is receiving increased attention here, and the spirit of enterprise is well rewarded. I have no doubt that apples enough can be grown on an acre to render the crop an exceedingly profitable one. I can say nothing with regard to the comparative value of apples and potatoes for feeding hogs and cattle. The varieties of apples that are mostly sought after here for winter use are the Newtown Pippin, and a handsome dark-red apple called "Carthouse." The last-named apple I believe is very little known in latitudes higher than 39°. It somewhat resembles the "Pomme d'Api" in flavor, but is very much larger, and in shape more round. The variety which seems to keep best or longest is the Butcher apple, and next to this is the "Grindstone." These varieties will keep till April and May. The most salable apples we send to the Philadelphia market are the Belleflower and Pippin. We have no such thing in this section as "blight" on apple trees, nor are we ever troubled with borers, of which so much complaint is made in the more Northern States. Our pear trees are somewhat affected by "blight" which some of our fruit-growers think is occasioned by electricity, and undertake to prevent by laying blacksmiths' cinders at the roots of the trees. The yellows on peach-trees we believe can be prevented, but do not think a tree can be saved after it is once attacked. This disease first manifests itself by causing the tree to put forth from the trunk or larger limbs bunches of very delicate switches or sprouts, bearing a very narrow, sickly-looking leaf. As soon as this symptom is discovered the tree must be removed, root and branch, and the whole should be taken to some point remote from the orchard and burnt. If you attempt to trim off the diseased part and touch another tree to trim it with the same knife, the latter is certain to be contaminated. So, if you allow the diseased tree to put forth its flowers or blossoms after the symptom above named appears, the disease is certain to be carried by the bees to the surrounding trees. By this treatment, and by cultivating the orchard every year in corn or truck, we seldom hear of the "yellows," and our orchards are kept in good bearing condition for twelve or fifteen years. I know an orchard of fifty acres, immediately in this vicinity, that has been thus managed, and the owner told me to-day that at least 90 per cent. of the trees planted by him in 1838–'39 are still in their prime, and bid fair to last for several years to come. He has also made it a point to give his trees a dressing with soft soap at least once in three years. This keeps the bark in a smooth, clean, and healthy state. If you will dip your hand in the soap and then place it upon the body of a peach tree, you will see the prints of your fingers on the tree for at least twelve months. The soap may be applied with the hand when the tree is small, and with a large paint or white-wash brush when it has grown larger. It is only to be applied to the trunk, and care should be taken to prevent it from touching the leaves or small boughs, as it will destroy the leaves and injure the buds. The best method of transplanting known with us is the following: 1st. Have your trees fresh from the nursery. If practicable, the holes should be prepared to receive them before they are removed at all. 2d. Take up as much of the root as possible. 3d. Let the holes be dug at least three feet in diameter and two spits deep; then fill in the first or lowest spit with the soil; place your tree in the hole, having all the side roots in their natural position, and fill in with soil; no yellow dirt should be used in the filling. The soil should be moderately packed and rounded up in pyramidal form about the trunk of the tree, some two inches above the mark made by the ground in the nursery. 4th. Make a small trench around the periphery of the hole, so that no water shall settle around the trunk, but to secure water at the extremities of the roots. If the trees have been several days taken from the nursery, they should, before being set out, have the roots soaked 24 hours in water, so as to have the pores free for the early circulation of the sap. For the first two seasons the trees should be mulched as soon as the warm, dry weather begins—that is, have half-rotted straw placed around the root and lower part of the trunk, about a wheelbarrow load for each tree. If the ground is poor, about a handful or two of guano may, with great advantage, be mingled with the soil—that is, throw it in the bottom of the hole. I have little or no experience in grafting or budding. Our nurserymen furnish us with trees at a very moderate cost, and the trees are always what they are sold for; so that it is less troublesome, and not more expensive, to supply ourselves in this way than to raise our own trees.

We have not gone much into the culture of grapes or the manufacture of wine in this section of country; so that no suggestion which I could make would be of any worth, not being based either upon experience or observation. And, as to *forest culture*, our great desideratum is to get rid of our wood, of which we have a superabundance, as fast as possible. We have three times as much in the county as we need.

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Manures.—Our farmers generally consider that the best plan of making manure is to have a stock of hay, straw, and other provender, which will be abundant for feeding their cattle, and some to waste, as they term it. The cattle should each have separate stalls where they are kept haltered at night, and be permitted to run at large, in the pound or barn yard, during the day, in the winter season. In the fall of the year, the pound is to be cleaned up, and the manure, if not applied on wheat, to be taken to the field intended for corn the next season, and covered, in large heaps, with soil. The pound, after having been cleaned up, is immediately filled with corn-stalks, to the depth of eighteen inches or two feet. After these are somewhat trampled by the cattle, woods-earth is hauled into the pound, in depth about three inches; then another layer of corn-stalks or straw. After this, the manure is taken from the stalls, and spread over the last layer of litter, and that immediately covered with woods-earth. This operation is repeated from time to time during the whole winter, care being always taken to keep the manure that is taken from the stalls and stables immediately covered with woods-earth or a deep covering of straw. Lime is extensively used of late years. Plaster is very seldom used as a fertilizer. It is the prevailing belief that of itself it has no fertilizing effect, but is useful as a top-dressing in time of a drought, as it attracts moisture from the atmosphere. In using lime on a worn-out soil, we generally begin with a dressing of twenty-five bushels of quicklime to the acre, on the top. If the land is suffered to lie without being cultivated for two years, it may then be broken up with a deep ploughing. Then it is ready to receive another dressing of quick lime, fifty bushels per acre, on top of the ploughed surface. This application should be repeated every fourth year. Guano is getting to be very extensively used, and it has never yet failed of success. It is, of all manures we have ever tried, the surest and the best. The only complaint we have to make respecting it is the exorbitant price at which it is held by the agents of the Peruvian government. We usually apply about from 250 to 400 pounds to the acre. The effect of 100 is very visible on worn-out land; and on the very leanest soil it may be applied at the rate of 500 or even 600 pounds per acre with increased success. The only question with us is, will it pay the landlord to furnish his tenant with this manure? More than one-half the land in this county is yet cultivated by tenants, who usually pay the landlord a rent, in kind, of about two fifths of the merchantable grain. It is a rare case that a tenant will agree to pay for any portion of the guano, though some of them are sufficiently intelligent to see their interest in doing so. As I have stated in the commencement of this communication, the increase in the yield of corn from the application of guano is about 5 or 6 bushels per hundred pounds. Taking 5½ as the average, this increase is equal in money (estimating corn at 50 cents per bushel) to \$2 75. The cost of guano to the farmer is \$2 25 per hundred pounds, leaving a profit of 50 cents. To this is to be added the increase in provender or fodder, which is equal to about \$1 25 per hundred pounds, making the excess of product of 100 pounds of guano over cost, in money, about \$1 75; from this is to be deducted, again, 25 cents per hundred for hauling and spreading on the land, leaving a clear profit of \$1 50 per hundred pounds, or thirty dollars per ton. Now, out of this the tenant gets, first, all the increased yield of fodder, \$1 25 per hundred, one fifth of which pays him for the cost of hauling and spreading; and he also gets three fifths of the increase in the grain, equal to \$1 65 per hundred, leaving the landlord only a yield of \$1 10 per hundred for that which costs him \$2 25. It may, then, be asked whether this loss of \$1 15 is not returned to the landlord in the improvement of his land. We think it is not; for the increased yield, if the land be tilled the second year in corn, or be put in wheat, without an additional dressing, will not exceed two bushels of corn per 100 pounds of guano, or wheat equal to that in value; and, by the third year, the whole strength of guano is exhausted. I know, from several years' experience, that even if the landlord receive a rent of one half the grain, he will still lose money by paying for the whole of the guano. To this remark I may also add, that the poorer the land the greater is the increase per 100 pounds of guano; that is to say, if you apply 300 pounds to an acre of worn-out soil, which, without help, would not bring 5 bushels of corn, it will, with this dressing, give you 20 bushels or more. But if you will take an acre, just beside the first, that has been manured from year to year, until it is capable of yielding 30 bushels, and then apply 300 pounds of guano on it, you need not expect, at most, more than 40 bushels; while on land which, without guano, would bring 50 bushels per acre, the increase from 300 pounds would scarcely be 5 bushels. There can be no doubt that even at the present extravagant prices of guano, the farmer who cultivates his own land, if that land is poor, is handsomely paid back his outlay for all his guano judiciously applied, and has a margin left for profit, besides the additional advantage of having his ground covered with a thick crop of grass, which will furnish him the basis of an improvement less evanescent than that made by the guano *per se*, whilst the landlord who furnishes his tenant with this manure is paying at the rate of \$1 per 100 pounds of guano, at least, for this mere advantage of having his land in a condition for speedy improvement. The quickest mode of renovating our worn-out soil, we have found to be the following: Take a field, and dress with 300 pounds guano, turned very deep; then sow 1½ bushel of wheat per acre, about the 10th of September; the wheat to be seeded with a drill. When the ground is thawed, in the latter part of February, or early in March, sow one-sixth of a bushel of clover-seed per acre; it is best to sow this on a light fall of snow, so that the melting of the snow shall carry the seed with it into the cracks of the earth made by the escape of frost from the ground. If it should, by reason of high winds, become dry before the clover has had time to get up, it will be well to run a rake-harrow over the field. This will benefit both the wheat and the clover. If the season is not excessively dry, the clover will be thickly set. My experience last year on this point was as follows: I sowed, in the autumn of 1851, a field of 20 acres in wheat, one-half of which was drilled and the other broadcast. Five years before that, the field was in corn; and so completely had the soil been exhausted, that it only yielded 135¾ bushels of corn, or about 7 bushels per acre. I gave the land about 280 pounds of guano per acre, when flushed for the wheat, and turned it under, to the yellow dirt. The clover was sown on all the field at the same time in March. The half that was drilled yielded enough wheat more than the other half to repay the seed; and there is now more than twice the quantity of clover on the drilled half than there is on the other. It is to be hoped that the next

territory we shall have annexed will be the Lobos or some other guano islands. They would be worth more to the farmers of this country, who compose four-fifths of its population, than Cuba and all the rest of the Antilles besides. Or if annexation is not to be the future fashion, some honorable means should be used by our government to effect such a negotiation with Peru as will enable us to buy our guano at a reasonable price. I have no doubt, if it could be had by the consumer at $40 or even $35 per 2,240 pounds, the government of Peru would lose nothing by the reduction, whilst it would greatly benefit the agricultural portion of our community.

I have the honor to be, sir, with respect, your obedient servant,

GEO. P. FISHER.

Dixmont, Penobscot County, Maine,
December 9, 1852.

Sir: Your Circular, soliciting information on various subjects of importance to the agriculturist, came duly to hand.

I would say, that we live in a country comparatively new, of an inclement climate and a sterile soil; consequently, scientific farming has not made that progress which is desirable, and which it will make as its resources come to be more fully developed; and it is much more becoming in us to receive instruction than to undertake to impart it.

Guano is not used in this region, so far as my information extends.

Wheat is one of the staple products of our State, though, owing to the extensive lumbering operations carried on here, we are largely importing flour. The average product per acre may probably be set down at 12 bushels.

The kind most extensively raised is the Red Sea—time of sowing from the 25th May to the first of June—quantity usually sown per acre two bushels—harvested about the middle of August. Hessian flies do not exist to any extent in this vicinity. We find late sowing to be the most effectual, if not the only remedy for the ravages of the weevils; and as the Red Sea is the kind which has been found to do best late sown, it is preferred; average price of wheat is one dollar per bushel.

The various kinds of winter wheat have been tried, but with indifferent success generally; though isolated instances of very large crops have rewarded the efforts of some, who have made the experiment under very favorable circumstances. The circumstances most favorable to its growth here are early sowing—say latter part of August, on clean burnt land, newly cleared of wood, and so situated as to remain covered with snow all winter; quantity to be sown, from one bushel to five pecks per acre. One instance of wheat sown in an adjoining town, in 1850, under the above circumstances, yielded forty-four bushels per acre.

There was a considerable quantity sown in the fall of 1851; but the following winter proved so severe that its growth was a failure, and generally abandoned.

The variety considered best here is the "Schlosser Blue Stem," known here as the "Banner wheat."

The ground generally considered most favorable for the growth of wheat is greensward, top-dressed with stable manure, and ploughed under, the same spring it is sown, with a large breaking-up plough, to the depth of six inches, with four oxen.

Corn is raised here to some extent, notwithstanding the shortness of our seasons and the sterility of the soil, and is generally considered a profitable crop.

About forty bushels per acre may be stated as the average crop. The cost of production is usually stated at 75 cents per bushel, though we have no reliable data from which to count the cost.

The usual method in this region of preparing ground for planting corn is to spread and plough in about 30 or 40 loads of stable manure per acre; then drill about 4 feet apart for rows, with horse and small plough; then manure with one shovelful of old stable or hog manure to the hill, about 3 feet apart in the rows, and drop corn on it, four kernels to the hill, usually a hill of beans between each hill of corn, so that 6 or 8 bushels of beans are obtained in addition, with no perceptible diminution of the crop of corn. The corn crop is usually followed by a good crop of wheat without additional manure.

A very favorite way of preparing corn to feed to neat stock and hogs, and one much practised here, is, to crush and grind corn and cobs together, without shelling. The food thus given is less condensed, and considered more easy of digestion.

The hay crop is the great staple of this State and of New England. The saying is, "the more hay the more manure, and the more manure the more everything." In a climate like this, where the stern necessity exists for feeding cattle from 6 to 7 months in the year, it will readily be perceived that any considerable diminution of the hay crop must be followed by serious consequences, as affecting, more or less, every branch of business in the community; for nothing can fully supply its place, and the only alternative is to drive off the surplus stock to some more favored region, or slaughter it on the spot; either of which expedients proves highly injurious to the farmer, inasmuch as he is forced into the market when it is glutted, and at the lowest ebb. The exhausting process pursued very generally by farmers here, of selling off their surplus hay in seasons of plenty, cannot be too severely condemned in a country like this, where everything depends on the quantity of manure. No farmer should ever sell hay unless he is near enough to the consumer to make up the deficiency by the purchase of manure. Plaster is considerably used as a top-dressing for grass-fields, and on strong moist soils, with good effects; quantity usually sown, from two to three bushels per acre.

The quantity of hay cut per acre will probably average something less than a ton. My experience does not show that red clover is injurious to horses; on the contrary, it is considered a favorite feed for them.

Dairy Husbandry.—For the past year I find the product of my dairy to have been 125 pounds of butter per cow, which is probably not far from a fair average; though, on account of the severe drought, this estimate may be too low. The cost of cheese is usually considered as half that of butter, though the making of the latter here is regarded as most profitable, as butter is not imported into the State in so large quantities as cheese, as it does not bear handling and transporting so well as the

latter. In the treatment of milk for making butter in the winter, we pursue a course somewhat peculiar, which is as follows: After setting the milk in common tin pans for 12 hours, scald it, by setting the pans on iron vessels of boiling water, on a common cooking stove, and, after cooling, skim the cream off. By this mode of treatment the butter does not become bitter, as usual with winter butter, and is nearly as yellow as summer butter. Besides, by this course, the process of churning is very much accelerated. The process before mentioned is pursued by some in making summer as well as winter butter. Our rule for salting butter is, 1 ounce of finely pulverized rock-salt to the pound of butter, applied after thoroughly excluding all the butter-milk, by washing in cold water and rolling with a common rolling-pin; then pack in a clean barrel, either in lumps or solid, and completely cover with pickle as strong as it can be made; then add a bag of coarse rock-salt, and see that there is always undissolved salt in the bag. Butter made and packed in this way we find to keep perfectly sweet the whole year. Average price of butter here is 15 cents per pound.

Potatoes.—Till the prevalence of the potato rot, this was a very important crop for this State, not only as a feed for cattle and hogs, but as an article of export; and, next to the hay crop, its failure may be considered the severest calamity that could befall the farmers of this State, and its cause and cure have thus far baffled all the researches of the scientific and the practical; though I think its ravages may be somewhat abated by the observance of certain rules in planting. Select, if possible, dry land in good heart, turn the grass under the fall before, and plant as early in the spring as the ground can be worked, without manuring; and in the selection of seed, reject all small, affected potatoes, planting none but those of good size, fair, and suitable for the table. It is a prevailing opinion—and one I consider very erroneous—that small potatoes are just as good to plant as large ones, and, if the theory is true, better, for they will go over more ground. On an experiment I tried three or four years ago, it was found that where five or six bushels of good, selected Carter potatoes were planted in the midst of a field of the same variety of potatoes, unselected, but in other respects planted under precisely the same circumstances, scarcely one of the product of the former was found in the least affected with the rot, while of the product of the latter at least one-third was more or less affected. The Carters are generally considered the most palatable—at the same time they are probably the most subject to the rot of any potato of this region. The long red potato is considered the most prolific. Average potato crop, abut 200 bushels per acre.

The culture of the carrot, turnip, and beet has considerably increased since the prevalence of the potato rot, and they are usually considered profitable. Probable average of carrot crop, 600 bushels per acre.

The cultivation of all kinds of fruit adapted to this climate is fast increasing, and the farmers of this region are becoming thoroughly aroused to the importance of this subject, and manifest their interest by greater care in the selection and culture of the choicest varieties. We find this region peculiarly adapted to the growing of apples, plums, and cherries—I am inclined to think, also, of the pear; though the growing of the latter has not been sufficiently extensive to warrant us in speaking so positively as of the other fruits. It is now generally conceded, that ap-

ples grown in Maine are superior in flavor and in keeping properties to apples grown in any other State. The varieties regarded as best for winter use are the Ralston Pippin, the Newtown Pippin, Rhode Island Greening, and Baldwin, though the latter variety does not seem quite so well adapted to our climate as the others, being more liable to winter-kill. There is not a question that the raising of apples is one of the most profitable species of farming which can be pursued here; and the only reason why it has not been more extensively carried on is the disinclination which exists of doing business on so long credit.

Very respectfully, yours,

WILLIAM UPTON, Jr.

To the Commissioner of Patents.

Augusta, Me., *December* 28, 1852.

Sir: Your Circular, addressed to me as secretary of the Maine Pomological Society, was duly received. Approving, as I do highly, of the object and queries it embraces, it would afford me pleasure could I answer all the questions therein contained; but I will at this time take up the subject of "fruit culture," and give some information from facts, and the practical experience I have had in planting, pruning, and engrafting in this State and county (Kennebeck) for the last twenty-four years.

In answer to the question—"Is the culture of fruit receiving increased attention?"—I answer in the affirmative, that it is receiving very much, it being the most profitable crop the farmer can raise in Kennebeck county. One orchard in the town of Monmouth, owned by the Messrs. Benson, of Winthrop, (my native town,) consisting of some fifteen hundred grafted trees, three varieties—Roxbury Russets, Rhode Island Greening, and Baldwins—the land very rocky, so much so that it can only be improved for pasture for sheep, was purchased a few years since for about $1,000, which produced apples the next year that sold on the spot for eight hundred dollars; and another year since eight hundred and fifty dollars' worth were sold, paying more than 75 per cent. on the cost. Mr. Plaisted, of Gardiner, told me, a few days since, that he raised last fall, on a row of about 150 small trees, which I engrafted for him some ten years since with winter fruit, 150 barrels of nice apples. I might enumerate many more facts that have come within my observation, but will only state that every farmer who has a few acres of grafted trees receives more net income from them than from all his farm besides.

A farm in this city, consisting of some 60 acres of land, and good buildings, was sold this year that had about 400 grafted apple trees, most of them Roxbury Russets. The seller and buyer told me they valued the orchard more than half, which was $3,225. Several persons in our village raise apples, pears, plums, and grapes enough for home use, and some sell enough to pay their taxes.

We raise very large and nice plums—such as the Jefferson, McLaughlin, Washington, Imperial Gage, Purple Gage, Magnum Bonum, &c., many of which I grafted on moose plum stocks—a native and very hardy plum of this State, which will bear full in two years from grafting. Grapes thrive very well in this climate; some early sorts get fully ripe.

The comparative value of sweet apples for feeding hogs or cattle is considered equal to potatoes, and they are frequently grafted for that purpose, the hogs being kept through the summer in the orchard, to keep the soil light and to eat the apples as they fall; the rest being picked to feed them in the winter.

What varieties best to keep for winter use and for exportation: The best variety is decidedly the Roxbury Russet; it bears well; and, being hard and dry, will keep in a cold, dry cellar until October. Next best varieties are Rhode Island Greening, (keeps here till June,) Baldwin, Esopus Spitzenberg, Nonsuch, Yellow Bellefleur, Talman Sweet, &c.

We have not found a remedy for the "blight," or what we call the "sap blight," in apple or pear trees.

The best method of transplanting is to prepare the borders, or dig the holes, as they are sometimes called, by digging at least three times as large a hole as the roots of the tree to be set; then, unless the soil is very light and sandy, so as to cause the roots to extend downwards too much, spade up the soil to the depth of a foot and a half at least, and the growth will be very much promoted by this course. The tree should be set exactly as deep as it grew in the nursery; the roots will then take a natural position, and not be turned up at the ends, as they will be if the holes are dug too small.

The tree should be mulched with straw manure, sawdust, old tan, or something to prevent the escape of moisture at midsummer, which is better than watering often; it will keep the soil light.

Budding is not much practised, except on small stocks; cleft-grafting is mostly for larger trees or in the branches, and wrapped with clay or grafting wax, made of rosin, beeswax, and tallow.

Nearly all our fruit trees are being grafted, and many are enlarging their orchards, it being considered the most profitable crop raised. The more we raise, the greater the demand, with a better price. Other States can raise better fruit than we do, but none can compete with Maine for raising apples to keep for winter or for exportation; and it is my opinion that, if this State were a forest of orchards, as it was formerly a "forest of pines," we could export to Europe and other places, and find a ready market for all we could produce.

With great respect, I have the honor to be your obedient servant,

D. A. FAIRBANKS.

To the Commissioner of Patents.

Jonesborough, Washington County, Maine,
November 20, 1852.

Sir: In answer to your Agricultural Circular of August last, I will now proceed to make a few statements, as approximate to what is required as the nature of the various queries and my location in so high a northern latitude will permit.

Wheat.—During the last five or six years the cultivation of wheat has been almost entirely neglected; our farmers having become discouraged from the sure and fatal attacks of its natural enemies—the rust and mildew. This season some sowed spring wheat in small quantities, and generally with success. One individual in this vicinity raised 9½ bushels from one half bushel sowing, of bright, well filled, excellent grain; and some others were similarly successful. It is highly probable that we shall soon be able to raise wheat again, or, at least, the weather of the past summer would seem to indicate a return of favorable seasons for growing wheat. I hope our farmers, another season, generally, will feel disposed to plant a little; certainly it would lessen the expenses of our citizen farmers to no inconsiderable amount could they produce bread enough for family demands.

Corn.—I shall leave for corn-growers, and those who live in corn-growing lands, to describe their modes and success of cultivation. We raise but little corn, depending chiefly on the West for that great and important article of consumption among us. Our seasons will not justify the attempt to cultivate corn, any more than enough for an occasional mess through the green corn season, of which we Yankees are proverbially fond; hence arises the saying, "that a Yankee will eat his length in corn." Corn this fall is very high, ranging from 95 cents to $1 25 per bushel.

Oats will grow most seasons and on most any soil, though a sandy loam is preferable. I deem a spring-ploughing best, though others favor the fall. I do not think favorably of fall ploughing for any crop the succeeding year, especially of side-hill fields, or those lands located in such a manner as to be much exposed to the washings and drainings of our severe fall and spring rains. Will others give an opinion upon this matter? for I consider it one of much interest to the farming community. I have raised my best crops of oats from grass and pasture lands with a spring ploughing and early seeding—say the 1st of May. Oats are invariably worth, in fall, 50 cents; in spring, 60 to 75 cents per bushel. Persons desirous of making their hens lay well should feed them liberally with oats. Try it.

Barley is raised to considerable extent, for fattening hogs, feeding poultry, &c. Barley succeeding potatoes on the same ground, will seldom fail of a good crop; worth $1 per bushel.

Peas and Beans.—Raised on every homestead; nearly enough for family use. They are both easily raised, though June frosts are sometimes destructive to beans. Beans are worth $2 per bushel. Peas ground with oats or barley make an excellent living for hogs; generally worth $1 25 to $1 50 per bushel.

Neat Cattle.—The raising of stock is becoming very generally attended to in this vicinity. Inducements for so doing were never stronger, as beef, young and old, commands a high price, and our farmers are not troubled to drive to market themselves; the butchers going 20 miles distant from their slaughter-houses to the farmers' fields and pastures, purchasing and driving at their own expense. The supply the present season fails to meet the demand, and, as present appearances indicate, may continue so for years to come. It is also proved to be a profitable business, as compared with other agricultural pursuits, from the fact that he who raises beef for the market, as well as stock for the farm, is sure to have a *good* farm, as he consumes his hay at home, thereby producing manure; wherein lies the real secret of agricultural success. "The cost of raising till three years old," according to the principle of our "Down East" reckoning, "is all the animal will fetch at that age in the market;" but, in my estimation, is not the correct mode of count-

ing cost, for there is an actual profit over and beyond the cash value of the animal which most farmers but little appreciate, because of its seeming indirect aid. The worth of three-years-old heifers is $20 to $25, and steers $22 to $28 per head.

As to the different modes of feeding cattle, I have never experimented enough to give a satisfactory opinion. "How do you break steers to the yoke?" Yoke them when calves, certainly; when a year old handle them often, and in a spirit of kindness; learn them to draw light loads, if no more than a common draught chain with a billet of wood attached. If permitted to run till two or three years old, yoke them, give them a free, smooth yard or field, and let them be, to act their own pleasure for two or three hours at a time, only with a watchful eye upon them; in this manner they will soon become accustomed to the various duties of the yoke, and, what is more desirable, easily managed. Here it is no uncommon thing to see a yoke of yearlings drawing a light cart or sled; but I deem it a lack of sagacity in the owner. So far as my observation goes, it tends to stint the growth, and make small, unsalable cattle. Kindness should ever be used to cattle; and I know of no better mode to judge of a man's manner with his cattle than to see him enter the yard where they are: if rough, they will move about, and even run to escape his touch; if kind, they fear not his approach, but rather solicit his presence. Price of good dairy cows in fall, $20 to $25; in spring, $30 to $35; of working oxen, $65 to $125.

Grasses.—Quantity of English hay per acre, on an average, about 1¼ ton, The best fertilizer for highlands is stable manure. The grass-seeds preferred in laying down lands are red-top, Timothy, and on porous soils a quantity of clover is admissible. One peck red-top, 4 quarts Timothy, and 4 pounds clover, per acre, is a fair quantity for seeding. I think a mixture of seed preferable to all of either kind on the same or any soil. The cost of growing is near $5. (In your Report of 1850, you make me say $3, which is too cheap.)

Hay this season, owing to a failure in the crop, is very high; averaging $15 in barns. Those who have hay to sell are disposing of it at large profits over the cost of raising. What is very remarkable is that beef should be so high when the demand for hay keeps pace with and in advance of the supply.

Dairying.—Average produce of butter per cow per annum, about 150 pounds. Cheese, none of consequence made; butter-making being much the most profitable. The cost of making butter is not less than 14 cents per pound. Butter this season has not been lower than 16 cents, while for the last and present month 20 and 25 cents are paid, and glad to get it at that. Many individuals hereabouts keep cows and manufacture butter on purpose for the market, carrying it on their team wagons in quantities varying from 50 pounds to ¼ ton; and they say, "We make it profitable." Cellars are most used for setting milk in, though some have their milk-houses erected on purpose for their milk and butter business.

Treatment of Milk and Cream.—About the following is practised among our dairy women, so far as my observation and inquiry permit of speaking: The milk is strained into thoroughly-cleansed pans, set in the milk-room so long as cream will rise to the surface, which varies in different cows from three to seven days; it is then skimmed off, and put in stone or earthen pots—stone much the best—and then churned in quantities to suit convenience. The old dash churn is mostly used. Time was when patent churns of complex models and forms were much in vogue; but the cost of keeping clean, and the poor butter often made, caused an almost general return to the old churn with its perpendicular dash, which is now conceded, everything considered, to be decidedly the best. After churning is through, the butter is gathered, taken from churn, put into a tub selected for the purpose, and covered with pure cold water, well beaten and washed out, and then in tubs again, worked over and beaten by the hands until the butter-milk is all removed; then salt added "to suit the taste." After which, for winter use, pack solid into kegs, or, if soon to be offered in the market, "lumps" are preferable, as customers are more readily suited as to the choice of quality and quantity.

Potatoes suffered very materially from the rot the present year. Notwithstanding this serious impediment to potato growing, our farmers manifest a very great unwillingness to abandon so desirable and profitable a crop. All attempts to avoid the disease, and all the expended skill, theoretically and practically, have alike proved failures.

Farmers do not feel safe to plant extensively since the potato failed; but we find there is a way, though the rot come, whereby a fair crop may be secured. My mode for the last five years for raising potatoes has been much more successful than that of most others of my aquaintance. I use new land, ploughing the first week in May, and planting as early in the month as possible. I plant in hills, making furrows with the plough crosswise the piece ploughed, about three feet asunder, and six to eight inches deep; then drop the manure new from the stable or sheep-house, (the latter is preferred,) in hills thirty inches apart, and cut my potatoes, (not the small ones, nor do I plant them if I can get large ones,) putting three pieces in each hill, and covering as soon as dropped three to four inches deep. I seldom have a hill to fail of coming, and they are up and ready for the hoe the first time the last of June; then again, about the 20th of July they need rehoeing, which in my opinion saves them in no small degree from the rot, while it pays well otherwise, as the potatoes will be larger, with few, if any, small ones in the hill. The last of August, or the first of September, look out for the blight on the leaves, if it come at all, when I dig and put them in the cellar, before I allow the main stalk to become much affected by its ravages. Many think it best to let their potatoes lie in the ground till they "get done rotting;" but I differ with them, as I did so the first two seasons of the rot, and lost nearly all my potatoes, the same as they generally do now. I have put my potatoes in the cellar the first and second weeks of September, and planted some of the same the following May, and had them for use during the summer months, as good, as sweet, and as sound as of olden time. I prefer light, loamy, or gravelly soil for potatoes. Ten bushels of cut seed is sufficient for an acre; and a crop of 200 to 300 bushels a fair yield. I think thirty cents the average cost of producing potatoes; while in the fall they sell for 50, and in the spring 75 cents per bushel.

Sheep and Wool.—I consider raising sheep profitable to the farmer, aside from the benefit derived from wool. The profit attached to the production of wool alone is of little importance, aside from the actual wants of the family. We have no wool depôts, nor manufacturing

establishments, in any of the eastern counties of this State; and exchanging wool for cloth with the traders and wool peddlers is attended with so great inconvenience and loss that our people, though formerly much accustomed to do so, have now generally abandoned the practice; wool is generally worth 20 to 30 cents per pound. Our butchers, the past season, paid as high as $2 per head for live lambs; and in the market the meat has been worth 6 to 10 cents per pound. On an average, it requires one ton of hay to seven sheep for winter fodder. Seven sheep, Saxony and Merino blooded, will shear 25 pounds wool, worth $6 25. They will raise, at common increase, six lambs, worth $10 50, making, in all, $16 75; while the only actual outlay and expense of production, save a little time, is the value of the ton of hay, which, in ordinary years, is $10 to $12, though this year it is much more. The wolves have been very destructive to sheep during the past season, killing probably 25 per cent. of the flocks in this vicinity.

Fruit culture is rapidly coming into favor with our agricultural community. A few of the orchards, the present year, produced from 100 to 300 bushels of apples. Some are planting new orchards, while others are nursing and grafting, and bringing to productiveness, those heretofore worthless. An acre of thrifty, productive apple trees will give yearly a greater amount of profit than the same ground, under any other process of cultivation possibly can. Apples are worth, on an average, 50 cents per bushel. Damsons and Egg and Sweet-water plums are also coming in for a share of attention.

Having dwelt briefly upon most of the queries propounded in your Circular applicable and adapted to our soil and climate, and which, if published, will occupy as much space as one correspondent, unless more interesting than I, is entitled to, I will now close. It is indeed interesting to our people to get the communications contained in your Reports from the farmers of the South and West, showing how differently they pursue the agricultural vocation, and what different results are obtained.

The good of the agricultural work emanating from your Office, I trust, is too sensibly felt by the farmers of the American Union, and too generally appreciated by all classes of the community, ever to be neglected or abandoned by our government. To agriculture and its vast resources, as well as to the enterprise and perseverance of its agricultural people, is our country chiefly indebted for its present conspicuous and honorable position among the nations of the earth. Let our people go on from acquisition to acquisition until they shall have searched well the hidden treasures of agricultural knowledge, and possessed themselves of all that well-investigated theory and thoroughly-tested practice can impart, to facilitate the cultivation and increase the production of the soil, and add to the well-being and dignity of man.

With high respect,

GEO. W. DRISKO.

BLOOMFIELD, SOMERSET COUNTY, MAINE,
December 27, 1852.

SIR: Your Circular of last August was duly received; but press of business has prevented my noticing its contents till now. In answer to that paper I would say that guano has not been used in this vicinity, except as a curiosity. It has been used on corn-land once with good success; but living so far inland, the experiment has not been pursued. The time of seeding, about, as I stated last year, to wit, as early as the season will permit to the 10th of May, or delay till late in May. The intention of this is, to be too early for the weevil, in the first case, and too late in the last case. Early sowing is sometimes injured by early drought, and late sowing is exposed to the rust and blight. The quantity of seed not changed; about two bushels to the acre; though much doubt exists whether this may not be too much, if the seed be good. The average product per acre for this year, I think, may be set at from *twelve* to *twenty* bushels, where the weevil did not attack it, and meaning always on good fair cultivation. Harvested from the 20th of August to the 20th of September; land ploughed once or twice from four to six inches deep; and I have the pleasure of announcing that the crops are apparently on the increase, attended with a more healthy and natural appearance. No remedy worth much has ever been found for the Hessian fly or weevil; seed mixed with lime or wood-ashes, and lands treated with lime or other alkalies, may be somewhat better; but the sun has shone on the just no more than the unjust, in this respect. As to rotation of crops we have no regular system; some plough mowing, or pasturage, and sow wheat the first year; others plough sward-land in the fall and sow in the spring with oats and peas, or barley, and then dress it for a succession of corn and wheat. Wheat grows well on pasture-lands, broken in summer or early fall, and run over with a cultivator or harrow, and sowed in the early spring; market at home ever since the lumber business has been prosecuted to any extent, and large quantities of flour transported from the West; wheat worth per bushel from 6*s.* 9*d.* to 9*s.* Lands to be "seeded down" are sown with from ten to twenty pounds of clover, mixed with about from eight to twelve quarts of Timothy or herdsgrass, sometimes mixed with and sown with the wheat, and sometimes sown on afterwards and "bushed" in. Thus much for spring sowing. Winter wheat, much in favor now, is sown as early as may be, in the latter part of the summer and early fall, in every variety of fashion; some, even, sown very late, so that it will not sprout till spring. It is believed that good seed sown on broken sward-land, or other land not long up, ploughed from any time in June to the twentieth of August—and well put in, none the worse if dressed before or after ploughing—will be most likely to insure a good crop, yielding about the same as spring wheat. For the last season the crops have, to some extent, failed, owing, I think, more to very dry weather in the fall, and drier in the spring, than to winter-killing. One piece I saw, half of which was quite dry land and half a little more moist, all sown at once, of the same kind of seed; the moist part produced none, but the other was good. The reason I assign is this: The moist ground brought the grain forth and the drought killed it; but the dry part was too dry to vegetate till the rain came, and it lived well. Many such things pass unnoticed, and are taxed to the incapacity of the country to produce winter grain. Ground well ploughed and smoothed is successfully sown to wheat, and the wheat covered with a small plough with one horse, or a good cultivator. If it be sown to grass the seed may be put on and "bushed" in, as it should not be as deep as wheat, to

succeed well; and wheat is much better defended from frost to be down three or four or more inches, and also from drought.

Of guano, as dressing for corn, I have never known it used but once, and then only a teaspoonful to a hill, I think, and it was said to add greatly to the crop. The production of well dressed and well attended land is not often under forty bushels, and so on to one hundred and over. One case in Oxford county rose to one hundred and forty, and another to one hundred and twenty-five. In some cases rich spots of pasture are ploughed, without manure, and planted a little farther apart than usual, and, with plaster or gypsum, produce a cheap, good crop. Corn is variously stated as to expense of culture; some would say one dollar; but, with the proper allowance for betterment of soil, I think not over half that sum. Ground corn is undoubtedly better than raw, by the trouble and loss, and more, and if cooked, better still. As to the manure from a given quantity, it would be guess-work, for all farmers add something. Ordinarily ten bushels of corn would yield half a cord mixed. The ground is prepared by being ploughed one season beforehand, and cropped with oats, barley, buckwheat, or potatoes, with more or less dressing; then ploughed in the fall, and sometimes a coat of manure ploughed in again; ploughed in the spring; sometimes with another coat ploughed in; then a shovelful put into the hills, about from three to three and a half by two to two and a half feet apart. But much doubt exists whether we have not crowded our hills at the expense of the crop. On strong land perhaps the old method of four feet by three and a half, with four or five kernels, is not better than less distance, with two to four kernels, yielding more ears to the stalk, and larger. Some are beginning to plough sward-land soon after haying, and, with a good dressing, to turn in; then plant next season with good success. Corn-stalks are sometimes cut when the corn is well turned, and saved in any manner which suits, in stacks or in the barn. Others, and a majority, cut up the whole and dry it in stacks. Not much difference in stalks. Found to be good fodder.

Oats have been declining several years, and the last season not much over half the usual quantity was raised. Found exhausting, as it is said; but I am doubtful if seed thrashed with a flail, and never having seen a machine, by itself or ancestry, would not give a good, old-fashioned yield, worth thirty-seven and a half cents per bushel. Seed two to five bushels.

Barley is not exhausting so much, but is not a very certain crop; well sown, in proper season, pays well, and is a good grain, worth about seventy-five cents per bushel. None raised for distilling in Maine. Sown most any time from the middle, or even 1st of June, to some time in July. Crops from fifteen to thirty-five bushels. Seed two bushels to an acre. Good for hogs.

Rye is generally sown in the fall on ploughed or "burnt land." Yields from twelve to thirty bushels to one bushel, or one and a quarter on one acre. Worth from eighty-three cents to one dollar, and is used in "Yankee brown loaves," and given to hogs. It is a good crop on proper land; generally sown on poor land.

Peas are raised to some extent as a renovating crop, recently, and are a good seeding crop. Though spots will vine too heavily they are a good crop, well sown on smooth land, yielding from ten to forty bushels to the acre. Seed with one bushel or more. A good crop for hogs, and are in demand from fifty cents to one dollar and fifty. Used to grow seventy bushels to the acre, virgin soil.

Beans are a profitable crop, raised without much expense, but rather exhausting; generally planted with corn more than alone; were formerly thought to grow well enough anywhere, but are found to crave good mellow, or at least rich land. Seed near half bushel to the acre. Yield, clear of corn, 30 to 40 bushels to the acre, and are in demand at from $1 50 to $2 25 per bushel; are much used on shipboard, and found better than split peas.

Grasses sown as above stated, with wheat, barley, peas, &c., 10 to 20 pounds of clover, and 8 to 12 and 16 quarts of herdsgrass to the acre, and yields well, tilled and manured, from 2 to 3 tons of hay. Much depends on making such grass. Some cut and wilt it and then cock it up in small bunches, and, regardless of weather, overhaul it often to give it the air till nearly fit to cart. Others dry it in the swarth till fit to rake, like lighter grass, and when dry cart it. Fields, or mowing, are distinguished from meadows here; the former mean upland and the latter low meadow, or fresh meadows, in contradistinction to salt-marsh uplands; are manured as stated above; fresh meadows are sometimes flowed, and sometimes enriched by carting on rough manure, and, if necessary, harrowed over and sown with suitable grass, as Timothy, fowl meadow, red-top, &c., &c. Manure is not afforded on pastures unless ploughed, except occasionally a coat of gypsum. Cost of raising hay, from $2 50 to $3 per ton; as sold standing in market, from $5 to $10; and so on in dry seasons to $15. Red clover is not materially injurious to horses, provided they have it all sweet, but it is undoubtedly gaseous, and horses should not be driven on it but with great care. The same occurs with it as a "cut feed to some extent." The great danger lies in the leaves of early summer. They die as the clover shades them, and become dust, which the horse inhales, sadly to his cost and value.

Neat Cattle.—Actual cost of rearing may be estimated variously, as they vary too greatly in size and value. As a general working price, it may be put at $12 at 3 years old, though to hire the work done would perhaps cost double that. Heifers generally become cows at from 2 to 3 years old; are worth from $15 to $20. Oxen, some of which girth 6½ to 7 feet, sell from $60 to $75 per pair—though some not improved in breed will not sell over $30 per pair. Cows in the fall (good seasons) are worth from $12 to $20; and in the spring, from $16 to $30; and so on for superior to $50, $75—even $100. Corn-meal is given to cattle for fattening at $1 per bushel, but not much, and this when beef thus fed is worth $4 per cwt. Various breeds of cattle are kept—the Durham, Devon, Hereford, Ayrshire, Galway, &c.—but no one keeps them separate; steers are trained variously. Some have sons who yoke them when young and break them; some put them into the team and they become docile; others yoke them (especially older persons) and let them run for days; then put them in the team.

Horses are grown to profit, as the price is very high. Horses could be kept from $7 to $15 per year, for the first 3 years; and I have hired them kept for $5 a few years ago. Horses, or colts, at three years and upwards, sell, according to quality, from $40 to $150, and so on to $200. Brood mares and colts are considered best off when least attended, only

to see them well fed and housed, but allowed to run loose, as convenient. Young horses are trained as easily by bitting first, then put into shafts, with nothing but wheels, and using as little coercive power as possible; very soon the poor fellow understands all that is required.

Mules are not reared in this vicinity. So many oxen are kept for lumbering they are crowded out.

Sheep.—Wool-growing, with the increase of the flock, is as good stock as any for profit. Twenty-five cents is the minimum price for wool, but sheep had better be kept when it occasionally runs below that. Wool is generally from 28 to 45 cents. A ton of hay will winter from 4 to 5 sheep, unless the winter is long, as they eat hay far less time than other stock. Some say six sheep equal a cow, at 2 tons or over—*too high*. Sheep are large or small, according as they are kept, and the wool decides the profit. The large coarse-woolled sheep are hardier than the small fine woolled. Much may be said on sheep-raising, but it is unnecessary. Sheep should be kept well in winter, and in good pasturage in summer. Then separate the lambs from the ewes in September, or sooner; keep the lambs from yeaning the first year; and good flocks may be kept without "running out." Merino wool may cost two cents more on the pound than coarse—not more—for the Merino gives a little heavier fleece for his bigness. Sheep, well kept, will save over three-fourths of their young, without twins; but great carelessness is often observed at a high cost—should have sods where they can get them in long snowy winters.

Hogs.—The best breed is hardly found. A great exertion has been made to obtain the best breeds, but in crossing little attention is paid, and the best breed is unknown. A cross, however, somewhat prevalent, is as good as to be expected. Much is lost by breeding "in and in." As to the cheapest method of making pork various opinions exist. Between keeping a pig over winter and killing a hog, or fattening a pig and killing a shoat, I think a pig will eat (from the first of June to killing time) a much as will fatten a hog. Then, if 400 pounds of pork against 200 or 250 pounds will pay for wintering a shoat, that is as well, or better—the pork is better. A bushel of corn will make pork enough to bring it to 8 cents the pound. Pork is salted by judgment and not by rule; cut in strips, well packed, covered with salt thoroughly, and so on, put in a little saltpetre. Bacon is better cured South and West than here, though we have good.

Cotton is not raised, but worn abundantly.

Cane, none—*rice*, same—*tobacco*, same—though formerly it was considerable; is used enormously.

Hemp—not raised—has been tried, but not liked.

Roots.—Crops increasing fast, and found profitable in our cold climate to feed out with hay and other fodder for stock of all kinds. Carrots are best liked for horses; worth $2 50 and over per bushel—sold by the ton. Rutabaga and mangel-wurzel found good for pork-raising, given with barley meal. Land prepared as for corn—the poorer will do; manure in drills, or holes, for hills. Seeding done by hand, or, far better, by a seed-sower; product not known—about from 500 to 1,000 bushels to the acre.

Potatoes.—The yield per acre, twenty years ago, was from 200 to 300 bushels, but more recently the blight has made such havoc that farmers have been glad to get enough which would keep through the winter for home consumption and for seeding. Not much improvement was realized till this year; yield this year, from 100 to 200 bushels of firstrate potatoes; cost of raising, about from 15 to 20 cents. It is hoped that the trouble is over, and wheat and potatoes are destined to take rank again among the profitable crops of Maine. The best kinds for a crop are the white, pink-eye, and the peach-blow; and these are all good table varieties. The blue and the white Christie, the Butman, the lady's finger, and the Carney, are good table varieties, but need much richer ground. As yet, perhaps, potatoes should not be manured much, as they are more likely to rot on manured land. The best way is to plant on good healthy soil, about 3½ feet by 2½ or 3 feet apart; I prefer 3. Hoe once or twice, but all before the tubers form.

Fruits.—Much more attention paid than formerly; grafting is very common, and many varieties are sent to market, and a fair business will be done as soon as we have a railroad.

Apples are a profitable crop when there is a market; but apples and most of the fruits are raised by every one, and the market is too full. The value of apples for stock-feeding is not known here, and thousands of bushels of apples have been nearly wasted this year, which the farmers could not be persuaded to pick and store for cattle and hogs, although fodder is very scarce on account of drought. It is believed that good fair apples are worth about as much as potatoes; mixed, the proportion of one part apples to two of potatoes, quite as good as all potatoes. Hogs have fattened on raw apples this year. The blight on apple-trees is seldom seen. Pears and peaches are not cultivated to much extent. Gypsum thrown on or about fruit-trees is very good, to keep them lively and prevent casting fruit. Grafting, budding, &c., I am not personally conversant with.

Manures.—Manures should be piled under cover, and covered with earth or leeched ashes. Much is done with swamp-mud, and many other materials, but none of them succeed to the best profit without some process of fermentation, as Bommer's plan, or some other. Lime and plaster have done well, but farmers in general lack faith, because it does not show its effects immediately. The geological features of Maine, more especially the northern part, present a great variety of soil, distinctly marked. Appearances go far in justification of the belief that the whole country has been flooded by some revolutions of nature, and that the waters of the western lakes have been precipitated over the whole face of Northern Maine, from the Highlands to the Gulf of St. Lawrence, and all along the seaboard. Consequently, we have very little vegetable mould; and while Canada West and territory beyond the lakes have from one to three feet of vegetable mould, we have not more than double that of inches. Thus, we have sand-hills and clay-fields, and seldom one without the other. This is beginning to attract the attention of the farmer, and several highly remunerating experiments have been made of mixing soils. Clay to sand, and sand to clay, will, eventually, do much to supply the place of manure; and the trial will, I think, far transcend the most sanguine expectations.

The crops have been very good this season, and had it not been dry in summer, would have been unusually productive. Wheat is good, as also corn, rye, barley, oats, peas, beans, &c. Turnips were injured by the worms this year and last, which may be prevented by putting a little fine salt at the roots, though attended with labor; dipping the roots in salt when set will help them. Wild fruits abundant, and apples as plenty as *advice*—had for packing, in any quantity; many thousand bushels wasted on the ground.

With respectful esteem, yours truly,

EUSEBIUS WESTON.

To the Commissioner of Patents.

New Sharon, Franklin County, Maine,
12th mo., 4th, 1852.

Sir: Thy Circular, under date of 8th mo., 1852, was duly received, and in compliance with the request contained therein, I forward the following particulars, viz:

Wheat.—Average product per acre, eighteen bushels. Time of seeding, on or near the twentieth of fifth month. Time of harvesting, about the twentieth of ninth month. Seed prepared by washing in pickle and mixing with a small amount of lime.

Plough once in the fall, about eight inches, and use the cultivator to mellow it in the spring. Yield per acre upon the increase. System of rotation: oats, corn, or potatoes, and wheat. Remedies for Hessian flies and weevils: late sowing, and lime and ashes sown broadcast when the wheat has attained a growth of six inches. Average price in our market, one dollar. Grass seeds, Timothy, and clover mixed and sown with the wheat.

Corn.—Average product per acre, thirty bushels; cost of producing per bushel, fifty cents. Best system of culture: green manure, ploughed under in the fall, and old manure put in the hill to give the crop an early start. Hoed twice or three times, according to the season. Best method of feeding, ground and cooked. Method of preparing soil, ploughing in fall and again in the spring, and harrowing fine. Rows three feet and a half distant, stalks three feet.

Oats.—Average yield per acre, twenty bushels. Quantity of seed, two and a half to three bushels per acre.

Barley.—Do not raise it. *Rye*—ditto.

Peas.—Planted with potatoes, four in a hill. Average yield per acre, five bushels. Not cultivated for renovation of land. Beans with corn between the hills, five in each hill; average yield, seven to eight bushels per acre.

Clover and Grasses.—Average yield per acre, usually about one ton. Quantity of seed used, eight pounds of clover and one peck of Timothy per acre. Have not experimented upon meadow-land. Cost of production, four dollars per ton.

Dairy Husbandry.—Average yearly product per cow, one cwt. cheese and thirty pounds of butter.

Respectfully,

FREDERICK SWAN.

To the Commissioner of Patents.

Perry, Washington County, Maine,
January 26, 1853.

Sir: In reply to the Agricultural Circular, I will state only my own experience with a few of the subjects therein named. Wheat is not much cultivated, and no systematic experiments are within my knowledge as to the increased product from the use of guano. It is usually made to follow the potato or turnip crop, and seldom gets any manure other than what was applied to the previous crop. It is as sure as most crops, yielding on an average 15 bushels per acre, sown with Timothy, red clover, and fowl meadow grasses. Corn—we raise none.

Average yield of oats, fifty bushels upon pasture land or green-sward—of barley, thirty bushels. As to the cost of producing wool, I have found that, with any breeds we have here, a pound of fine Merino wool costs less than a pound of coarse wool. From some experiments in pork-raising (incomplete as yet) I am led to suppose that five pounds of grain are required to make a pound of pork.

In the cultivation of root crops, especially rutabaga, I have found guano the cheapest and best manure. I have tried it side by side with manure from the barn cellar and find it fully equal, at a cost not exceeding that of carting the manure when the transportation is a quarter of a mile.

Six hundred pounds applied to an acre gave eight hundred bushels rutabaga, where without it there probably would not have been two hundred; a few rows left without guano for comparison, gave nothing at all. The cultivation of this crop is increasing, but not so fast as it ought. Where we cannot raise corn, this may, to some degree, supply its place. Beef may be made to good advantage, two bushels a day to a fatting ox, and he will require but very little hay, and will fatten fast; a half bushel a day, with straw, for cows or young cattle, I find very well takes the place of hay; and for store-hogs, half a bushel to each, *fed raw*, will keep them in good condition.

Irish potatoes, our great staple, rot as bad as ever in most places, while some localities entirely escape.

Fruit is only beginning to receive attention; yet it may be made the most profitable crop of the country. Apples may be produced here *good enough*, as we have examples to show, and in sufficient quantity, to be a source of profit. Plums succeed as well as anywhere; cherries also.

I consider the best method of grafting to be the following: Take up the tree at a year old, cut it off at the ground with a sloping cut an inch long; match the scion to it nicely, and tie with cotton wicking; put no wax or anything else around the splice, but set out immediately burying the splice two or three inches in the ground. This method performed as early as the young trees can be got up, will prove successful with apple, plum, or cherry, in most cases. I have some fine plums which are four years from a graft in the root, and bore fruit last year.

Manures.—I have not been able to perceive any beneficial effects from lime used in *any way*, or from plaster used alone; but mixed with guano in equal parts, I think it tends to retain the fertilizing principle, so that the crops get more of it.

Guano, at three hundred pounds per acre, gave a yield of potatoes equal to that given by twelve cords barn manure.

Respectfully,

WILLIAM D. DANA.

Average range of Thermometer, &c.

Date.	Temperature.	Snow.	Rain.	Remarks.
1852.	*Degrees.*	*Inches.*	*Inches.*	
January ...	20.5	18	8	
February ..	25.5	1[illegible]	6	
March.....	29.2	18	3	
Ap l	38.8	......	10	Sleighing till 10th April from the 10th November—150 days.
May	50.1	......	½	
June......	53.6	......	3	
July	65.4	......	7	
August	62.7	......	7	
September .	56.3	......	5	
October ...	44.2	......	11	
November .	36.1	1	8	
December .	30.2	12	9	
1853.				
To Jan. 26	26	......	4	

W. D. D.

WILTON, MAINE, *February* 5, 1853.

SIR: I have been in the business of rearing and marketing mules for many years; which I have marketed principally in New Haven, Connecticut, and in the States of New Jersey and Pennsylvania; which animal, in the latter two States, is much in use. I sold mules there twenty-eight years ago last fall, which were two years old; and I saw some of them two years ago, which were fat; and the owners said they were as good as ever.

I have conversed with many aged gentlemen, who have used mules for fifty years, and with some who then had mules in their possession which they represented to be forty-two years of age. I have been also told of one owned in Pennsylvania that was sixty-three years old. I am fully satisfied, from my own observation, that mules live to double the age of horses; that it costs but about one-half as much to keep them, and are not one-half so subject to disease; consequently, the saving would be great; and I think they ought to be used for draught in all countries, instead of horses.

Such complaints as heaves, spavin, &c., I have never yet seen or heard of about a mule; and I have raised hundreds and seen thousands; which complaints are very prevalent among horses.

I give it as my opinion, that the average age of mules is thirty-five or forty years. They are much easier broken than horses, if treated with kindness.

It is true, there seems to be a general prejudice existing with people against this animal; and it is expected that they will kick or kill everybody who has much to do with them; and when people undertake to break them, it is thought to be the first requisite to tie them up and give them a sound drubbing, not for anything the innocent creatures have done, but for something they are expected to do; and being animals that are intelligent, they rightly become dissatisfied with such treatment, and, of course, will show resentment. While engaged in selling, I have helped harness up a great many taken from the drove, without any previous training, and have driven them in a wagon containing several persons besides myself, and I never saw one contrary or refuse to go off immediately. They are much more intelligent and tractable than horses, and their attachment is much stronger, if well treated. The foal is carried easier by the mare, and reduces her less, both before and after birth.

They can always be sold for ready cash at the South; and, taking them on an average, and at any age, will bring more money here at the North than horses.

Therefore, I invite my fellow-farmers to examine this subject, and take a greater interest in rearing mules. They are a cash article, and a very useful and profitable animal; and it would save the North millions of dollars were they in as common use here as at the South.

The mule is adapted to labor at a younger age than the horse; and experience is all that is wanting to convince the people of the North of the great advantages that would accrue from bringing these animals into general use at home, and from rearing them more abundantly for the Southern markets.

S. SMITH.

RUTLAND, RUTLAND COUNTY, VT.,
December, 1852.

SIR: I had the honor of receiving the Circular from the Patent Office, through the politeness of Hon. S. Foot, and take this opportunity to reply as far as I am able to the questions therein; and if by so doing I can add anything to the Agricultural Report forthcoming, and contribute my mite to the worthy cause of distributing, through the Patent Office Report, general agricultural information, I shall be recompensed.

Rutland county lies between 43° 18′ and 45° 50′ north latitude, and contains almost all varieties of soils, consisting of clays of all kinds, sands of all qualities, muck, hard-pan, alluvial loams, and slate, and a mixture of these in every possible way. Of rock, the limestone formation is predominant; marble quarries inexhaustible, from the fine, clear, white (fully equal to the Italian) to coarse grades, and of all colors; slate is found equal to any in the world, for writing, for roofing, and other purposes, not forgetting the soft white slate-pencil quarries; the hard head, the flint and rock of primitive formation. Of soils, there is the most of the loams; a mixture of loam and sand is the best soil for grains; clay is the best for grass if there is plenty of wet, and slate for wheat; yet all crops raised here are made to prosper often on every variety of soil. Of crops, hay is the most important, treble the value of all the rest. Good farmers so manage the land as to make it produce the greatest amount of hay; keeping stock is the main business. Corn is the next crop in importance; then oats; then Irish potatoes, peas, beans,

carrots, and turnips are raised in small quanuties. We have an agricultural society that is in a prosperous condition, and through this I expect great benefit to the agriculturists of Rutland county. Horses, cattle, and sheep are improving, as are crops of grain and roots. Twenty-five years have wrought a great change in the plough and all other farm implements, for the better. Many now plough deep and give thorough culture, and begin to understand that the greatest support on which they can depend is their manure. The idea has exploded that a farm can be cheated and robbed and continue to produce well—have much absorbed by the crops and but little returned; the cheat is the other way. Men that make and apply much manure to their soils, plough deeper and deeper, and give thorough culture, are generously rewarded by their crops, by the increase of the value of their lands, and by the additional means to make the soil still richer; while those that adopt the shallow ploughing, half cultivating, half or less manuring, slovenly skimming operation, are growing poorer; their crops and the value of their lands decreasing, and *they* ready to say, hard times, a hard life, and poor business to farm it; when at least they are merely apologies for husbandmen. One great fault of many of the Rutland county farmers is, that they have too much land—they have not the capital requisite to carry on thoroughly, nor stock of approved kinds, to fence, ditch, cultivate, manure, and improve their soils; but all the money they can scrape together must go to pay for land. Taking us altogether, our crops are increasing.

Wheat did well on almost all soils when first cleared of the primeval forests, and for years afterward, and until 25 or 30 years ago; it had been for years a crop, and, on the farmer's delivering his surplus at Troy, N. Y., lined his pockets with the ready cash. But then came a failure in the crops of both winter and spring varieties; and from that time to the present, but few have continued to try to raise it. Most kinds of seed that have been brought here from abroad have done well for a few years, and then would be attacked by the Hessian fly, the weevil, or the rust, and would then be discarded. There have been some favorite spots, however, that have always born good wheat. Mellow loams on elevated lands, in the bosom of the Green Mountains, generally of the spring varieties. About 10 years ago, a Black Sea spring wheat was very productive and much raised, but it run out in a few years. Winter wheat is now in fashion—the white flint and a bearded wheat, brought from Michigan. It is sown from the 20th of August to the 20th of September. One way to prepare the ground is to take an old pasture, plough in June, (summer fallow,) plough again the last of August or fore-part of September, harrow fine, and sow with 1½ to 2 bushels per acre. Harvest late in July or early in August; yield per acre, from 15 to 40 bushels—average 25 bushels. Another method is, to take a piece that has been in corn, and heavily manure on the sod and turn it under; the corn crop cut up and drawn off as soon as ripe enough, which is from the first to the middle of September. The ground is ploughed, harrowed fine, and the wheat sown. The seed is washed and soaked in strong brine 24 hours; then mixed with slacked lime, 4 quarts to the bushel, and then sown; the salt and lime kill the weevil and prevent smut.

Corn.—This is a sure crop. The best method is to take a piece that has been in grass from 5 to 8 years, manure with coarse manure and plough thoroughly, pass a heavy roller over it, then harrow until well pulverized; lay the off-rows both ways, 2 feet 10 inches to 3 feet apart, and plant 4 to 5 kernels in a hill; cover 1 inch deep with a hoe, if the soil is rather poor after ploughing; spread 20 loads of fine manure before harrowing; time for planting, from the 10th to the 25th of May. The nearer the ground is ploughed and fitted to the time of planting, the better. The ground is laid off with a marker that makes 3 or 4 rows at a time; they should be straight and cross each other at right angles. Seed is soaked 25 hours in saltpetre-water, then rolled in plaster. When the corn is about 4 inches high, pass twice in a row each way, with horse and cultivator, and dress the hill with a hoe. The next hoeing is the latter part of June, before the tassals appear. Cultivate twice in a row one way, hoe as before, without raising much hill. Experience has shown that the level culture is the best for corn. At the first hoeing the corn is thinned to 3 or 4 stalks in a hill; after the second hoeing, the corn should cover the ground. By standing thick, it prevents the growth of weeds, and the corn will not succor; should any appear they should not be removed; they will bear some corn and make fodder. From the first to the middle of August, the corn will be sufficiently advanced to cut up at the ground and shocked to cure; the time may be known when to cut, as one half the husks have turned white. If the ground is to be sown, this is the time to remove the corn; it should be set on fresh earth to cure, never on grass. The kinds raised are all yellow, from 8 to 12 rowed ears, from 7 to 13 inches long; yield per acre of shelled corn, from 40 to 110 bushels; the average of mine for years has been over 80 bushels. The general average in the county is 50 bushels.

I consider the fodder well-cured where the crop is 80 bushels, equal to 1½ ton of hay per acre, to feed cattle. We have a home market for corn and other grains; average price, 80 cents. I estimate the labor of cultivating, fitting the ground, and securing the crops, at 20 days' work for a man, at 75 cents; team, 3 days, at $1 50, exclusive of putting on the manure.

Oats are raised after corn or potatoes, weighing 32 pounds to the bushel. They are considered exhausting, but furnish a large amount of straw, to be again converted into manure. They are excellent grain for all kinds of stock—particularly such as give milk—and are thought to be a profitable crop. Seed 3 to 3½ bushels per acre, sown without preparation; yield, about the same as corn when sown on good land—40 cents per bushel. Irish potatoes are raised of many varieties; land fitted similar to corn-land, if manured after ploughing. The manure should be fine and well mixed with the soil. Run a one-horse plough 3 inches deep one way for the rows; mark the other way with the marker. The seed should not be smaller than medium size; by cutting, it will take less to seed an acre. I plant from 16 to 25 bushels; rows 2 feet 10 inches each way; cultivate and hoe as for corn, without raising much hill; drop a large table-spoonful of plaster on the hill before covering; cover 1 inch deep with a hoe; plant from the 5th to the 25th of May; dig the last half of September, or dig early; yield, from 150 to 300 bushels to the acre. Since the potato rot has been in the country, which is 6 years—potatoes are not affected by the rot—this year I have lost but a very few by the rot when planted on warm dry land, or on corn land; but the yield by the acre has diminished. This year the yield will compare with the yield when the potato was healthy.

Rye is raised on light, sandy soils without manure; average price, 75 cents; yield per acre, 15 bushels; sown at the same time as winter wheat; seed per acre, 1¼ to 1½ bushel. White beans, on similar soils, yield per acre 20 bushels; price, $1 50. Buckwheat is raised on the poorest soils; buckwheat is said to make excellent warm cakes, and is good to fatten hogs. I am unable to state the yield or price.

Carrots have been raised by many since visited by the potato rot, but the seed is uncertain to germinate. We often fail to get a good stand of plants; but when we do, the yield is from 400 to 700 bushels. The great expense of cultivating necessary—extending through the middle of summer, and the high price of labor—from $10 to $15 per month, and boarded, make it discouraging to raise this root. I consider them of more value for feeding than potatoes; but I can cultivate four acres of corn with less labor than one of carrots. Turnips, both English and Swedish, are occasionally raised, and produce from 40 to 800 bushels to the acre. The mode of cultivation and rotation of crops of our best farmers on strong soils, is this: Make the soil produce the greatest amount of hay, and grain, and roots, for their own consumption. When good land has been in grass from 5 to 7 years, manure on the sod and plough under, and plant with corn or potatoes; give them thorough cultivation; then sow wheat or oats, and seed down with 12 quarts of herdsgrass and 3 quarts of clover-seed to the acre. The grass is sown before the last harrowing; then roll with a heavy roller. This mashes all lumps and leaves the ground smooth for mowing, and the seed comes up better. When this has been in grass 2 or 3 years, it needs a top-dressing of fine manure, leached ashes, &c.—10 loads to the acre. Sow plaster occasionally, or once in two years—100 to 150 to the acre. To obtain large crops, the soil in grass or grain needs to be manured once in three years. If a farm has a muck bed near, it is a mine of wealth to enrich the soil; litter the stables, sheds, and yards with it; make hogs work it; they will make manure enough, if rightly managed, to pay half their keeping. Have a basin to receive the wash from barn-yards; fill this with muck and animal or vegetable substance. In this way, we have a manure to give each acre its quota once in three years. On heavy soils that are unfit for corn, when the grass has become light, and they can be turned flat with the plough, do so any time from hay-time until winter; pass the roller over it, give it 10 loads of fine manure to the acre, (manufactured muck is the best;) harrow until well pulverized. When this is done, if it is past the middle of September, let it lie until it has become sufficiently dry in the spring; then sow grass seed, harrow, and roll; and about the middle of August, cut 3 tons of tender, excellent hay to the acre. If sown in the fall, omit the clover-seed, and sow the latter part of March. By this management, expending all hay, straw, and corn fodder on the farm, using and mixing other materials with it, we make a large quantity of manure; the soil is increasing in productiveness, and consequently in value. But should any that have not tested this course ask us what we had to sell? The answer is, our horses—from $75 to $500 each. The most approved breeds at the present are the Morgans and the Black Hawks—they are not excelled by any in the States. Our fat oxen, cows, steers, and heifers, for the Boston and the home markets, at from $4 to $7 50 per hundred. Pairs of fat oxen bring from $100 to $200. Our large annual clip of Spanish Merino and Saxon wool, at an

average price of 40 cents per pound. Our surplus sheep find a ready market. Our pork, for home consumption, average price, 6¼ cents per pound. Our butter, average price, 18 cents; cheese, 6¼ cents. Our apples, both whole and dried, 50 cents per bushel, or 6 cents per pound when dried; and potatoes and white beans bring high prices. Dairies, when well managed, make from $30 to $40 worth per cow. Fair cows in the spring are worth $30; some extra ones sell as high as $60. The Rutland county farmers admire red, close-made, fine-haired cattle; and but little foreign breeds are crossed on our natives except the Devon. The Durhams are bad-colored, too large, and require too high feed to make them a favorite breed with us. It makes but little difference what breed you feed a given amount of food to make beef, if it possesses a quiet disposition, a loose mellow hide, and has the fattening properties. Our cattle and sheep get the most of their fat on grass, and are then fed with grain and roots. Corn is generally ground for horses and cattle with the cob; for hogs it is best without the cob. Fed without cooking, by being wet up with slops from the house, or water. Meal would undoubtedly make more pork cooked; but it is some labor, and is not often done without it is fed to a *crack* pig to beat one's neighbor. Three hundred to four hundred pounds, dressed weight, is not very uncommon for such pigs at nine months old. In raising all kinds of stock, keep well until three months old. After that, it is hard work to stunt them; but if they have been pinched before that time, it is rare that they outgrow it. Those that feed well raise cattle that dress 500 pounds average weight at two years old; while the average weight of the skinning farmer's cattle is 450 pounds. Our winters in this latitude, or foddering season, last full one half of the year. Working horses and cattle need stabling seven months; cows, to be fed on dry fodder six to seven. Colts, young cattle, and sheep, five to six months. All stock should have good shelter stables and sheds through the foddering season. They thrive better, consume less food, and the extra price that the manure is worth alone, such as is exposed and leached, will soon pay for the erection of sheds and stables. One hundred sheep will consume from 17 to 20 tons of good hay in the foddering season; fifteen bushels of corn, or thirty bushels of oats, besides roots and provender, for breeding ewes. Breeding ewes, when well managed, from three to seven years of age, will raise 90 per cent. of their lambs. Good flocks shear, washed on the sheep, four to five pounds of wool; on the Saxon, three pounds; the Saxon and Merino, four pounds; and the Spanish Merino, five pounds of wool. The prices at which it sells makes the Merino the most profitable. Average price of hay, $7. Twenty-five acres of good pasture will summer 100 sheep; but if ordinary, it is not sufficient. Give all stock all the salt they will eat at all times of the year; it keeps them healthy. Mix ground sulphur with the salt for sheep; it will keep off disease, and if exposed to the foot rot, and not an entire preventive, a less number will be affected, and it will work with less virulence. It would be a poor business to grow wool here for less than 40 cents per pound. In our county there is a large amount of interval meadow lying on the banks of the streams; the overflow of the streams in high water keeps them fertile. These lands that lie low are never ploughed, but produce a crop of hay annually of interval and good upland, two tons per acre at one crop. Hay is cut from

the 1st of July to the 1st of September. The after-crop of grass is fed off by stock late in the season.

Rutland county raises one tenth of its wheat, nine tenths of corn and oats consumed, and pork equal to its own consumption. The workmen and teams on our railroads, railroad depôts, marble quarries, marble mills, iron furnaces, slate and slate-pencil quarries, and manufactories, make a large home market for our surplus products. A majority of our farms have their maple-sugar orchards. Sugar is made from the sap of this tree. The most approved method is, to boil in shallow sheet-iron pans, set on arches in a sugar-house. The fire comes in contact only with the bottom, which must be covered with sap when over the fire. Three-fourths of a cord of wood, of any description, if dry, will boil to sirup enough for one hundred pounds of sugar. The manufacture of sugar is a simple process. To make good white sugar, keep all the apparatus perfectly sweet and clean; the quicker the sap is boiled to sirup the better; take it off the fire, and put it in wooden tubs, to cool and settle over night; then pour off all but the settlings; strain through a fine cloth strainer into a brass kettle, and put it over the fire. The fire should only come to the bottom of the kettle; this prevents burning on the sides of the kettle. The natural color of sugar is white, and if kept clean in the manufacture, and not burned, it will be perfectly white. Add to the sirup, when warming, two eggs well beaten, and one pint of new milk, which is sufficient for fifty pounds; skim well just before it comes to the boiling point; then boil to tub sugar; put it in wooden tubs; let it stand a few days, until the grain has done forming; start the plug in the bottom of the tub and let the molasses drain off; keep a wet cloth on the top of the sugar while draining; and the operation is done. Sugar is made this way equal in color and whiteness to double refined loaf sugar. For most families, it is preferred without draining. Sugar made this way is free from the rank, nauseous smell of cane brown sugar. The sap of the maple varies in sweetness. Two and a half to four gallons will make one pound of sugar.

Fruit.—Little is raised here except apples. The first settlers planted a generous supply of trees; and until about 18 years ago, there was an abundance of apples; since that, death and decay have nearly done up the old orchards, except in moist, elevated, and rocky locations, where they are yet thrifty. For the last ten years, the attention of the husbandman has been called to the subject, and a large amount of young trees have been planted. Pears, grapes, and many kinds of plums, cherries, and strawberries are cultivated by few with success. The past year has been a very peculiar one. November 7th, 1851, cold weather and good sleighing commenced; all stock came to fodder; snow laid until late in March. The spring was cold and wet up to the 5th of May. This was the first day that my soil was dry enough to start the plough, and grass began to start. Apple trees were not full in the bloom until the 7th of June; from that time until the 1st of September, but a small quantity of rain fell. It was what might be called a dry season. The eastern part of Rutland county will stand the drought better than any other section with which I am acquainted; but here the grass suffered severely. The hay crop was from one-fourth to one-third short; other crops proved good. The present prices of hay, grain, butter, cheese, and pork are from 20

to 100 per cent above the usual prices, caused mostly by the severe drought of last season.

Swine.—Most of the breeds in the States (except the western pointer) have been introduced here within the last thirty years, and crossed and mixed in every way, so that no one breed, or a cross between two, is distinct. There is a kind now in favor, called the Belgo, undoubtedly a cross of other breeds, that is a well built and well proportioned animal; and it is my opinion that our farmers' swine are equal to those of any other community.

Respectfully, yours,

H. W. LESTER.

Hon. S. H. Hodges,
Commissioner of Patents.

Springfield, Vermont,
December 28, 1852.

Sir: In reply to the Circular of the Patent Office, received last August, I shall confine my remarks to one inquiry—that of "sheep and wool," having in recent numbers of the Reports gone somewhat into detail in answering these inquiries, so far as Vermont is concerned, in my ordinary manner, according with my judgment and experience.

Wool-growing is profitable here whenever the price does not fall below 40 cents per pound; yet the amount of profit depends greatly upon the perfection of the flock for wool-growing purposes, the skill and management of the grower, and the adaptation of the constitution of the animal to our climate. It costs as much to grow a pound of coarse wool as it does of fine Merino, though the carcass of the coarse-woolled sheep may be turned to better account for mutton; but on the whole the kind of sheep which will afford the most profit in the hands of a judicious and an experienced farmer is the thick, close, compact fleeced Spanish Merino. This is a docile and hardy race, producing as much fine wool for a given amount of feed as any other kinds; and the wethers or castrated males, at four and five years old, either from the pasture in the autumn or from the stalls in the winter and spring, are not slow for mutton purposes. This breed of sheep is comparatively small, and by a law of nature which cannot be set at naught, will consume no more food in proportion to their weight than the larger breeds, though they carry a much heavier fleece proportionably than the coarse or long-woolled kinds; with ordinary care, three-fourths as many lambs as ewes in the flock, designed for breeding, can be annually reared, and with extra care and attention the number can be increased up to a lamb for each ewe, though it should be an undeviating rule not to allow ewes to yean until they are three years old; having then attained size, strength, and vigor, they will impart this essential—a good constitution—to their young provided the sire be right; and here let me say that too much care cannot be taken in selecting the sire; a careful discrimination should be exercised, and none should be used but such as are perfect in fleece, both as to quantity and quality, also in form, strength, and vigor, as can be found in the best Merino

flocks of our country. Betwixt the sire and dam no relationship or affinity of blood should be suffered to exist; it tends to weaken the constitution, engenders deformities, and reduces the weight of fleece A renewal of blood every three or four years, by an exchange of bucks from one good flock to another, is a great desideratum in progressing and improving with a high-bred flock. The keeping both summer and winter should be generous and uniform, not sufficient to produce a high degree of flesh unless the animal is designed for the butcher, but in a fair stock condition, conducive to health and to the uniformity of the staple of the fleece. In the winter season in this locality, and in all high latitudes, the Merinos should be kept in flocks not exceeding 150 in number, in enclosed yards with open sheds, having a southern or eastern exposure, with access to running water within the enclosure if possible; a box always supplied with clean pure salt, racks for feeding hay, and the sheds kept littered with straw for a bed. The *quantity* of hay per diem depends upon the *quality*, as the waste is less as the quality is better; two and a half pounds per day for each full-grown sheep, or two pounds for lambs or yearlings, is sufficient of *good hay;* or, what is better, two pounds per day, with a gill of corn or a half pint of oats, per head. Oats are better than corn for young sheep; both should be fed with care at first, or it may produce the scours and kill the animal.

I am aware that all sheep-owners and wool growers will not adopt my opinion as to the most profitable kinds. I have come to the conclusion, that the small sheep of the race I have described are the most profitable. In addition to the large coarse-woolled kinds, we have in this country the Saxon, French, and Prussian Merinos, which have originated from the Spanish; all these fine-woolled races possess a common origin, and it only shows what the workings of nature are when assisted by art. The Saxon desired the perfection of the fleece in *fineness of texture*. The Frenchman took the opposite extreme, and sought quantity of fleece: both attained their object. But in so doing, one weakened the constitution, and reduced the weight of fleece and growth of the animal; the other enlarged the growth of both animal and fleece, but, as a natural result, which could not be avoided, suffered a deterioration in the quality of the fleece. The Prussians, like many of us Americans, seem to have taken the middle ground, and have sought only to improve upon the original stock, so far as it could be done without detriment to *quantity*, *quality*, or vigor of bone and muscle. I have seen some fine specimens of all these races, and it yet remains to be determined whether an improvement may not be made by a cross one with another, or a mixture of all the races. I speak as regards this section only; to some localities the coarse mutton-sheep may be best adapted; and to others, the French and Saxon Merinos. Sheep husbandry has been a vast source of profit to Vermont, and will continue to be, unless the raw material should cease to be wanted, by a suspension of the woollen business in this country.

I notice a striking fact in the last Census report, in relation to the average weight of fleeces throughout the United States, for 1850. Vermont stands at the head of the list, giving an average weight of near 3¾ pounds per head on her one million of sheep; while the aggregate of the whole is less than 2½ pounds.

Another fact speaks well for her sheep-husbandry. By a reference to the weekly reports of the Boston live-stock market, it may be seen that Vermont sends more sheep to that market than all the other New England States; and the same remark will apply to horses and cattle. Limited as her boundaries are, small in area, with an uneven and broken surface, and sparse population, she may well be proud of her position as an agricultural-producing State. Nothing short of the skill, industry, enterprise, untiring energy, and intelligence of her people, could have made her what she is. None of her sons, if they would but think so, need seek the mines of California, the valleys of Oregon, or the fertile regions of the West, to acquire a competency.

Respectfully, yours,

J. W. COLBURN.

Hon. SILAS H. HODGES,
Commissioner of Patents.

MIDDLEBURY, VERMONT,
December 22, 1852.

SIR: In the spring of 1851 I made a visit to France, for the express purpose of a thorough examination of the best Merino sheep of that country. I was much interested in the government flock at Rambouillet. Every department was conducted with great skill and attention, by competent shepherds, who devoted their whole time in the feeding and management of the flocks. A doctor, even, is supported by the government to administer to their physical wants—one well skilled in the anatomy of animals.

The sheep are all numbered and registered in a book for that purpose, by the Director, so that the pedigree of every animal can be traced for several generations, giving the age of each sheep to a day, of the birth and death, and to whom sold, with the price and the quantity of wool shorn each year.

The ewes are numbered, by cutting notches in the ears, and the rams are marked upon the horns with hot irons, upon which the numbers are engraved. This flock has remained at Rambouillet since 1786. No sheep can be purchased from this flock, except at the annual public sale, which takes place in April or May each year—always on Sunday. Such animals as are considered not worthy to be preserved for breeders are consigned to the butcher.

Their lambs are allowed to drop in January; the rams, at one year old, are crowded to the highest point of fatness, to prepare them for the sale. The average live weight, as registered upon the books, of 50 rams, at 15 months old, was 186 pounds.

There are two or three private flocks in France, of equal purity of blood, which are superior in size to those of Rambouillet. These descended from another branch of the government flock, that started at Croissy, near Paris, at the same time, being one half of the original flock; presented by the Queen of Spain to the King of France. Jean Baptiste François Gilbert, of Vidderville, purchased at the first sale of

the produce of this flock, which took place at Croissy, in 1800, one ram and eight ewes. The ram was four years old, and weighed 125 pounds, and carried 12 pounds of wool. The ewes then averaged 9 pounds of wool in its pure, unwashed state. Mr. Gilbert was the principal purchaser at the annual sales till 1818, when the whole flock at Croissy was sold, at an average price of from 120 to 300 francs each. The blood of Mr. Gilbert's flock was renewed every few years by a selection of rams from the flock at Rambouillet. This, together with the occasional renewal of blood and superior skill in breeding, gave Mr. Gilbert's flock the advantage over the others.

After becoming fully convinced that the private flocks were superior to any other of the fine-woolled breeds, for size, symmetry, for the greatest production of superior wool, and for their propensity to put on fat, I resolved to make my purchases there.

There are three or four extraordinary flocks, which have attained their present popularity and perfection by the long-continued patience and skill of the breeders, who have, by degrees, reared them up to their present excellence, from the puny Spanish race as they stood in 1785, among the best flocks in Spain.

These successful breeders did not allow their ewes to drop their lambs until three years old, nor to use rams until they arrived at full maturity; selecting only those of the largest size and most perfect in their points, combining a superior quality of wool, as well as a great weight of fleece. It was by this method, faithfully carried out, that they could produce rams, at 18 months old, to weigh 225 pounds, and to impart to the several succeeding generations all that constitute a perfect Merino sheep. They are well fed the year round upon such hay, grasses, vegetables, and grain as would tend to produce the greatest amount of muscle, bone, and flesh; housing them through the winter in warm but ventilated stone barns; and careful to fold them at night and during tedious storms.

Many of the rams, at maturity, will weigh from 250 to 300 pounds, and estimated to shear from 18 to 28 pounds of wool at one clip.

It is from these most celebrated private flocks that I have made my selections, and imported, during the last two years, near six hundred, at great cost, preferring those animals that would produce the heaviest fleece of the finest quantity of Merino wool; making a voyage each year to select and to see to the shipments, at a cost which will not fall short of $50,000. I am at present an owner in the whole of, or a part interest in, about 500 ewes, old and young, and am supplying rams to be shipped into all ports of the United States.

A cross of these French Merinos upon the common flocks of our country, has been fully tested. The half-bloods are not only improved in size and constitution, but the annual production of wool is increased from one to three pounds to each sheep; and in many flocks the quality is improved in fineness and length of staple.

My recent sales of unwashed wool have varied from thirty-three to thirty-five cents per pound. Washed fleece or pulled wool, of this quality, at present readily commands from 52 to 58 cents per pound.

Half-blood wethers, at full maturity, must command from $8 to $15 per head, in a favorable market, by the lot.

Our minister at Paris, Hon. William C. Rives, is collecting statistical information, visiting the different departments in France, to better enable him to give us a correct history of the agricultural interest of that country, including the best breeds of horses, cattle, and sheep. Such facts as may be of interest to us will be published in a book soon to be issued.

Respectfully,

S. WRIGHT JEWETT.

CHESTER, WINDSOR COUNTY, VT.,
December 30, 1852.

DEAR SIR: Mr. Whitcomb (postmaster) has lately handed me your Circular of August, ultimo, requesting me to answer some of the inquiries made therein. I fear but very few persons will be benefited by the trifling amount of my experience.

Wheat.—Wheat is raised in small quantities in this section of country, and comparatively by very few farmers. When raised at all, it is raised upon high lands, much exposed to strong northwest winds. If sown upon our meadows or lowlands early enough to escape the rust, which is sure to strike late-sown, the weevil will destroy it; and if sown late enough to escape the weevil, the rust will injure, if not destroy it.

Indian corn may well be said to be our great staple, whether considered as forage for stock or food for mankind. It requires much labor to cultivate it aright, and much manure to insure good crops; but I think it generally pays well for interest. The best method, according to my experience of cultivating, is to plough, deep and well, two or three times before planting, spread manure freely, and furrow in rows, each way, about three feet apart—I am well satisfied that corn will ear much better at that distance than when nearer; manure in the hill, with well-rotted or hog-manure, (though, I doubt not, in very dry seasons it would be less likely to sustain damage by drought if the manure was all spread;) plant deep enough to prevent the corn from drying after it sprouts. Much labor is frequently lost by persons slighting in the process of covering the seed. As soon as the corn is large enough to be seen in rows, cultivate each way with a good cultivator, and then the labor of clearing the weeds from the hills is very slight. Keep the ground as nearly level as possible, without raising the hill even at the third hoeing. Never hoe after the tassel is in blossom. I do not use a plough in my corn-field after planting. My practice, for the last five years, has been to put 2 or 3 table-spoonfuls of tar and a small handful of salt into one gallon of water, boiling hot, into which I put four quarts of seed-corn, (selected from the field as soon as the husks begin to turn,) stir briskly about two minutes, then drain off the water and stir in as much plaster as will stick to the kernel, when it is ready for immediate planting. Care should be taken not to let it stand too long after this process before planting; if it becomes much dried it will not sprout so quick. I am not troubled at all with crows pulling it up; do not use any *"lines or scare-crows."* In the spring of 1849 I planted a field of corn, prepared according to the above directions, excepting four rows upon one side of it. The crows pulled almost every hill of the four rows of unprepared,

and pulled some half dozen hills of the other, but did not eat it. Barn-yard fowls will not eat it. The average quantity per acre here is about 60 bushels, though some fields produce more than that.

I think 100 pounds of butter about an average per cow. A neighbor of mine, who kept 12 cows in the summer of 1850, made 1,220 pounds of butter, besides the milk used in a family of seven, and raised 5 calves. The last season, which was remarkably dry, and feed short, he kept 8 cows; made from them 600 pounds of butter, and raised 8 calves. The same person raised 42 chickens, the past summer, which weighed, when dressed for market, 163 pounds, and sold at his door at 10 cents per pound—$16 30.

Hogs.—The Suffolk breed of hogs is decidedly the best for fattening to slaughter previous to one year of age, and make the best pork. A cross of the Suffolk and Middlesex is thought an improvement by many, as it increases their size. Pure blood Suffolk pigs will bring $10 per pair at 5 or 6 weeks old, while other kinds are sold from $3 to $5 per pair.

Your obedient servant,

PRESCOTT HEALD.

BERNE, WASHINGTON COUNTY, VT.,
September 20, 1852.

SIR: Your Circular is received, and I will endeavor to answer some of the inquiries contained in it very briefly.

Wheat is not raised here to any great extent, on account of the weevil, although on high land with an inclination to the north or west, we raise good crops. It does the best after corn, if the land is well fitted. Our usual method of preparing the land for corn is to give it a good top-dressing with green stable or yard manure—say twenty loads to the acre; then plough or harrow it in. We then furrow it three and a half feet apart, one way, and then drop manure—either manure drawn out in the fall or from the hog-pen—and put it two and a half feet apart in the furrows, a small shovelful to a hill. We then drop the corn, five kernels to the hill, and cover it two inches deep with the hoe. We plant from the 15th to the 20th of May, and get from fifty to one hundred bushels per acre—on an average, about sixty bushels. We get of wheat, on upland, fitted in this way, from fifteen to twenty bushels per acre, if sown the first of April; but wheat is so uncertain a crop that the farmers prefer raising oats, as land so fitted will yield from fifty to seventy-five bushels of oats per acre; and they are worth from thirty to forty cents per bushel, and wheat is worth but one dollar. The kinds of wheat raised are mostly Black Sea or tea wheat. I have raised for a number of years the golden straw. We have never used guano in this section. We use Timothy or herdsgrass mostly for seeding clover, and sow it when we do our wheat or oats. A peck to the acre is enough, and if the land is rich six quarts will do, and the first crop will be full half clover, carried on in the manure. There is but little barley raised here, and but few peas. Beans do well, but are not cultivated to any extent.

Dairy Business is carried on to a considerable extent in this vicinity, and is, perhaps, as profitable as any business in this section. An average amount of butter per cow is about one hundred and twenty-five pounds, (but some yield double that amount,) and is worth, this season, from eighteen to twenty-five cents per pound. The average yield of cheese per cow is two hundred and fifty pounds, or double that of butter per cow, and the price is seven to nine cents per pound. It costs as much to make and take care of two pounds of cheese as it does of one pound of butter. Making butter is more profitable, and cheese is attended with less care when made. In setting milk for butter we use tin pans, from six to ten quarts, strain them as full as we can handle them, and set them in the milk room, in a cool part of the house, and let them stand from twenty-four to forty-eight hours, until the cream has risen. It is then skimmed off, and kept cool until it is churned. Some churn every day, and some but twice a week. The churn mostly in use here is the barrel churn, placed on legs, with a crank and floats attached to it, so that by turning the crank the floats keep the cream in motion, and it will come in from ten to twenty minutes. We then draw off the buttermilk and wash the butter in cold water until it is clear of buttermilk, and salt it with the best ground rock-salt, and work it with the hand; let it stand twenty-four hours, and then work it thoroughly again and put it down solid in a firkin made of spruce or fir that will hold from thirty to sixty pounds, (the firkin having been previously soaked in strong brine.) We then set it in a cool place until we send it to market. In this way we seldom have any hurt. An average price of butter and cheese, for three or four years past, has been sixteen cents for butter and seven for cheese; but this year butter is worth twenty cents, on an average, and cheese eight cents. The cost of raising neat cattle here, on account of our long winters, to three years old, is eighteen dollars, or all they will fetch at that age. Good cows are worth twenty-five to thirty dollars in the spring, and fifteen to twenty in the fall. For feeding beef cattle we use but little corn, but feed potatoes, turnips, and carrots. We think the native animal, with the same attention and care, will compare favorably with the Durham, Devon, or Hereford. Our mode of breaking steers to the yoke is to begin when they are calves; the boys have a small yoke, and yoke them occasionally, and soon learn them to do anything they require of them; so they are broken from the time they are six months old; and they never forget it. Horses are the most profitable stock we can raise, if we take pains to improve the stock. It will cost thirty dollars to raise one to three years old, and the average price at that age is not less than fifty dollars, and at five years old they are worth from seventy-five to one hundred and twenty-five dollars, and, in the latter case, double the cost of raising.

Sheep are profitable stock at the present prices of wool. There is but little difference in the cost of producing coarse or fine wool; we prefer the latter, as it brings the most money. The Merino has the heaviest fleece, yielding on an average four pounds per head. It is worth forty cents per pound; and the coarse-woolled sheep will yield about the same amount, worth one-fourth less. For mutton the large and coarse-woolled sheep is the best. The ewes will raise about sixty lambs to one hundred ewes on an average.

Hogs.—The breed most sought after here is a cross of the Suffolk and grass-fed, (so called.) They are peaceable and easily fattened, and very sweet and thick pork. Pigs seven to nine months old will weight when slaughtered, from two hundred and twenty-five to three hundred

and twenty-five pounds, and at eighteen months old five hundred pounds. We take all the bone and lean meat when we cut it up, and use fresh. The fat we pack in layers, in a barrel, putting salt (rock or Turk's island) on each layer, eight quarts to one hundred pounds; and after a few days we add pickle enough to cover it, and it will keep sweet for years.

Very respectfully, yours,

OSMAN DEWEY.

To the Commissioner of Patents.

West Rupert, Vermont.

Clover and Grasses.—The hay crop is of vital importance in this latitude—north 43° 15′. The average quantity cut per acre is about 1¼ ton, although the past season has not given over three-fourths of a ton to the acre in consequence of the drought.

The best and most durable fertilizer for our meadow sand pastures is a top-dressing of ashes. Gypsum is mostly used. Sheep manure is also used advantageously on meadows. Clover and Timothy are the principal grasses cultivated in this vicinity. About 8 quarts of Timothy and 6 pounds of clover-seed is the usual quantity sown per acre. Spear grass adds much to our meadows and pastures, although it is not cultivated. I have no experience to show that red clover is detrimental to horses.

Sheep and Wool.—As the verdure of grass extends to the very summit of our hills, they are well adapted to wool growing, and it is profitable.

A few facts in relation to wool-growing are conclusively settled, viz: That a fine staple of wool cannot be grown on a carcass that is suitable or profitable for the butcher; and second, all animals require food according to the live weight of their bodies.

The average weight of the improved Saxons is about 65 pounds, consequently the yearly expense of keeping Saxons is as follows: If fed with hay 150 days, 243 pounds, which, at $7 per ton, is 85 cents; pasturing 31 weeks, at 1¼ cent per week, is 39 cents; care, 6 cents, which foots up as follows:

Wintering	$0 85
Summering	39
Care	6
Making the expense of keeping a Saxon sheep one year	1 30
In return we receive—	
2¾ pounds of wool, at 50 cents per pound, making	1 37½
Manure	6
Proportionate value of increase	60
	2 03
	1 30
	73

From which, when the expense of keeping is deducted, you have 73 cents profit on sheep, or making 1 pound of Saxon wool cost 26 cents.

Cost per pound of growing coarse or fine wool. A like quantity of food will produce an equal quantity of clean wool upon all sheep raised for the value of the fleece. It is therefore more lucrative business to the farmer to grow fine than coarse or common wool, in proportion as the fine exceeds the coarse in price.

Large or small sheep most profitable? The expense of rearing animals should always be taken into account. Small animals come to maturity with much less expense than large ones, and therefore they are more valuable. This is especially true of sheep. Small sheep are the most profitable, and particularly so for the fleece.

How much more does it cost to produce 1 pound of fine than of coarse or ordinary wool? It costs *less* because the food of the coarse sheep is converted into fat rather than into wool.

Proportion of lambs raised to the number of ewes is about four-fifths.

Respectfully,

JOSEPH PARKER.

Middletown, Newport Co., R. I., *12th mo., 4th*, 1852.

Corn.—Average yield, about 40 bushels per acre. Best system of culture is to spread a good coat of manure on the land and plough in, and another on the surface after ploughing, harrow, and then plant, about three feet apart each way, four or five seeds to a hill.

Barley.—Average yield—say 30 bushels; three bushels seed per acre; less exhausting than oats.

Oats.—Average yield, about 45 bushels; from three to four bushels seed per acre sown.

Hay.—Quantity per acre, average, about one ton; all animal manures good for meadow land generally, and ashes, for some lands, produce crops equal to any kind of manure; about a bushel of grass-seed sown per acre, of different kinds, mixed and sown together, varying the quantity of clover according as the soil is wet or dry, putting most on dry land. I do not think clover injurious to horses.

Horses raised here are not very profitable, unless of extra quality. The best way to break young horses, I consider, is, to begin with them when very young; almost as soon as foaled, to handle them, and to halter them, and accustom them to lead while quite small, and, as they ncrease in size and strength, accustom them to wear the harness, and to draw light carriages, and they will soon become very docile and tractable.

Sheep are raised here as much for the meat as the wool. The middle size thought best—say Southdown; the cost of raising a pound of Merino not much more than of coarse. About as many lambs as ewes are generally raised, and sometimes more.

Root-Crops considered on the increase; soil should be made fine and rich. Average crop, about 400 bushels per acre.

Potatoes, Irish, used to produce on an average 200 bushels per acre, but since the disease, much less. Best method of culture is to spread

the manure on the furrows, and harrow well before planting, and plant in rows about three feet apart.

Fruit culture is on the increase. I consider apples enough may be grown to make it profitable. The Rhode Island Greening best for winter use here. Apples are good to feed to hogs and cattle, but not so good as potatoes.

Manure.—I consider the best way to preserve it is to spread it on the soil as fast as it can be procured, when the state of the crops will admit. Lime and plaster not much used here, and, from my experience, not of much use on the soil of this island.

DAVID BUFFUM.

To the Commissioner of Patents.

Mason, Hillsborough County, N. H.,
December 26, 1852.

Sir: Having received a Circular from the Patent Office, I will answer some of your inquiries, as far as I may be able.

From a somewhat extensive examination, I am satisfied that the average crop of Indian corn will not equal the amount of thirty bushels to the acre, in this region, and I should presume the same of the crop throughout the State. There are occasionally instances of more than four times that amount. The cost of raising corn, where the expense of manures, cost of labor employed, interest on the valuation of land, and taxes on the land, are all included, cannot be much, if any, less than one dollar per bushel on the average of crops.

Guano is beginning to be used in the production of Indian corn. From a field which I examined last harvest, I gathered the following reliable and certain facts, namely, that an application of about one hundred weight to the acre increased the quantity of the crop to the amount of seventeen bushels and six quarts. The land was first well dressed with barn manure, which was spread and ploughed in. After the ground was furrowed, the guano was put in the hill. It was covered to about the depth of one inch with earth before the corn was dropped upon it.

The most common manner of cultivating corn is to use a field which has been worked on the preceding year, plough it two or three times in the spring, spread on manure and put it in the hill, and hoe it two or three times during the early part of summer. When it begins to ripen most farmers cut off the top stalks.

Some of the best fields of corn which I have seen in this State were upon ground which was broken up in the spring, manured well, and planted in rows about three and a half feet apart, and hills about two and a half feet, and a liberal top dressing of lime and ashes after planting, to hasten the decomposition of the vegetable matter; and, after a short time more, a good dressing of plaster of Paris. The field hoed about as is usually done, and the top stalks not cut off.

The average quantity of hay, I should think, was something less than a ton to the acre. The cost of growing hay, adding the interest on the value of land, taxes on the land, cost of manure to keep the earth from exhaustion, and the expense of labor, would be from six to eight dollars per ton.

Clover, to be free from danger to working horses or oxen, ought to be cut and wet with cold water.

There is an increased use of lime, plaster, and guano as fertilizers, and in most cases with good success and profit.

Respectfully, yours,

A. G. COMINGS.

Haverhill, Grafton County, N. H.,
January 14, 1853.

Sir: In accordance with your request, I will endeavor to give some information to the questions in the Circular sent me some time since.

Wheat.—This crop has been on the increase with us for the last few years. Spring wheat is the kind raised, and is generally sown as late as the 1st of June, as late sowing is considered the best preventive for Hessian flies and weevils. Average crop, 15 bushels per acre; price, $1 25. Kinds of grass-seed, 4 pounds clover and ½ bushel Timothy sown with the wheat. Guano is not used with us at all.

Corn is our principal crop on our bottom lands. The ground is manured with from 10 to 15 cords per acre; which is well ploughed in and harrowed, and is then planted with Woodward's planter, generally in drills. Average crop, 50 bushels. Cost of production, from 25 to 30 cents per bushel; usually ground and fed raw. Rows 3 feet and spears 6 inches apart.

Oats, Barley, Rye, Peas, and Beans.—Oats, average crop from 30 to 60 bushels. Barley not raised. Rye, from 10 to 15. Peas and beans, from 15 to 20; peas least exhausting, but not used as a renovating crop.

Clover and Grasses.—Quantity of hay per acre 1½ ton. Best fertilizers, clover, and that with Timothy, at the rate of 4 pounds clover and ½ bushel Timothy, is used for laying down meadows. Cost of growing hay, $4 per ton. I have no doubt but clover will give horses the heaves by over-feeding when they are not at work.

Dairy Husbandry.—I have been in the business some for the last 10 years, and find that cows without extra feed will average 150 pounds of butter, besides raising their calves. Cost of making butter, 2½ per pound. (For description of making, see my letter of last year.) The business has been good for the last year; average price of butter, 20 to 25 cents. Cheese, 9 cents.

Hogs.—We consider the Suffolk breed of hogs to be the best, and we think we can improve them by crossing with our natives. The cheapest way of raising pork is to keep just what your milk will feed till fall, and then feed with Indian meal, and you have good sweet pork. My method of curing hams is as follows: To 100 pounds meat, 4 gallons water, 8 pounds common salt, 2 ounces saltpetre, 2 pounds brown sugar, or molasses, if you prefer. In this pickle let them remain till you wish to smoke them, and you will find them equal to any.

Potatoes.—We think we can remedy, if not entirely escape, the rot in the potatoes by early planting. Our method for the last 2 or 3 years has been to plant in April, and at the time of planting we use a composition of plaster and ashes—say about 2 parts ashes and 1 plaster, at the rate of 8

bushels per acre, and we have not been troubled with the rot. We prefer breaking up old pastures for potatoes, and then the next year we are sure to get a good crop of wheat, as potatoes fix the ground in good shape for wheat.

HENRY MERRILL.

To the Commissioner of Patents.

Richmond, Mass., *January* 12, 1853.

Sir: Your Circular, making inquiries on agricultural progress, was duly received. As times and seasons have very much to do with the labors and products of the farm, you will permit me to say, in the outset, that the winter of 1851–'52 was one of very severe and uniform coldness. From November to March, we had scarcely the semblance of a thawy day. The snows which fell early in the season were the last to acknowledge the power of warmth, and to dissolve under its influence. The quantity of snow that fell during the winter was not so great as we often have; yet it remained unusually even, so that bare grounds and huge drifts were alike unknown. Winter but slightly relaxed its hold until nearly April; and the middle of that month, snow was full plenty enough for January. About the 20th of April, cold, heavy, northeast rains set in, which wasted the snow in the valleys, and on hills of moderate elevation, and removed the frost from the earth; but the ground, as must needs be after such rains, was cold, exceedingly wet, and in no condition for the plough or the harrow. The rainy season continued until about the 8th of May, when a drought—the long continued, wide-spread drought of 1852—set in, and continued, with but few slight showers, until the last of October.

During the continuance of this drought there were many atmospheric phenomena worthy of notice. It was not unusual—indeed, it was sometimes an every day occurrence—to see huge black clouds, bellowing thunder in fierce tones, and shooting lightning in frightful streaks, arising in the west and moving towards the zenith, promising to water the earth and give joy to all who feed upon bounties; but they most usually parted before coming in showering distance, and marched off, perhaps, after dispensing a few drops, to dissolve in thin air or water other lands or seas. So it must be seen that the earth became very dry, so that you might dig in common loamy soils two feet and find no more indications of moisture than at the surface; so, too, the lowlands. Swamps were dry; for all but the most enduring springs refused to let out their liquid treasures, and the streams ceased to flow. Yet the drought was not entirely uniform in the strength of its ravages. Some localities received more rain than others, and these were in the neighborhood of the highest mountains, and where they are huddled together most closely. After such a drought as we experienced the last year, it cannot be supposed that crops were so abundant, as though rains had been mingled with sunshine. The hay crop was probably diminished from one-fourth to one-third. The falling off was most visibly seen in old stocked and very recent stocked meadows. Those coming into mowing from the previous year's seeding-down were light; those in the second and third year from stocking were middling; and the quantity diminished as you went back

of the third year. Low lands gave a fair crop, and of improved quality. In so dry and pleasant a season, it will readily be supposed the hay was secured in fine order. This fact, with its superior quality, caused it to spend well, and heavy horses are much less common this winter than usual. Owing to the lateness of spring, but little ploughing was done until quite the last of April, and on many farms not until May. Fortunately it was so; for in consequence of this delay, most of the sown crops were not got in until the heaviest rains were past, and the earth was left in a lighter, more pliable condition, which enabled it the better to withstand the drought.

The oat crop was fair, from the perfect manner in which it was secured. The straw will do much towards lengthening out fodder. The current price of oats is fifty cents per bushel. Winter grain was well started before the dry season came on; consequently the crop suffered less than many others; an increased quantity was on the ground, mostly of rye.

The corn crop, in consequence of the lateness of the spring, and the dry weather that followed, was for a while considered a failure; it came forward, however, and did remarkably well, unless it were in particular localities, where the effects of the season were too severe for it. The fodder saved with care from corn-fields has helped much in this time of scarcity.

Wheat.—Less and less of it is sown each year. When oats are worth fifty cents a bushel, and corn seventy-five cents, and superfine flour can be bought for five and six dollars a barrel, a general opinion prevails that it is cheaper to raise the former and buy the latter than to run the risk of an uncertain wheat crop. Present profits may induce to this course; but taking the drainage of land resulting from the system into consideration, it looks like questionable economy.

Buckwheat was sown in as liberal quantities as usual, and paid well—being a full average crop. Its fine effects in cleansing land from weeds, by its great shady tops, and the pulverizing influence of its roots in the soil, are enough to recommend its culture on many lands, if there was no other consideration.

A farmer of my acquaintance recently bought a field so densely covered with hard-hack, (potentilla,) that it looked like a barren waste. It was bought cheap, of course, for, with the incumbrance, it was worth but little. Early in the spring he commenced ploughing it with a stout team, which tore out the bushes, which, when properly dried, were burnt, and the ground sown to buckwheat. The avails of the crop more than paid for the labor, and he expects the next crop will more than pay for the land—thus giving him a good field at a cheap rate, besides beautifying and making productive one of the waste places of the earth. In two years more he will have a beautiful, clean sward, where, a year ago, the eye could only rest with pain. This is not a solitary instance; we have many such, where fields are being reclaimed and subdued to the production of less hardy crops by the influence of buckwheat.

The potato crop has, finally, once more, nearly survived the blight, rot, or whatever it may be called. We have heard very little complaint of rotten potatoes this year. The yield has been fair compared with it in olden time. The flavor of potatoes is excellent and healthful. Whether this fact goes, in any way, to show the disease to arise from fluctua-

tions in the atmosphere, aided by predisposing causes in soil and cultivation, which may be traced to atmospheric influence, we leave it for others to decide, without venturing an opinion, which might only call out from some theorist the exclamation that we knew nothing about it.

Sowed corn is coming into favor for the fodder it produces. The sward on a piece of run-out meadow is inverted, a coat of manure spread on, and a thorough harrowing is given. The crop is highly remunerative, and leaves the ground in a clean, light, good condition for a future crop. Care must be used in saving the fodder, which, if well cured, is valuable for any stock, but is excellent for milch cows.

Fruit.—The attention to fruit-growing is increasing every year, as the adaptation of our soil and climate to the object is being developed. These have received a powerful influence through the exhibitions at horticultural meetings, where the facts have come out that Berkshire is admirably adapted to growing apples, pears, and cherries in any quantity, and peaches, plums, and grapes in comfortable supplies. The appearance of the black warts on plum-trees, for the last season, in immense quantities, may, perhaps, throw a damper on the cultivation of that fruit. There are, however, some choice varieties which have not yet been affected by it, and it may be they will escape.

In consequence of the light crop of fodder there was a great reduction of stock in the fall. Though some lots were sold cheap, yet, as a whole, the farmer has but little cause of complaint of prices. Fat cattle and sheep, though lower than a year ago, were in fair demand, and sold quick, and prices are advancing.

On the whole, taking all things into consideration, the farmer has but little, if any, cause to regret what may seem to have been the unfavorable character of the season. If the earth has not given her usual abundance, she has enjoyed a rest from which she will arise to brighter and more abundant harvests. The deep drought has operated on her soil to give it richness; and the leanness which has come over her has invited the farmer to consider in what way similar evils—if they are evils—can best be averted. And, first, he may learn that deep and thorough tillage are among the best preventives of loss from lack of rain. The deeper the soil, and the finer it is pulverized, the more readily and efficiently it will imbibe moisture from the earth beneath, and from the atmosphere, which is often humid when the clouds give no rain. Equal benefits result from lands so tilled in times of heavy rains. It is a known fact that deep soils soonest relieve themselves of superfluous moisture; hence we may conclude that they are best for preserving a uniform degree of humidity. Can it be wondered, then, that the advantages of deep ploughing or of subsoiling are yearly gaining more favor wherever their benefits have been tested?

Another specific remedy for drought, as we have seen fully illustrated the last season in gardens and with all hoed crops, is frequent stirring the land; keeping it open and loose with the plough or the hoe.

Garden vegetables, *corn*, and *potatoes*, dry as the season was, all uniformly, where well cultivated, did well. A friend remarked to me that he, for a long time, watered his garden; yet his productions did not come forward. He at length threw away his water-pot and took his hoe, and gave it vigorous action, when everything smiled under its influence.

Another fact, not a new one, but presented in a more forcible form, developed itself most conclusively, in consequence of the dryness of the season: Lands inclining to moisture should not be ploughed at all immediately after a heavy rain. In consequence of the lateness of the season, farmers did not wait to have the ground get so dry as they would otherwise have done. Such lands, when ploughed again in August, broke up in clods so hard that a wonder would arise how anything had grown from them. It also taught the fallacy of an old-established practice of ploughing head-lands first, and allowing the team, when turning at the ends, to trample over them. We saw an instance where, in August, such head-lands were reploughed, and were continuous blocks of earth as hard as bricks. No impression of a heavy harrow could pulverize them; then they remained hard, and worthless, deforming and cumbering the surface. But had the land remained unploughed and left to grass, how much worse would have been the predicament? A thin, sterile soil and meagre crops would have been standing memorials of an abusing system, until a better course suggested a remedy. Head-lands should be the last lands ploughed to leave them in the comfortable and productive condition that good management requires.

Yours, truly,

W. BACON.

MARSHFIELD, MASS., *May* 19, 1852.

SIR: If I did not misunderstand, you consented, as my friend, to signify to the Hon. Commissioner of Patents, (Mr. Ewbank,) that on receiving a Circular from his office, I would cheerfully endeavor to get together some raw material of this place; and, though, in consequence of the sterility of our soil and secluded locality, it must be barren of incidents, yet, through his Reports, the farmers of distant States have an easy and happy way of interchanging civilities, and of telling each other how they do; and may possibly help a little to consolidate our Union. I hope the cost of publishing these Reports will never be thought an unwise appropriation of public money; but lest I should not live to receive a Circular, I beg leave to trouble you with one thing now—and that is the fertilizing matter which may be concealed in the bottom of our rivers. I know of no river, overflowing its banks with any degree of moderation, which does not make them more productive; and yet, I suppose, this treasure is not the cause of such overflow. We know that the lands enclosed in the bends of our little rivers, backed up by tide water for a few hours, and then taking their regular course to the sea, are very productive. I should be glad to read the opinions of scientific men on this subject, through the Reports. I have thought an instrument could be made, (which, in consequence of my poverty of language, I must call spoon-bowl pincers,) which, in the hands of an ingenious man, with a gondola, and what I believe is commonly called a derric, might make rapid progress in examination.

ISAAC DINGLEY.

To the COMMISSIONER OF PATENTS.

MARSHFIELD, PLYMOUTH COUNTY, MASS.,
January 10, 1853.

SIR: Through the kindness of our great and good friend, the late Secretary of State, whose lips were "as the doors of a treasury," I have received your Agricultural Circular for 1852; and all the abatement I feel in the pleasure is, my inability to do it justice. I must not, however, contend with myself much about that, but *sorrow more* because I cannot compress my narrative into fewer words, and be less burdensome. Under this impression, I shall confine my remarks, unless it may be some of a general character, to a small space of territory, and not interfere with what may more properly belong to those who may hereafter be called upon to speak of the adjacent country.

This town, incorporated in 1642, has features somewhat eccentric; being settled around the outside, and as near the rivers as the land will permit, with her forest-ground mostly in the middle; and though facetiously dotted with

"Hill and valley,
Fountain and fresh shade,"

there is a general inclination to the southeast, with an elevation of about 150 feet from the sea, on the western border. The air is invigorating for all but consumptive constitutions, and is said to afford an agreeable place of rustication for the successful men of Boston.

But this is our bright side; we have to struggle on under marked disadvantages. In any of the three directions, we have to go quite through one town and into another, to do business by such means; this breaks up time, and is a sad draught on our energies.

Corn.—This article is raised in considerable quantities, though far below the consumption. There is an increased attention paid to preparing the ground; a few years ago, an average crop was not any over 20 bushels to the acre; now it may be set at 30, while some fields go as high as 50 or 60, and we hear of some that go much higher; but of these last I am not prepared to speak. We spread the manure on the ground before ploughing; plough mostly in the spring, seldom more than once, and harrow; then check with the skooter plough all the way from 3 to 4 feet, as opinion leads us, planting at the intersections.

Warping with stakes and twine will keep off crows; but tarring the seed, and then rolling in plaster, will secure it not only against crows, but blackbirds and hens, unless it shall be an unusual time in coming up; but quails, cat-birds, and squirrels are not always to be prevented in this way, as they will work later, and after the ground has taken the tar out of the corn. These I now feed as my friends; they are not great eaters; it is only to keep a little corn scattered in their haunts. Formerly I have threaded the corn with hair from the horse's mane, but have abandoned it as a species of barbarism, and shall not again resort to it till milder means have proved abortive.

To prevent the cut worms in ground kept for frequent cultivation, it is necessary to clear off corn stumps, or anything else they can find for protection from the frosts before winter, and they will be very likely to die. The wire worms appear to be a little different. I believe, though I am not quite certain, that they sink and remain below the frost during the winter, living on themselves, and returning in the spring with renewed appetites; they will eat almost anything that can be eaten. The best way I know is to plant some short pieces of cobs with the corn, as they will busy themselves with the piths, and this will lessen their mischief; I wish some one, who can afford the time, would ferret this out, and let us know.

In planting, we must be governed somewhat by the season; but in South-eastern Massachusetts, in the first half of May, when the corn is well up, the skooter plough, or cultivator, should be used freely; some fields will do as well with twice hoeing as others will with three times. The cost of raising corn here cannot be much less than 50 cents per bushel, exclusive of land rent; this may be thought high; it is, however, in part owing to the diminished value of the stover in the neighborhood of so much coarse meadow hay. We may pass one half the value of the manure to succeeding crops, and until the growing of it is better understood on our land, this is all we can look for beyond the simple reward of our labor.

Rye.—Winter rye receives attention; it is a common way to sow, in August, about one bushel to the acre at the last hoeing of corn, to come as a rotation crop; it often rusts a little, and many choose to wait longer; there should be red-top grass-seed sowed with the rye; we know it makes a poor lay of land, but we cannot well do without it; for next, to the potato and the pudding, a bread made of rye and corn is the cheapest article of substantial food within our reach.

It is ripe about the middle of July, and is as sure a crop, of from 10 to 12 bushels per acre, as any we raise; and I think we need none from abroad.

Grasses.—Timothy, red top, and clover are sown sometimes in the spring with oats; but such seed is very likely to die on our light land by summer drought. A better way for us is to plough after the grain or grass crop is taken off, and sow about the first of September, six pounds of clover, one peck of Timothy, and two pecks of red-top, per acre; it needs to be new-laid oftener than where there is a deeper soil.

When first laid to grass, from one to one-and-a-half ton of hay per acre is obtained; and, by hauling a few miles, can always be cashed to a profit. The cost of growing this article may be set at ten dollars per 2,000 pounds.

Dairy.—Good attention is paid to making butter, compared with our means; but it is sold, without being put into kegs, in the neighboring towns, while some little finds its way to Boston. The cost may be 15 cents, though sometimes a little more, and it sells to a good profit.

We call her a firstrate cow that can furnish milk to make a pound of butter per day by grass alone, in the best part of the season.

Neat Cattle.—The raising of cattle is now receiving a little more attention. Not long since we were overrun with the dregs of the Brighton market. Forty years ago we had a thick-meated breed, making strong oxen for their keeping, and good cows for the dairy; but at a later period the skilful drovers poured in upon us their *creeping things*, which would have been dear at almost any price, were it not that they helped wipe off our coarse meadow hay, and assisted in making some manure. It was, however, a poor speculation, as it induced us to sell our best calves, and made our cattle grow worse.

Within a few years, the mistake had been discovered. Many are now crossed with the Durhams, and we are looking for favorable results, though I think it is questionable whether they will be able to combat a careless wintering so well as our former native breed.

Sheep and Wool.—The rearing of sheep is a branch of business in which I take great interest, and it is *very lamentable* that they are so much neglected. Since reading from gentlemen at the South, I am led to believe there is no one of these United States, or their territories, unless we except Massachusetts, which could not grow *wool* to clothe their present number of inhabitants, without much interfering with other pursuits; and I believe it is as yet unknown how we, who inhabit the earth above the tropics, can be comfortably and decently clothed without the sheep. I think we should not be disheartened because we cannot now compete successfully with the Australian wool of England; with all her dexterity she may have trouble with her gold, and fail to clothe us when we shall most need her assistance.

At the North, the manufacturers are glad to work wool into cloth, on a share; and if those at Columbus, Georgia, could do the same, our young friends in that region might clothe their laborers by such means, and keep a larger part of their capital in reserve for extended enterprise.

Good common wool, unwashed, costs us 25 cents per pound, and on this we can now make nothing; but our lambs can be kept till four months old for $1 25 per head, and on these we make a little profit; and this is not all: sheep will clear off briars, weeds, and other troublesome herbage from our pastures, which I look upon as no small affair.

We know dogs do sometimes make sad havoc. But gentlemen are now very good and kind to see that their hogs are properly cared for; and we are led to hope that the improvements at this time being made in the state of society will soon induce them to take a similar care of their dogs.

In my little way I have been able to raise nine tenths of my lambs; but *my sheep know my voice and they follow me.*

Hogs.—Some pork is made partly on the save-all principle, beyond the consumption of the place, but not enough to pay for the pigs brought in by the drovers. It is carried away in the shape of whole, butchered hogs; the only profit there is in this branch of industry, beyond our own wants, is their activity in making manure, which I will omit describing, as I should be very tedious.

Potatoes, Irish.—They can be grown at the rate of 200 bushels per acre—I mean if we could manage so as to measure them before they rot; but this is bad policy. We have already dug enough of the sorry fruits of trying to raise a large amount of them on a small piece of land; 100 bushels per acre is all we should seek after; this can be done at 20 cents per bushel, including land rent.

We plant the Chenangos, round reds, long Johns, and pink eyes, with a few early whites; they should be planted on ground which had been in some crop the year before, and made pretty rich; the ground should be ploughed rather deep, for common ploughing; *no manure should be spread;* the rows should be *full three* feet apart; some weak manure should be put in the hill; *all slaughter-house or barn-cellar manure should be avoided;* for while these, together with the rotting of grass roots, are in active operation when they are most needed to fill out ears of corn, they are equally so to fill the potatoes with water, and prepare them to rot.

Notwithstanding all the disasters which have befallen us with regard to this crop, we yet grow them in considerable quantities, both for home use and a market; but as this is no light affair with us, I may have something to say with regard to it under another head.

Fruit.—The culture of apples is now receiving increased attention; some years ago, orchards were suffered, and even encouraged, to run down, from a *strange philanthropy*, lest the juice of the apple would somehow find its way into alcohol; this was an unfortunate conclusion to arrive at. We can sell all the very good fruit we can raise in a raw state; the second quality we can dry; these find a market on board whale-ships, and are useful for all long voyages; and the refuse of these may be fed to the cattle, or boiled for the hogs.

Manures.—This is a highly important item in working our light land; all excremental substances which can be obtained are preserved, and we all have our little manure heap, of muck and collections. Great exertion is now made to procure help from the sea-shore; very little is suffered to be lost after landing on the beach; it is a good article, and will pay for hauling six miles.

A little plaster is used on very dry land, for potatoes, to a profit; but guano and lime we think too expensive; if it were not so, lime would undoubtedly be used for potatoes, as it is a great absorbent, and would do something to prevent the rot. And here I may say, the steady dry weather, in August and September, 1852, had a very favorable effect on such as were badly planted; it saved large quantities of them, which must, otherwise, have been worthless. I think we may feel much less anxiety for the future with regard to so valuable a production.

Under the head of fruit, an opinion is asked on the comparative value of apples and potatoes for feeding; and on this I think I can say a little with a good degree of confidence. The last fall, I fatted a cow mostly on these two articles; I gave her a bushel of apples in the evening, and half as many potatoes in the morning. I thought the feed was about equal; the cow did well, and the beef was good. I salted the principal part for my own table. But this opinion, I think, would not be good in all cases; if the potatoes should be dug in a green state, as many are, to prevent them from rotting—I mean before the hull has surrendered to the starch for safe-keeping—their nourishment would be less; and so it would be with the green apples. As I understand, the conclusion must be this: in a ripe state, the starch in the potato, and the sugar in the apple, form the leading properties, not only of nourishment, but protection; and I think if the potato has barely enough starch in it to prevent it from rotting, when ripe, its nourishment is double that of the apple.

Poultry.—Hens are receiving strict attention, and the eggs sold do much towards paying for the large amount of corn we have to buy; the necessary care falls much upon children and shoemakers, who need some exercise in the open air. The eggs cost about 10 cents per dozen, and we can always sell them to the peddlers, for the Boston market, at a profit.

Cranberries.—The vines are set in cold, wet land, which is good for but little else without powerful draining; where they have grown well, large profits have been made, and we have them in moderate quantities for a market.

It must be *exceedingly desirable* to know how far South this berry will flourish, for if present prices could be received for fifteen years to come, most of the swamps in Massachusetts could be cleared of bushes, and planted, with advantage to the owner; although it may be of *greater public utility* to know how far north the rice will flourish; for there can be but little difference of opinion that, when the United States shall be fully peopled, this article must be raised wherever it will grow to maturity.

Meadow Grass—by this I mean our grass growing under the influence of tide-water—is always redundant for foraging purposes. Sixty years' remembrance furnishes me with but one season when hay made from this grass was not for sale in this place; but this year, it is thought it will be nearly all taken up.

Pursuits.—And here I need make an apology, and it must be this: without saying something under this head, our picture must look so sickly as to pain the beholder.

Box Boards.—We have four mills at work in sawing this article; they are not only used for boxes, but carriages, trunks, and furniture. There is a good profit made on them.

Lobsters.—This business has been followed twenty years, and is good; from 50,000 to 100,000 are taken annually. The pots are made of oak or ash, generally half round, with the meshes as large as they can be and prevent their escape; baited with any dead fish. They enter by a tunnel-nosed aperture, and are set with a buoy and sinker. The lobsters are sold to the smacks, for Boston, and peddlers for the interior, at a large advance.

Shoemaking.—This finds employment for a very considerable number of our active young men. The business is so profitable as to cause them to leave farming and engage in it. Their places we have to fill with lads from the "Emerald Island;" and a goodly number of them do very well.

Whortleberries.—These are ripe in the first half of August; they remain in a good state about a couple of weeks. The schools then have their vacations to accommodate this business, and we have known a little child to earn a change of light clothes in a few days, without assistance. Some near place of deposit is provided, from whence the peddlers take them to Boston.

Shoe and Needle-work.—Considerable employment is now found for ingenious women in preparing vamps of shoes, and in making various kinds of clothing. The business is moderately profitable, and commands quick returns.

I am aware the space, *if any*, which can be allowed me should not permit the speaking of individuals; and yet there is *one so* distinguished, and connected with so much that is lovely, and of good report, that this communication would suffer without it—I mean the Hon. Daniel Webster, who died at his residence, in this town, October 24, 1852. It is not as the fearless counsellor, the flowery orator, or the far-seeing statesman, that I have anything to say; this is not mine to do.

While the State has hesitated at the cost of a model farm, he has furnished one from his own pocket, where we may go and see and judge for ourselves, *without money and without price*, in what we may follow him and in what we may not. He has undoubtedly raised the credit of farming among us, and solved to a certainty that interesting problem, which more provisions can be raised within the town, when they cannot be procured to better advantage elsewhere. His urbanity was known to all; and his evening and morning greetings were carefully treasured up to festoon our household words, and help beguile our slothful hours away.

There is a society in this county, called the Plymouth County Agricultural Society, which has a meeting annually in October, and it is well attended, where premiums are awarded for the best cultivated farms, the best neat cattle, and for victorious specimens of handiwork; and it is a spur to the farming interest generally. But here I must stop—I have already said too much. If there is *anything* which will be useful to report, it is humbly offered.

Very respectfully, your farming servant,

ISAAC DINGLEY.

To the Commissioner of Patents.

Greenfield, Mass., *September* 24, 1852

Sir: With this I enclose a letter from Henry W. Clapp esq., of this place, giving the particulars of the most remarkable grass crop (a fraction less than six tons to the acre in two cuttings) of which I ever saw any authentic account. He is a gentleman of the highest character, and has been president of our County Agricultural Society. The grass was well cured, and the hay carefully weighed, and those who saw the grass on the ground were not astonished at the result of the weighing; as a well-attested case of remarkable yield, it is well entitled to your attention.

I am, very respectfully,

GEO. T. DAVIS.

To the Commissioner of Patents.

Greenfield, *September* 24, 1852.

Sir: The Hon. G. T. Davis, from Massachusetts, has handed me a Circular of yours for 1852, asking for answers to several agricultural inquiries.

I will confine myself to my personal experience with seven acres, and one hundred rods of land accurately surveyed and devoted to raising grass. Early in the fall of 1848, I spread thirty loads of horse manure to the acre, (each load containing thirty bushels,) when I ploughed the land with a four-ox team, beam deep, following every furrow with a subsoil plough with four other oxen; in July, 1849, I thoroughly harrowed the land, and ploughed again (without subsoiling) and seeded and bushed herdsgrass seed only; and in July, 1850, my first crop yielded 29 tons 497 pounds; my second crop, in September, 14 tons 97 pounds; making 43 tons 594 pounds. The land is light, loamy soil, and, previous to subsoil ploughing, never yielded four tons per acre, notwithstanding it had been equally highly manured years previous.

Respectfully, &c.,

HENRY W. CLAPP.

HADLEY, HAMPSHIRE COUNTY, MASS.,
December 27, 1852.

SIR: Some weeks since I received a Circular soliciting information upon topics connected with agriculture. If the following observations are of any value, they are at your disposal:

Wheat.—The production of this grain is on the increase; it is thought by many farmers to be almost as sure a crop as rye. In this vicinity it is but slightly affected by the depredations of insects of any kind. The injuries to which it is most liable are those resulting from smut and blast or blight. The former of these is generally prevented by soaking the seed before sowing in a strong brine for twelve hours, and then rolling in unslacked lime. A change of seed, also—getting that grown in the Western States—is deemed by some a good preventive.

We have no sure preventive of blast, but consider early sowing and proper draining of the land the best. Our average product for winter wheat is probably 20 bushels per acre. Thirty is not an uncommon crop, and 50 is sometimes obtained on new lands. We sow two bushels to the acre early in September, if possible, and harvest the latter part of July. Guano is not much used. The most common system of rotation here is corn, broom corn, or potatoes, one or two years, with manure; then rye, oats, or wheat, with grass seed; making a rotation of from four to six years. By far the greater part of the wheat grown in this section comes in after a hoed crop. An excellent preparation is to plough in the stalks of broom corn while they are yet green, after having taken off the brush, and covering them thoroughly. Sow upon the furrow and roll and harrow in the seed. The stalks act as under-drains through the winter and spring, and then afford nourishment for the wheat when it most needs it. In these cases, and in most others, we plough but once, and from six to nine inches deep.

The grass-seeds most commonly used are herdsgrass or Timothy, red-top, and white and red clover. They are usually sown upon the wheat or rye early in the spring, and harrowed in with a light harrow. Sometimes they are sown immediately after a fall of snow in the spring, but before the frost is out of the ground, and the harrowing omitted.

The price of wheat varies from $1 50 to $2 per bushel.

Cows.—One hundred and fifty pounds of butter per year is considered a fair yield for one cow, though 200 are sometimes obtained. But little cheese is made in this region. We think a temperature of sixty degrees the best for raising cream, and also for churning it, though the temperature must be varied somewhat as the weather changes. The milk is allowed to stand from 36 to 48 hours, and when the cream is taken off it is put into a tin vessel and slightly stirred whenever more cream is added.

The churn pretty generally used here is in the form of a cylinder with a dash hung horizontally, and revolving by means of a crank. The butter finds a market in the immediate vicinity, so that but little is packed into firkins. The average price is 18 or 20 cents.

Hogs.—A mixture of the Suffolk and Mackery breeds are most sought for; combining, as they do in a high degree, the two qualities of good size, with small bones, and great symmetry of form. It is thought best to have a kind that will come to maturity in a short time. Pigs are frequently killed at six and nine months old, and make as profitable a return

as any; they sometimes attain the weight of 350 pounds when dressed, in the latter space of time. Managed in this way they must be well fed the whole time.

Pork to be packed is cut into strips four or six inches wide and tightly packed in layers with one edge down and a layer of coarse salt sprinkled in between each layer. After the pork has stood two or three days, cold water is poured over the whole in quantity sufficient to cover it.

A receipt for curing hams, proved to be good, is the following: For 100 pounds meat, 6 pounds salt, 4 pounds sugar, 2 ounces saltpetre, 4 gallons water. Boil together and take of the scum, stand until cool before using. Let the meat be in the brine six weeks and smoke four.

Corn.—Guano is sometimes used with good effect in the production of this crop, either sown or put into hills. I should think the average product of corn would not vary much from 35 bushels per acre, costing 60 cents per bushel, estimating value of stalks at $5 per acre.

After thoroughly ploughing and harrowing the ground, it is marked off into rows both ways; the rows three feet apart. A composition of plaster, ashes, night soil, and manure from dove cots or hen roosts, and earth in the proportion of one-third of the whole, is dropped in quantities of a small handful to each hill. A good dressing for an acre is 100 pounds plaster, 5 bushels ashes, and other materials to make 10 bushels. This does not supersede the use of stable manure in all cases, but gives the plants a fine start. Four kernels are put into a hill and covered about an inch deep. When the corn is some three or four inches high, a cultivator is run between the rows both ways, and it is dressed with the hoe; this is repeated at intervals of a week or ten days, until the corn is so large as to cover the ground.

Most of the corn is ground before it is fed out to stock. For hogs it is sometimes partly cooked.

Manures.—The best method of making and preserving manures, or the one most in favor in this part of the State, is the following: A lean-to is erected over the stable window, out of which the manure is thrown. This protects it from the weather, and, at the same time, affords a shelter for the cattle when they are not in the barn. Corn-stalks, sometimes cut into pieces a foot long, are much used for litter, and for augmenting the manure heap. Stable manure is frequently mixed with muck in the proportion of 1 load of the former to 2 of the latter. The muck should be dug 9 months or a year before it is applied to the land. If the compost is to be used in the spring, it is best to dig the muck the summer before, and work in the manure well in the fall. A compost made in this way is as valuable, load for load, as common barn-yard manure. When stable manure is not to be had, the muck may be made available by mixing with 50 loads of muck and 50 bushels of ashes, 100 pounds of saltpetre and 500 pounds of plaster; the whole to lie some weeks until heat is evolved. Lime and plaster are used as fertilizers; the latter in large quantities. It is applied every year at the rate of 100 bushels per acre. It is sown upon pastures and mown in the spring; and also dropped into the hills of corn before planting. Shelled lime from New Haven, Connecticut, was used here for the first time last season. In one instance it was applied in the hill, in connexion with salt, in small quantities, by the advice of the late Professor Norton, who had previously analyzed the soil, and with a very favorable result, in-

creasing the crop, in the estimation of good judges, one-third. For other crops, also, it has proved beneficial, though I have no particular facts to present. When sown, it has been at the rate of 20 bushels per acre.

Most respectfully, yours,

THEODORE G. HUNTINGTON.

WAREHAM, MASS., *August* 31, 1852.

SIR: Your Agricultural Circular is before me, and I have ventured to make the following hints in reply:

Wheat.—When the legislature of Massachusetts offered a bounty on wheat, many of her farmers appropriated their best land and manure to the raising of this article. In most cases they failed to get more than half a crop; which soon convinced the farmers (not the legislature) that it was better for a Massachusetts farmer to raise something else, and let New York and Ohio raise wheat, as heretofore. Had the time and money lost on the experiment been put into railroads, connecting this State with the wheat-growing States, the result would have been more beneficial to all parties concerned.

Corn.—In Massachusetts first set as stiff a grass sward upon your land as possible; your own ingenuity must devise the means. Turn this sward over about the 1st of May, and plant your corn immediately, in hills 4 feet apart, to save labor in cultivating; in drills it will yield most, but the labor in tilling is increased fully equal to the gain.

Grasses.—In low ground plough your land about the last of August, and put some fine manure upon the top of the furrow, and seed immediately. The first rain will bring it up, and it will get well rooted before winter. In this way you may renew your meadows without the loss of a crop, and improve the yield both in quantity and quality.

Roots.—These may be easily raised on good land; but their value for feeding has been over-estimated. I have found their fattening properties, when compared with corn, as one to five. Potatoes are worth about half as much as corn for man, but are not much better for beasts than carrots, beets, and turnips.

Respectfully, yours,

SILVANUS BOURNE.

FARMINGTON, CONNECTICUT,
December 30, 1852.

DEAR SIR: In answer to inquiries from the United States Patent Office, enclosed in yours of the 22d, requesting me to answer such questions as I am most familiar with, I send you the following estimates, as my experience and observation on growing sheep and wool, and will answer the questions in rotation:

First. Is wool-growing profitable? Wool growing I believe to be the most profitable business of the farmers in the county of Franklin.

Second. Cost per pound of growing coarse or fine wool? Cost of

coarse wool, 33⅓ cents per pound; cost of Merino wool, 26 cents per pound; cost of Saxony wool, 42½ cents per pound (washed on the sheep.)

Third. Are large or small sheep more profitable, either for mutton or for their fleece? The Merino is the most profitable for wool and mutton; the Dishly and Irish for raising lambs for the market. The butcher and drover will tell you that large sheep are most profitable, for the reason that there are less draughts in weighing large sheep.

Fourth. How much more does it cost to produce a pound of Merino than of ordinary coarse wool? You will perceive by the above estimates that the expense of growing coarse wool, over fine Merino, is 28 per cent. By actual experience, I find 2½ pounds of hay per day for a Merino sheep to be as much as they will consume through the winter, of one hundred and fifty days; native sheep will eat about the same as Merino. The difference in the expense of keeping large and small sheep is in proportion to their difference in weight. We charge the wintering of sheep to the wool they grow; their lambs paying for washing, pasturing, and other expenses.

Fifth. The proportion of lambs annually reared to the number of ewes is five lambs to six ewe sheep, over one year old.

To put a Merino buck with coarse-woolled ewes improves the stock of the latter very much. In my allusion to Merinos, I mean the most hardy kind. I find there is a great difference in the various importations.

For a further description of what I call the right kind of Merinos, I enclose a specimen of wool grown on a Merino ewe, that grew six pounds two ounces of washed wool, and raised her lamb last season.

Yours, respectfully,

T. WENDELL, JR.

DR. PERKINS,
President of the Franklin County Agricultural Society.

Remarks.—The sample of wool which came in the letter sent by Mr. Wendell is remarkably clean, and reasonably fine for Merino, or a few shades below Saxon wool. Mr. W. speaks from experience and with confidence, and is, probably, not far from the truth in his several statements.

LITCHFIELD, CONNECTICUT,
December, 1852.

SIR: Litchfield town and county have in former days been somewhat celebrated as pioneers in the work of training men and minds for usefulness, and for places of honor and trust in this widely-extended country. Many of our ablest statesmen and jurists have in *this* town, under the guidance of such men as Keever, Gould, and Huntingdon, been fitted for the important posts which they were afterwards called to fill, (more than 1,000 in all;) and many, very many, of the great men of our land first saw the light of the sun as it shone on the rough hill-tops of this county. Litchfield, also, was a pioneer in the work of training the mind

of woman. The Female Academy, by Miss Sarah Pierce, opened in the year 1792, was one of the earliest schools of the kind established in the United States. And as in mental culture, so in the mechanic arts, we, of this county, have not been last, nor least. The clocks from Plymouth, the scythes and axes from Winsted, and the woollen cloths from Wolcottville, have been celebrated almost throughout the country long time ago; and more recently, in Salisbury, there has been established the pioneer shop for manufacturing American pocket cutlery, already followed by one in Plymouth, and others in this State. But if Litchfield has been somewhat celebrated as above stated, she has been more so in a different line. There is not, perhaps, a county in the United States where so many fine steers and oxen have been raised as in this. To particularize the different towns of the county might be thought invidious, where nearly all take so much interest in the subject. The Messrs. Hulburt, of Winchester, were the *pioneers* in raising stock from imported Devons, and their celebrity is to this day as extensive in our country, as their orders received for bull calves from year to year will show. Mr. Case, of Harwinton, has a Devon bull which was imported a year ago at great expense—a very fine animal.

The stock of the county are generally grade animals, being a mixture of what is usually termed native and Eaton breeds, with or without Devon blood. The usual manner of breaking in steers is to yoke them at any age from one year to two and a half years old, and put them between two pairs of cattle, to drive occasionally until familiarized to the yoke and driver; then, when returning towards their place of keeping, after having been a while from it, to put them on the lead, and accustom them to mind the motions of the whip, and haw or gee, as told. As they advance in training, put them on the pole or neap of the cart or sled when empty, and accustom them to hold it back or carry it steadily down hill. Use and care in driving by an experienced teamster will soon make them pefectly tractable and handy. A large proportion of the finest steers raised in the county, and broken to the yoke, are sold out of the county at four or five years old; and many of them are those which have taken premiums at the shows and fairs of the adjoining counties of Hartford, New Haven, and Fairfield, in this State, and at the New York State fair, and that of the American Institute of New York city, but more particularly bulls and heifers at the two last mentioned places.

CYRUS CATLIN.

Columbia, Connecticut,
December 30, 1852.

Sir: In reply to your Agricultnral Circular of August last, a copy of which came to hand, I would say, that corn is the principal crop with us. Guano is but little used; average product, about 40 bushels per acre. Cost of production varies much; an average, perhaps, would be 25 cents per bushel for the labor. I planted, the season past, 2½ acres on a field which had been pastured for about 30 years previous, and it was considered worn out. In the spring of 1851, it was ploughed up; July 1st, ploughed again; 12 loads (25 bushels each) of barn-yard manure spread on; two bushels buckwheat sown and harrowed in; product, 40 bushels

buckwheat. In the spring of 1852, in May, 48 loads (30 bushels each) of coarse manure from the barn-yard were spread on; ploughed once; dunged in the hill with 20 loads (30 bushels each) of fine manure, which was carted on the fall previous; planted the 20th of May; rows 3 feet apart each way; yellow corn; hoed twice; running a cultivator between the rows each way before the first hoeing, and using a plough at the second; harvested by cutting up by the ground, and husked about the 20th of September; carted in and husked about the 1st of November; product, 196 bushels ears assorted corn, and 36 bushels of poorer quality, making 232 bushels of ears in the whole, equal to about 120 bushels of corn. I have measured out and shelled two bushels of ears; product, about one quart over one bushel grain. The whole expense, including drawing the manure last fall and this spring, was $40, or 33⅓ cents per bushel; cultivation, aside from the hauling of manure, $16, or about 14 cents per bushel.

I have described this crop more minutely, as it is the ordinary course pursued in this vicinity. Considering the previous state of the field, I should consider this more than an average crop for the labor. It was so considered by my neighbors.

There is a spirit of emulation excited in regard to this and most other farm crops in this region, and I think I hazard nothing in saying that the average per acre of the corn crop has doubled in the last 20 years in this town.

The crop is usually ground before it is fed out.

Oats are a profitable and good crop; average, about 40 bushels per acre; usually do well; expense of cultivating, small; and a ready sale at about 42 cents per bushel. They are now worth 50 cents per bushel.

Barley but little cultivated in this vicinity.

Rye.—Our soil in the main is not fitted for this crop, it being springy and wet, except some sandy land on the borders of the small rivers, and occasionally dry knolls.

Clover and Timothy are the grasses mostly cultivated; average per acre, 1½ ton. Clover is thought to be injurious to horses by most people, tending to an irritation which results in the heaves. Others claim that if the clover is cured in a proper manner it will not produce irritation, or a cough, in horses sooner than any other kinds of hay; and this opinion seems to be gaining ground, and people are more particular about curing it. The results, as far as my observation extends, are most favorable to the latter opinion.

Butter is made to some extent; sold in the manufacturing villages at sixteen to eighteen cents per pound in summer, twenty to twenty-five cents in the winter.

Hogs are raised only for home consumption. There is much emulation among farmers in regard to them. Many, at sixteen months old, are made to weigh, when dressed, over five hundred pounds. Pigs, at eight months, are often made to weigh three hundred pounds and over. Making pork here is a good business at present prices—eight to nine cents per pound in the hog.

Irish potatoes are a good crop; but have suffered by the rot in past years, and farmers have not planted so many as usual. The past season they have escaped entirely.

Fruit is beginning to receive attention, and I am satisfied can be

made with us an exceedingly profitable crop. Our soil seems to be favorable. The yellows are destroying our peach trees, however. I know of no remedy except one, which I regretted to put in practice last spring, to wit, hitching a yoke of oxen to the trees and pulling them up, root and branch, as I did some favorite ones.

Respectfully, yours,

JOHN L. YEOMANS.

BRUNFORD, NEW HAVEN COUNTY, CONN.,
January 25, 1853.

DEAR SIR: By the politeness of C. M. Ingersoll, esq., I received your Circular some time since, and, more recently, am still more indebted to him for a copy of the Patent Office Report.

These reports are very useful, and highly prized by the farmers; and I could wish that every man that tills the ground of our beloved country was possessed of these books.

My home is in New England, in one of the oldest towns in Connecticut. The land here has been cultivated for more than two hundred years; and yet, when properly improved, is capable of producing, and does produce, as good crops as most any other section of the country. The manures mostly used are barn-yard manure and white fish, (manhaden,) although the latter is not so much used as formerly.

Wheat.—But little is raised here, for the reason that, years past, it could not be raised; but last summer some fine pieces were grown here. One man told me he had as fine a piece of wheat as ever grew out of the ground. It is being more cultivated than formerly, and, if it continues successfully, will enlist the attention of farmers immediately.

Corn.—Corn is grown here extensively, principally for feed. People generally raise and fatten their own pork. Hogs will fatten on ground corn. I cannot tell what the average yield per acre is; some large and some small. It is generally planted on grass ground, turned over with a coat of barn-yard manure. Some turn in rock-grass with yard manure, and some add a coat of manhaden at the first hoeing; others think it best to put on a coat of fish at the third hoeing, just as the corn is setting, which tends to push out, and fills the ears more perfectly.

Oats.—Oats are not so much raised. Formerly it was the practice to seed our land down in grass, with oats; but of late years grass seldom comes in with oats; so that oats have, in a measure, gone into disrepute.

Rye.—Rye has become quite a favorite with our farmers. Grass succeeds much better sown with rye than oats. A mixture of wheat and rye is frequently sown together.

Grass.—Herdsgrass and clover are grown here. Herdsgrass is the chief. It is now almost universally sown in the fall; sometimes alone, but oftener with rye or wheat.

Clover is sown in the month of March, on a light snow generally, the object being to secure a crop of grass the first year. The clover is soon overcome by the more hardy herdsgrass.

Neat Cattle.—Probably there are more neat cattle in the town than were born here. If it were not for making manure and disposing of

some of our poorer kinds of hay, the raising of neat cattle would not be profitable.

Potatoes.—Irish is the crop on which the farmers principally depend as a source of income. Being on Long Island Sound our potatoes find a ready market in New York city, by means of coasting vessels. We have suffered much from the rot for some years past; know nothing of the cause, but are well acquainted with its effect. The past fall our potato crop was nearly free from the rot; the average yield would not be more than one hundred bushels to the acre, if that. Those planted early have succeeded best; those planted late rotting more than early ones. Last year late ones did very well, not rotting.

Manures.—Perhaps nowhere in the United States are manures of more importance than to the New England farmer. Without it we can do nothing; with it we succeed in raising fine crops, by careful attention. To us the study of the nature of soils and manures is of vast consequence, and, indeed, necessary.

I have not had much experience in agriculture, or, rather, my experience has been such as would bear testimony that, with improper treatment, good New England land can be made to bear *small crops.*

It was formerly our practice to drain our yards, and keep them as dry as possible; but now I feel perfectly convinced of the folly of such a course.

If I were to build a barn, I would have a cellar under it; which I think would be better laid with stone and cement; although yards are dishing, and there is no chance for the liquids to run off, yet, the best part of it will be constantly soaking into the ground. Rock-grass is used, or has been used extensively some years past; it is a very good manure if you can get that which is good.

But, next to barn-yard manure, nothing has been so generally used as white-fish. The use of them has been the means of making many fertile fields of land, which were before barren and unimproved; although many times they have been used injudiciously.

I was thinking, if these Reports from the Patent Office could be more generally distributed amongst our agriculturists, or be placed within the means of our farmers, they would be eagerly sought for, and prove a blessing to the nation. I am not aware that the books can be purchased at any book-store, or of any agent.

After Congress have published their quantum, if many thousand copies extra were printed, to be sold at cost of publishing, I think that many of a class who seldom now, if ever, get hold of one, would soon have them after an opportunity.

I am, very respectfully, yours,

SAMUEL BEACH.

WESTON, SOMERSET COUNTY, N. J.,
December 20, 1852.

SIR: In compliance with a request contained in your Agricultural Circular, I forward you some practical hints on the different crops which are cultivated in this part of our State.

Wheat, varieties sown: Mediterranean, white flint, red chaff, Hutchi-

son, old ball, and several others; Mediterranean, however, is the kind which is mostly sown; in fact there is more of that kind raised than all others together, and when cut in the dough state makes a very superior flour, since it has become acclimated among us; bakers considering the flour from good Mediterranean wheat superior to any others for bread, because it is stronger and will bear more water. I would here remark, that I consider any wheat better by being cut while it is so that you can mash most of the grains between your fingers when you commence cutting. If left until fully ripe, the bran is thicker, and of course is more liable to be cut up among the flour.

Our rotation consists of the five-shift course, commencing with corn on the sod, which has been top dressed with lime the previous year, and ploughed under in the fall or spring. The corn is followed by oats, which being harvested, the stubble is turned under about 7 inches or more, (the deeper the better for wheat,) manure spread upon the ground and ploughed two different times after, and a portion of lime—say 50 bushels per acre—harrowed in with it; when it is sown with wheat and Timothy seed in the fall—say by the 15th of September; clover-seed is sown in the spring. About 2 bushels of wheat and 6 quarts of the grass-seeds per acre are used. The wheat has the important advantage of succeeding two cleansing crops, and the ground, after harvesting the wheat, is left in fine condition for hay grasses. The first year after the wheat is harvested, the grass is mown; the second, pastured; after which, the sod is again turned under for corn, and the rotation recommences.

Guano is used by some farmers in large quantities, who apply from 200 to 400 pounds per acre. It is considered an excellent and economical manure for wheat; 400 pounds will generally give 30 and 35 bushels per acre on land that would not give 15 bushels without it. We have an article called the super-phosphate of lime, manufactured on a large scale, which comes at the same price of guano; it is composed of bone-dust dissolved in sulphuric acid and mixed with sulphate of ammonia and guano, and it is said by those who use it to be superior guano, inasmuch as it is all soluble, not volatile, like guano.

Average yield per acre, about 20 bushels; though some farmers get as much as 40 bushels per acre. After sowing, we sometimes use the plough to work in the grain, which, by the way, is one of the best modes of putting in wheat. Some use the cultivator, which answers very well. Within the last two years some farmers are introducing seed drills, and, when the land is not rough, these machines will prove very valuable to the farmer. By using them there is a great saving of seed. The yield is generally on the increase; land improving rapidly by the use of the subsoil-plough, and by the draining of the wet lands. Many farmers who use tile and stone for draining the wet lands get paid for all expense in the first crop raised after, especially when planted in corn. Price of wheat, $1 12½ per bushel.

Corn.—This important crop is largely cultivated among us. New Jersey corn always stands highest on the list in the New York market. The practice of raising varies with the location. Some lime and plough up the sward without any manure; others draw out all their barn-yard manure, in the spring, on their corn ground, and plough it under as deep as the strength of the team will admit of. The last practice is generally followed in sandy and loamy locations, especially where wheat is not

much raised. Varieties: the eight-rowed white and yellow, which are the kinds most esteemed in New York market; likewise, the twelve and fourteen-rowed white and yellow, which answers better on rich lands, as it does not sucker. Average yield, about 40 bushels per acre; and some premium crops have gone over 100 bushels per acre. I use the plough first among my corn, and cut it close from the hill; for corn, when young, wants the ground warm and dry; and I know of no better way than to cut close by the row, so that it will warm and dry through; and after laying a few days, I cross it with the cultivator, and continue to work it with that implement. I hoe until the middle of July, when I plough it for the last time, by throwing the dirt well to the hill. I would here remark, that the last summer I tried the experiment of using the cultivator with the plough, in finishing off a field of corn; I worked one cultivator with three ploughs, in the same field, and the same day; and we had a very dry summer, so that all the corn suffered greatly from drought, especially when it was not subsoiled; but that which I finished off with the cultivator suffered most; and I worked the cultivator alternately among the ploughs, so that the experiment reached all the parts of the field. In the same field, I had some 15 acres which were ploughed and subsoiled 22 inches deep four years ago, and 2 lands left which were not subsoiled, but in all other respects treated precisely alike—and the land all as nearly alike as possible, as to quality. And we had no rains the past summer, to wet plough deep, until the 25th of August; but the subsoiled land stood the drought, so that the corn scarcely ever twisted, while the portion which was not subsoiled was nearly all dried up. My land is a sandy loam. I grind corn with oats for horses, but prefer cooking the food for all other kinds of stock, especially hogs and beef cattle. For cattle, break up the ears, and mix a portion of oats or wheat "ship-stuffs," or buckwheat, and then put all in the kettle, with a portion of salt, and boil it until the corn is soft; then feed it warm. I am fully satisfied it is best, from experiments I have made, and which I shall mention hereafter.

Rye.—Rye is cultivated but little—chiefly in inferior soils. It is raised mostly to bind corn-stalks with. Average yield, not over 12 bushels per acre. Average price for the grain, 75 cents per bushel.

Peas.—Peas and beans not cultivated to any extent in the county. They are only raised for family use, and not for market. Peas seldom grown out of the kitchen-garden.

Clover and Grass.—Our principal crop of grass, which is Timothy and clover, is raised on upland, and sowed with wheat and rye, following the regular rotation of other crops for 2 or 3 years in succession. We have also our natural meadows, which are seldom ploughed; and which, by irrigation, and occasional top-dressing with short manure, are very productive, not only for hay, but in autumn for the pasturage. By top-dressing, our meadows are made to produce a fine sward of natural grass, which is equal, if not superior, to any other, both for hay and pasture. Average of hay per acre, on upland, in favorable seasons, is about 2 tons; lowlands, rather more. Not much hay sold in this county. We have no large towns to supply.

Oats.—Oats are cultivated on any of our soils that will produce corn or potatoes; usually follow corn. Seed two bushels to the acre on well tilled soil, and more on poorer land. Usual time of sowing is in April,

or as soon as the land can be worked late. Oats make full as much straw, but less grain. Average crop, about thirty bushels per acre. Oats are considered the best feed for road horses, and good for all kinds of stock, especially when mixed with corn and ground; they are not considered a great exhauster of the soil, but are a very cleansing crop, and leave the land in fine condition to be worked for a crop of wheat. Clover will do well if sown with oats. I always use the roller on oat ground, it works so much better; gathering (as it frequently gets beat down with storms) about the time of ripening.

Barley.—Average crop in former years was thirty bushels per acre; sown the same time of oats. It has usually followed corn, and leaves the land in fine order for grasses, and is considered a light crop on the soil.

Dairy Husbandry.—Considerable attention is paid to this branch of business. Cows for the dairy have been much improved within the last few years. Many cows may be found that will produce from nine to twelve pounds of butter per week, on grass alone, for some three months together; but no farmer has a whole herd of such cows. Where we have one such cow, we have six that will not produce more than from six to eight pounds per week for the same time. One class of our farmers say, in theory, the Ayrshires or Durhams are the greatest producers; in practice, the other adopts the native breed, because he happens to have them, or, more likely, because he has not thought on the subject at all. Our good cows are mostly those of accident. There are, however, some honorable exceptions among some of our most liberal and intelligent farmers. The Ayrshire stock is being produced, and, from present appearances, will be a valuable acquisition to the dairies of Somerset county. They are a hardy race, and do better on uplands, and in dry seasons. The Durhams are a larger and heavier race, and require good lowland pasture to fully develop themselves. As milkers, farmers are paying considerable attention to crossing both the above-mentioned stocks with their best natives, and, consequently, are improving the race of milkers.

Neat Cattle.—Fifty per cent. of all our cattle are raised in the county; the other half are driven principally from New York State or Ohio. The foreign stock is purchased late in autumn, principally for the purpose of consuming the poorer kinds of fodder, and to be grazed in the summer to supply our markets with early beef. Young cattle, from two to four years old, that are in good condition the 1st of May, are turned out into the sweetest pastures, and are fit for the market by the 1st of August, before the Western or Northern beef comes in, and pay better than larger and older cattle, that depend upon winter stalling, and consume much grain, which is quite too costly for this market; and the beef is worth little more per pound than the grass-fed beef, which goes into market early. Many farmers graze two lots of cattle in one year; purchase a lot of fleshy ones late in the fall, when beef is down in price, and feed them on until late in the spring, when they pay very well; but the facilities for sending in Western cattle now by railroad interfere considerably with our trade. I will now mention an experiment I made three years ago in feeding a lot of cattle with cooked and dry-ground feed. I selected two pairs of cattle from among eight pairs, which

were equally conditioned, and which I had fed alike for about the same time. They were weighed on the 1st day of January, 1850.

No. 1 weighed 1,620 pounds.
No. 2 " 1,750 "
No. 3 " 1,670 "
No. 4 " 1,510 "

Nos. 1 and 2 were fed during January on 9 pounds corn and oats—not ground—in the proportion of nine parts corn to five parts oats, by measure, and boiled in a three-barrelled kettle, in which were placed 36 gallons of water, 1¼ quart salt, and about 7 bushels of the grain, mixed as above; boiled this mixture for two hours, using only an armful of dry wood and two bushels of corn-cobs as fuel. I then cover the kettle, placing over the cover a horse-blanket, keeping in the steam, and preventing the rapid cooking, and by this means the contents of the kettle will remain warm and soft until fed out.

Nos. 3 and 4 had 10 pounds of ground feed, mixed in the same proportion of oats and corn, (but not cooked,) each day. In every particular all four were fed alike, having a small quantity of carrots and turnips mixed each day, with as much common hay and corn-stalks as they chose to eat.

On the 1st of February they were again weighed.

No. 1 weighed	1,725	pounds, having gained	105 pounds.
No. 2 "	1,850	" "	100 "
Weight February 1	3,575		
Weight January 1	3,370		
Gain in one month	205 pounds.		

Nos. 1 and 2 had cooked food during the month of January, and gained 205 pounds.

No. 3 weighed	1,750	pounds, having gained	80 pounds.
No. 4 "	1,550	" "	40 "
Weight February 1	3,300		
Weight January 1	3,180		
Gain in one month	120 pounds.		

Nos. 3 and 4 were fed on raw feed, ground, and one pound greater per day in quantity than that fed to Nos. 1 and 2, not ground, and cooked; and still, although in every other particular they were fed alike, the difference in favor of cooked feed is very large. The expense of grinding being greater than the expense of cooking, the economy is every way in favor of cooked feed.

Gain with cooked feed	205 pounds.
Gain with raw feed	120 "
Gain in favor of cooked feed	85 "

On the 1st of February I ceased to use turnips and carrots, and sub-

stituted best clover hay for common hay and corn-stalks. Fearing the great difference in favor of cooked feed might arise in part from the peculiarity of the cattle, in regard to health, or some other accidental cause, I now changed them, and put Nos. 3 and 4 on cooked, and Nos. 1 and 2 on raw feed; increasing the quantity of feed to each pair two pounds each.

Previous to commencing the experiment, on the 1st of January, each pair had been accustomed to the use of some roots, pumpkins, &c.; and this may account for the change I am about to describe after a discontinuance of the roots.

From the 1st of February to the 1st of March Nos. 1 and 2 were fed on ground feed raw; Nos. 3 and 4 on whole cooked feed. On the 1st of March they were weighed again, when Nos. 3 and 4, on cooked feed, had gained but 47 pounds, and Nos. 1 and 2, on raw feed, had gained but 22 pounds.

It will be seen from the above that although the cooked feed, at least cost, continued to produce most growth, and in about the same relative proportion, still each pair, when fed with roots in addition, gained much more rapidly than when fed on grain and clover hay alone. I would here remark that 16 pounds of oats and corn, in the proportion above named, will weigh, when cooked, 34½ pounds; and that all four of the cattle were fat when I commenced the experiment.

The farmers select their best calves for raising. The usual way has been to take them from the cow at three days old, and teach them to drink milk; new milk is given until three or four weeks old, and skimmed milk until ten or twelve weeks old; after which they are turned out to shift for themselves in good pastures. The above is considered more judicious than to let them run with the cows, as it is considered injurious to the cows to be teased by them for so long a time, and not so well for the calves. Cost of raising until three years old, $25. Steers and heifers that are raised in this manner are always in demand, and command 25 per cent. more in price than the stock from the other States.

Sheep are not kept to any extent in this county. Small flocks are kept principally for producing early lambs, which sell from two to three dollars per head, and are considered profitable by those who have the convenience of keeping them. Our graziers, however, have been in the habit of buying a considerable number of Western sheep, principally wethers, which they buy in June or July from two to three dollars, and sell in the fall and winter sometimes as high as from four to six dollars per head; but sheep, like cattle, are now brought from a distance on railroads, and do not pay so well as formerly.

Hogs.—A considerable number of hogs are fed in this county, mostly on spare milk from dairies. The best breeds are Berkshires, Woburns, and Suffolks, crossed with the China.

Hogs are most profitable when turned out in clover, until fall, with plenty of running-water, or a good apple orchard is very fine to start them; but they do well in clover alone. In the fall, when corn begins to harden, commence feeding them moderately until about the 1st of November; after which, they should have all they will eat, until the last of December, when they will average three hundred pounds apiece, if they are the right breed, when sixteen months old; which, at present prices, viz: 8 cents per pound, pays very well. Where the food is cooked, it will go 25 per cent. further than when fed raw.

Curing Hams.—The best method I have found for curing hams is, after the hams have been cut, let them lie out on a shelf, where they can have plenty of cool air, so that the animal heat is entirely out of them before you attempt to put them down in salt; then corn them down for two or three days; after which, drain off any bloody water which may come out; and then make the following pickle, sufficient to come them: Take 9 pounds of salt, 3 ounces of saltpetre, 1 ounce of saleratus, 4 pounds of brown sugar or molasses, and six gallons of water; let them lie in the above pickle from three to six weeks, according to the size of the hams; when you may take them out and smoke them with good hickory or apple wood until sufficient to suit your taste. They should be taken down and hung up in a dry, cool place, in bags, to protect them from the flies.

I have hams cured after the above method, which were almost as fine when eighteen months old as when taken from the smoke-house. And while upon the subject of hams, I would further say that, when you boil them, they should be boiled until done, in good, soft water; and, when nearly done, throw in a handful of clean Timothy hay; it absorbs all impurities which may be around the outside of the ham. As soon as done, take out the hay, but leave the ham in the water until nearly cold, when you may take it out.

Root Crop.—Fifty per cent. more roots are now raised than five years ago—principally rutabagas, turnips, and carrots.

The carrot is considered most valuable—almost equal to oats—for horses, especially when used with a portion of grain. Yield, from five hundred to six hundred bushels per acre.

Manures.—As I before said, the farmers of Somerset county are rapidly improving, from the fact that there is more attention paid to the manure heap. In the first place, the farmers are clearing up their wet lands, by ditching and draining; and the ditch-cleanings, after they are thoroughly decomposed, either by frost or lime, are mixed with barn-yard manure, and used for wheat—about equal portions of ditch-dirt and manure, with a small quantity of lime sprinkled on the dirt—or a mixture of lime and salt, in proportion of one bushel of salt dissolved to slack four bushels of lime, which, after being turned over three or four times, and lying one month, is the most powerful decomposer which can be used; and, besides, it retains all the gases of the manure, which are set free by the use of lime.

The above compost, after lying some months, is turned over and mixed thoroughly, and then, in ten days, or as soon it goes into heat, is fit for use; and a cord of the above mixture is equal to a cord of barn-yard manure, after lying in the yard all summer.

Barns are built with special reference to saving manure—with cellar under the whole, and sheds attached for manure. My plan is to have single stalls, so that I can put up every animal on the farm, when it is necessary. I have some with gates made, so that the animal cannot turn round; and racks, the full length of the stable in front, to feed hay or stalks from; but for roots and feed, I use loose boxes. In other stables, I tie up the cattle; but, from experience, I find gates are best. I

have a gangway, full length of the stable in front, to feed without entering the stalls; and as the cattle never turn round, (but, at the same time, can lick themselves,) they are easily cleaned out every morning, and placed under the manure shed; and the stalls are littered down again for another night; so that all liquid manures are absorbed in the litter, and carried out under the sheds every morning.

Towards spring, as the weather gets warmer, I use ground plaster to sprinkle the stalls, which absorbs all gases. Charcoal dust is better, however, when it can be had. In summer, I never stable cattle except in very stormy nights; but I find, in winter, cattle do much better in stalls; and, having them separate, you may feed each one with what you choose, without the others interfering.

Very respectfully, yours,

JAMES CAMPBELL.

To the COMMISSIONER OF PATENTS.

SALEM, SALEM COUNTY, NEW JERSEY,
December 25, 1852.

SIR: Having received a Circular, propounding certain questions relative to farming operations, I herewith send the following answers—being to some of the questions which apply more particularly to this locality:

Wheat.—Guano is used in the production of wheat to a considerable extent; about 200 pounds per acre is the quantity generally applied; sometimes of little benefit—at other times it produces from five to ten bushels per acre extra, besides adding to the after-crop of grass.

It is thought to be most beneficial ploughed in; quantity of seed per acre, from five to six pecks when drilled, and from six to eight pecks when sown broadcast. The drill is much used here. The average yield is from 15 to 20 bushels per acre, and increasing. Timothy and clover seeds are generally sown; the former in the fall, the latter in the spring; average price, 95 cents per bushel. The rotation of crops generally practised here is, corn after grass, which is followed by corn, oats, or potatoes; then wheat; and grass follows wheat.

Corn.—Guano is not much used in the production of corn; average crop, 50 bushels per acre; some fields yield nearly 100 bushels; the season having been all the farmers could ask as regards moisture, but rather cool for corn. A sod is considered best for corn, ploughed soon after the frost leaves the ground—the earlier the better, so as to give the rains and other influences time to pack the ground previous to planting; which gives the young corn a better chance to take good root and grow off early.

Oats.—Not much grown, having given place, within a few years, to potatoes. The crop good—from 40 to 50 bushels per acre.

Barley, rye, peas, and beans not much cultivated.

Clover and Grasses.—About an average crop, one and a half ton per acre. Experience does not show that red clover is injurious to horses when fed in moderate quantities.

Dairy husbandry is not followed to any great extent, but must increase, owing to the facilities which are being made to convey our productions to market. A neighboring woman made 3,000 pounds of good

cheese, from ten cows, in four months, and sold the same in Salem for eight cents per pound.

Buying store cattle, and fattening them for market, has been followed in this section.

Root Crops.—These have not been cultivated to much extent.

Irish Potatoes.—The cultivation of this crop has been much extended, but the crop per acre has diminished; average this year, not over 50 bushels per acre—not so profitable as corn. A very large yield was anticipated until near the end of summer, when the vines died suddenly, without any satisfactory reason having as yet been assigned. Some say worms in the vine killed them; but I could find none in mine. Others say a hot sun after a heavy rain; but this is only conjecture. Best system of planting is in rows, in every third furrow, with a small plough. We manure from the yards, and spread broadcast; some plough twice, and some only once, and some rake the manure on the potatoes. Where marl is easy of access, (this being the marl region,) it is used to a great extent on potatoes, and produces the best. As soon as planted, run the fallow harrow over the ground, and continue to do so after every rain, sufficiently heavy to pack the surface of the ground, and start the weeds and grass, until the vines begin to bud; then use the cultivator and plough.

I have had a machine made far preferable to the plough, as a boy 10 or 12 years old can work it. Half a round to the row is sufficient, and it does the work better than a plough. I had 5 small ploughs set in a frame similar to a cultivator, 2 on each side of the frame, so as to throw 2 furrows to each row; and another, with 2 mould-boards to follow, to clear up the middle. In order for the machine to perform well, it is necessary to keep the ground mellow.

Fruit Culture.—The cultivation of fruit is receiving increased attention; and it is profitable both for market and home consumption. So much has been written and published on the cultivation of fruit within the last year by the pomological societies, that, although a nursery-man, I pass it by.

Manures.—Lime, plaster, and marl are much used as fertilizers. Plaster is used on clover at the rate of from a half to a bushel per acre, which more than doubles the crop in many places. Soaking seed corn and rolling in plaster help to give it a start; and also a good color.

Respectfully,

DAVID PETIT.

LOWER ALLOWAY'S CREEK, SALEM COUNTY, N. J.,
December 22, 1852.

SIR: I find thy Circular still lying beside me unanswered, after having had it in my possession some months. It will be but little information I can give in answer to thy queries. Yet I will take them up in order as they are asked, and pass over such of them as relate to crops not cultivated in our section of the country; endeavoring, to the best of my humble abilities, to give satisfactory answers.

1st. *Wheat.*—Guano is used to some extent on this crop in our section of the State. As to the exact increase 100 pounds of guano will produce, I cannot say; there being no experiments (that I know of) in

my neighborhood made with sufficient accuracy to ascertain it. I will attempt, however, to approximate it in the following manner, which those acquainted with the raising of wheat can interpret for themselves, and judge whether, in their own cases, the reasoning would be correct.

I have now growing on my farm a field of wheat, part of which was manured with 300 pounds of Peruvian guano to the acre, and the other part with barn-yard manure, about 18 two-horse loads to the acre, and the appearance of the guanoed wheat is fully equal to that manured from the barn-yard. From my former experience, I can, I think, safely conclude that the guanoed wheat will continue as good until harvest, and produce as much as my other wheat. Wheat will not do well in this section without manure; and I believe that the difference between my manured and unmanured wheat will generally be one half. My general average is about 25 bushels per acre; allowing one-half to be produced by manure, 12½ bushels, it will be $4\frac{17}{100}$ bushels increase to 100 pounds of guano.

The average product of this (Salem) county is, I believe, about from 18 to 20 bushels to the acre; although 30 and 35, and even 40 bushels, are sometimes raised on our best farms. The Mediterranean is the variety most generally raised; and it appears to suit our soil and climate very well. The blue-stem is somewhat cultivated; and the white, golden, and Australian are also sown by myself and others in my neighborhood. It has a very handsome grain, yielding well both in quantity and quality of flour; and in warm, rich lands, it promises to become a very valuable variety. We sow about the last of September, or the first week in October, using about 2 bushels of seed per acre; and harvest the last of June, or first of July. We usually plough twice before sowing, 6 or 7 inches deep. Our yield is, without doubt, on the increase. Our system of rotation differs some in different situations. Some farms have meadow-lands lying on our creeks and rivers unsuitable for tillage, but enabling the owners to crop their uplands oftener. We may, perhaps, set it down at 4 years. My own system is, however, once in 3 years. That is to one crop of Indian corn followed by either oats or potatoes; and these again by wheat, sown down with clover; but the clover is not suffered to remain, for I plough it under the next spring for corn again; and so on, as before. I set apart a portion of my land for grass, and allow it to remain a number of years, giving it an occasional top-dressing; believing a three-course system better suited to Indian corn than a four, and, with proper manuring, no disadvantage to the wheat crop. The best remedy for the Hessian fly is, in my opinion, to sow early. Our average price for all kinds of wheat for this year may be set down at $1. When Timothy is used, we generally sow in the fall; clover, early in the spring—as soon as the frost is out of the ground.

2d. *Corn.*—Guano is beginning to be used with us, and I believe with advantage in the production of corn. It is generally sown broadcast, and ploughed in in the spring, when breaking up the ground for planting; the quantity used is from 200 to 300 pounds to the acre. It is sometimes mixed with dirt and applied in the hill to advantage, particularly in low and cold lands. It is not easy to ascertain the average product; but in this county we may average from 40 to 50 bushels; some of our best farms have yielded in favorable seasons as high as 75 or 80. I believe from my own experience Indian corn is best planted on a clover lay; ploughed late in the spring, harrowed before planting and rolled, if the ground be dry enough. Cross-furrowed four feet three inches apart each way, with from three to four grains in a hill.

Oats have formerly been extensively raised in this county; but potatoes are now fast taking their place. They are a very uncertain crop, averaging from 30 to 50 bushels per acre. I do not consider them profitable, but they come off the ground very seasonably to be followed by wheat. The quantity of rye raised is very small compared with what it was some years ago—perhaps not over one-tenth; and in my immediate neighborhood there is none. We are in the habit of sowing clover and Timothy, about equally mixed, on our uplands for hay; and the yield is from one and a half to two tons the acre. The best fertilizer for meadows with us is winter flooding and top-dressing with upland dirt, because most profitable. For upland pastures I prefer long barn-yard manure, spread over the ground in the month of February. In our best banked meadows Timothy is preferred. The quantity of seed used is one bushel to five or six acres. In our low meadows we use the herdsgrass, (red top,) one bushel to the acre. I believe that it is not safe to feed red clover unmixed to horses. We are too far from market to do much with butter; the average price here this season being about 15 cents the year round. Cheese brings about 8 cents. I think we cannot raise a good steer until three years old for less than $20, and the usual price with us is from $25 to $30. Good dairy cows will command from $25 to $30, there being but little difference between spring and fall, owing to our having plenty of fodder, which we prefer feeding on the farm to selling it off and buying manure. In addition to our native breeds of cattle, we have Durhams and Devons, and it is thought that a given quantity of grain will produce more meat in them than in the native stock. Oxen were formerly used for work in our section, but they are now almost entirely abandoned for horses and mules; the rearing of which I consider profitable. The expense of rearing a colt until three years old will vary much according to feed, &c.; but I believe a good colt may be raised for $50.

Hogs.—The Berkshire and Chester county are both very good breeds. Our method is to raise on clover, and fatten on corn in the fall, which is mostly fed to them whole; but some grind it. I generally rub my hams with fine salt and sugar mixed together, lay them in the cask dry, and in the course of 4 or 5 days make a pickle, sufficiently strong to bear an egg, adding about one-half gallon of molasses and one-half pound of saltpetre to 100 pounds of ham, which I pour over them in the cask, so as to cover them, and let them remain in the pickle about 5 weeks.

Root crops are not cultivated with us as field crops, although I think they might be with profit. Irish potatoes have been extensively raised within a few years past in this part of our State. We consider the Mercer the most profitable variety on account of its ready sale; it generally brings about 50 cents a bushel at Salem or Hancock's Bridge, our nearest markets, yielding about an average of 75 to 100 bushels to the acre. Sweet potatoes are also extensively raised on our light lands for the Philadelphia and Wilmington markets, yielding a good profit to the owners of those soils.

Manures.—We gather everything we can into our barn-yards, composting very little, and finishing out with lime, guano, and gypsum.

We use about 50 to 100 bushels of slaked lime to the acre once in about four to six years. Gypsum, in my immediate neighborhood, does not appear to answer well as manure—supposed on account of salt air; but it is extensively used further from salt water. It has frequently been tried here, but uniformly without success. One of my neighbors tried it in four different places on three different crops this season, but without the least sign of effect; another one tried it upon clover, but without any perceptible effect. All this, it is true, was very well known to those who read before; but it has been said that "Eternal vigilance is the price of liberty:" so also truth can only be maintained by an eternal warfare with superstition and error. In the case of plaster, the evidence formerly adduced, that salt air would destroy its effects, seems to be losing its hold on the community.

Thine truly,

THOMAS SHOWRDS.

NEW YORK, *January* 15, 1853.

SIR: Presuming that the interests of agriculture are within the consideration of your department, I would ask your attention to the growth of hemp upon the extensive marshes along the coast.

These marshes can be reclaimed by enclosing them in a water-tight wall of hydraulic cement and sand, 2½ feet high, in sections of 160 acres, at an expense of about $4 per acre.

Hemp prepared in salt water is of a much finer quality, and preserves more of its original strength of fibre.

Respectfully,

EDWARD C. COOPER.

To the COMMISSIONER OF PATENTS.

OVID, SENECA COUNTY, NEW YORK.
December 27, 1852.

SIR: Your Circular in relation to the agriculture of this county for the current year was duly received. One of the undersigned having received one of the like kind last year, and answered it at some length, makes it difficult to respond to this and avoid unnecessary repetition.

The last winter was cold and the spring backward; wheat injured by the winter and also by the weevil; estimated at from 25 to 30 per cent. below a common yield; quality inferior; price here since harvest ranged from 87 cents to $1 a bushel; price of transportation to New York by canal, 14 cents a bushel; quantity sown to the acre of land, ½ bushel, and many of our practical farmers think it does best put in with the drill; varieties most esteemed are the Soule, the Hutchinson, and the white flint; some blue-stem was sown a year ago last seed time, but it did no better than other varieties. No satisfactory remedy has been discovered for weevils; they appear to do the most damage in such parts of the crop as have been injured by the winter; hence some conclude if we sow earlier and have an earlier spring, we may escape their ravages. The first remedy suggested may, and probably will, subject it to injury by the Hessian fly; and whether the same warm weather that will mature the wheat early will not at the same time bring to maturity the weevil, is yet to be tested.

The depth of ploughing for this crop in some localities is 7 inches, and sometimes more; it is said the average depth in the county will not exceed 7. In consequence of the weevil, very little spring wheat was sown, and that much injured.

The *corn crop* was above a common average; price 62½ cents; the best system of cultivation, on a sod, well ploughed and harrowed; the usual distance of the rows apart about 3½ feet. Some experiments have been made by marking out one way, and planting or drilling in about 15 or 20 inches apart, and dress and till it all one way, which sometimes gives a larger yield to the acre; but it is very questionable whether the difference in the crop is equal to the difference in the labor in its cultivation. In either mode the land should be manured before ploughing. Some prefer fall ploughing for this crop, as the corn comes up quicker and is easier tilled. Others object, that although this is so, fall ploughing subjects the crop more to the ravages of the wire-worm than if ploughed in the spring. Manure from the hog is generally taken out with that of barn-yard, and hence no satisfactory test of its particular benefits or comparative superiority. Corn should be ground when fed to stock.

Oats above a common average; price, 37½ cents a bushel; cost of transportation, 7 cents a bushel.

Barley.—The average yield of this grain is estimated at 21 bushels to the acre. A broader surface than usual was sown the last season. Yield, a full average; price, 62½ cents; cost of transportation, 10 cents. This crop is thought to be less exhausting to land than oats. The six-rowed is generally preferred. Both these crops do best on corn stubble; if on sod, it should be ploughed in the fall.

Beans and peas are cultivated to a very limited extent.

Rye is cultivated in some parts of the county; crop, a full average; price, 75 cents a bushel. Buckwheat is more extensively raised; this is thought to be a renovating crop and a purifier from foul weeds; crop this year is said to be good; these crops are generally consumed in the county.

The hay crop, average—estimated cost of cutting and securing a ton of hay, $1 25; of our grasses, white clover, spear and blue grass are indigenous, as is also red-top on moist soils; hence our cultivated grasses are Timothy and red clover, which are sown on winter wheat early in the spring and with our spring crops; of Timothy seed from 8 to 10 quarts, and of clover-seed from 10 to 14 pounds to the acre, which is sometimes mixed with Timothy at the rate of about one-fourth. Timothy hay is preferred for horses; it is thought clover inclines them to cough and heaves. Some of our farmers cut their Timothy either with the cradle or reaper for seed, leaving the stubble some 18 or 20 inches high, and then cut the stubble for hay; others cut in the ordinary way and thresh the whole before feeding; the yield of seed is said to range from 3 to 6 bushels to the acre; price of seed per bushel, $3. The clover most in use is the small or early kind, and is cultivated for hay, pasture, and seed; some of our best farmers do not pasture the first season; the top affords a protection during the winter; the growth in the spring is more vigorous, and the yield will be much greater, either for mowing or pasture. The crop of clover seed in the county the last year is estimated by those who were engaged in purchasing at 20,000 bushels; average price, $5 a bushel

this year it was much injured by grasshoppers eating off the blow, in consequence of which the seed never formed, and although a larger surface than last year was cut it is thought the crop of seed will be much less.

The proceeds of the dairy are increasing; price of butter by the firkin 20 cents per pound.

Our stock of cattle are improving; the Devons and short-horned Durhams are most esteemed; it is said by some of our stock-breeders the Devons make the best working oxen, and the cows are best for the dairy; those engaged in fatting give preference to the Durhams for beef, but think they do not fat to advantage and make as good beef until 4 years old; before that age, to use their language, they "grow away from their feed."

No mules are raised in the county. The growing of horses is thought to be profitable; to rear a colt to 3 years old is said to cost from $30 to $35; add to this the loss of service of the mare, and pay for service of the horse, which will make the whole expense from $45 to $50. For breaking colts, the most approved way is to begin to handle them when young; in weaning put the mare and colt in the stable, tie them both up in sight of, but not so near as to reach, each other; in this way we avoid the running and restiveness, and oftentimes injury to the colt by bruises and surfeitings which happen if left in the field; and while it is weaning it is being halter-broke. Then continue to handle and secure its confidence by kind treatment, and as it grows and matures put on the saddle or harness, and when they become familiar with these then drive them until they understand what is wanted or required of them; then fasten them to a light draught, which increase moderately until they become accustomed to drawing. Colts treated in this way while young will generally go to work quietly when sufficiently matured for service, and are not so liable to frights and shying when driven as if left to some 3 or 4 years old before they are taken up; if bitting should be deemed necessary it should not be continued so long as to become painful; severity or whipping should not be applied until they are so far taught as to know what we want and wilfully refuse.

A practical farmer of this place, the last winter, by way of experiment, took a portion or lot of three grades of sheep, put them together, and were kept alike, with, as he says, the following results: First grade, Spanish Merino, full grown: average yield of fleece 5½ pounds; price per pound, 40 cents. Second grade, not full blood, one-fourth lambs; average yield of fleece, 3½ pounds; price per pound, 34 cents. Third grade, coarse wool, (sheep full grown:) average yield of fleece, 2¼ pounds; price per pound, 28 cents. The carcasses of the coarse-woolled were worth the most when sheared. Thinks the half-bloods the best keepers, and most profitable for mutton. The grade of sheep has been improved in the county by crossing with the French Merino, and more attention seems to be paid to their keeping and comfort.

Of hogs, the most approved breed is the Berkshire, or a cross with them and the Byfield. With a good breed of hogs, making pork, to a certain extent, is profitable; they consume much on a farm, and thus convert it into a marketable article, that would otherwise, and but for them, be lost. It is thought by some that 15 bushels of corn, or its equivalent, will rear and fat a hog of good breed to weigh 300 pounds; and it is estimated that from 6 to 7 bushels will be sufficient to fat one of that size, that is in a good, healthy, and growing condition at the time

they are put up. Corn should be ground for hog feed, and, it is said, would still be better if scalded or boiled. Very little pork is packed here; it is this fall sent to New York either in the carcass, slaughtered, or on foot, to be butchered there. Price of pork in the carcass $7, and of live hogs, $5 a hundred weight. The present price of pork ought to be a sufficient inducement to procure and preserve the best breeds.

Carrots and beets are very little cultivated as field crops, though sometimes, when done, it is profitable. To prepare the ground, it requires a thorough and bountiful manuring, a loamy or musky soil does best; well pulverized, and thus prepared, may bring two crops in succession, and then be succeeded by a crop of barley or oats, and seeded to grass.

The potato crop this year is said to be under a common average per acre, but nearly free from disease. While much has been said, and many theories started and exploded on the subject of the potato rot, its causes, and the remedies, it would seem, after all, that the state of the weather at the time of the formation of the tubers, and their progress to maturity, has the greatest influence. The last spring was wet, cold, and backward, until late in June; July, August, and most of September, warm and dry. If the potato disease should subside altogether, a larger surface should be planted; they being good feed for most kinds of stock, and fitting the ground for all the varieties of grain.

Guano is not used as a manure; lime is used to some extent, and with beneficial results, especially so on clay soils. Plaster is used as a fertilizer, and, on what we call our oak lands, is beneficial to all growing crops, and should be sowed in every instance where we seed down with clover; if on winter wheat, as soon as the ground settles, and before the wheat starts in the spring; if on barley or oats, at the time they are sown. It is serviceable to the grain crop, and much more so to the young clover.

Attention is paid to barn-yard manure, so far as to keep it from actual waste. Some of our farmers have their barns and stabling so arranged as to keep it under cover; and while its benefits are admitted by all, there is a difference of opinion as to the manner of its application, especially on the wheat crop. Some plough and harrow; then apply the manure, and cultivate before seeding, for the reason that it places the seed in direct contact with the manure, and the germinating seed coming thus in contact with the fertilizer, is by this means well nourished at the very period of its growth when it most needs assistance to develop its fibres and extend its roots. The objection to this system is, that by leaving the manure thus on the surface, or nearly so, all the foul seeds it contains will vegetate, and produce a new crop with the wheat; and also that the volatile gases will escape and be lost, which, if they were ploughed under, would be preserved. In relation to the two systems, the first is probably the best in loose, spongy, and leachy soils; but in hard soils it is different—the loss there is by evaporation, and, although a top-dressing may be most beneficial to the first crop, to plough under will be most serviceable to future ones. Some of our farmers manure their meadows and pasture lands—a system of very doubtful expediency, aside from the objection of evaporation. When these fail, it is generally either that they are "bound out" (so called)—that is, that the cultivated grasses have given place to spear grass, John's-wort, or both—or is the effect of wire-worms and grubs at the roots. In either case,

they ought to be ploughed up. Meadows are sometimes ploughed after being mown, fitted and reseeded the same year, and produce a good crop the following. Some of our farmers think Timothy meadows ought not to lay longer than four years, unless they can be irrigated. In connexion with the subjects of manures is the preservation of our lands, by discreet system of rotation in crops, and the ploughing under of green ones. Clover, with its deep tap-roots, derives much of its nourishment from below, when it is necessary for the support of the other crops; and add to this its quick growth, by which the land is shaded from the sun, and the root itself, when ploughed up, is a good fertilizer. Clover, as a general thing, ought to be ploughed up in two years, and in the mean time this crop, as well as Timothy, should not be pastured too close, for what remains of either will protect through the winter and furnish a top-dressing for the succeeding one. The rotation of crops has not yet been reduced to a regular system.

Fruit culture continues to receive good attention from the farmers; crop last season was injured by frost, and, as a general thing, it was not fair. Price per bushel, 25 cents.

Of farming implements and machinery, we have nearly all the kinds and varieties. Among the reapers, Barrall's improved is said to be a favorite.

Our agricultural society was organized about twelve years since, and every year increases in interest. At the last county fair, the stock of all kinds on exhibition was much greater than at any previous one; as were also the farming implements and mechanical manufacture; the household products more than double.

Wages of common laborers or farm hands the last season, for a term of six to eight months, would range from $11 to $14 a month, and boarded. Female labor, from $1 to $1 25 a week—in some instances, $1 50.

The county of Seneca, like most of Western New York, is badly infested with foul weeds. The injury done to the various crops is estimated at from 20 to 25 per cent.; some think more. The most troublesome are the May weeds, ox-eye, Canada thistle, pigeon weed, and wild mustard. The May weed does harm to all growing crops, and will run out grass. The ox-eye is different in its appearance, but much like the May weed in its habits. Mowing often, to prevent seeding, and planting with corn, are the best means of destroying them. These weeds are supposed to have been brought here in the first settlements, either by the horses of travellers or in the grass seeds, as their first appearance was in the pasture-fields. Canada thistle was introduced in some instances with the grass seeds, but generally without a knowledge from whence it came; the seed adhering to the light down will be carried by the wind to almost any distance. Mowing will sometimes kill them, if it is done at a certain stage or flow of the sap, when they will, as is said, "bleed to death."

Ploughing frequently in a dry season is the most effectual remedy; they propagate from the root, as well as the seed, and injure all kinds of crops. Pigeon weed is injurious to wheat only, doing no harm to summer crops; it is supposed to have been brought by pigeons, as its first appearance was on the wheat stubble The seed has a hard shell or covering, and is oily, and will lay a long time in the ground and retain its vegetating power, as it will not vegetate during the summer months; the best means of destroying it is to plough and sow first with barley or oats, after they come off; till as for a crop of wheat, and let it lie; the pigeon weeds will then come up, which plough under and plant with corn; the next spring taking care, in tilling the corn, to prevent any of the weeds from seeding; the succeeding spring plough again, and sow with a spring crop, and seed to grass. Wild mustard, if not introduced, was much increased by the culture of flax; the seed, like that of pigeon weed, contains oil, and will lay a long time in the ground without harm; the best remedy is tillage with corn and weeding. Burdock, it is said, was introduced by the good wives of some of the early settlers, for the medicinal properties which the plant, or rather the root, was supposed to possess; the burs of this weed are especially injurious to wool. In the first appearance of the various foul weeds, the extent of their evil tendency was not suspected or understood; hence they were permitted to grow and propagate, until an effort to exterminate or check them seemed by some to be almost hopeless. The law makes it the duty of overseers of highways to cut down and destroy all the noxious weeds within their limits; but this is of little avail while they are permitted to grow on the farms adjoining. The farmers of this county are intelligent and energetic, and, when their attention is directed to an existing evil, will apply a corrective remedy. Much benefit has resulted from the agricultural society, and county fairs, not only by the competition for premiums offered, exciting a laudable ambition to excel, but more especially by the general information communicated to each other in relation to the crosses and rearing of all kinds of stock, and the mode of cultivation that produces the best crops.

In Ovid Academy, among other sciences, agricultural chemistry is taught, which by thus diffusing it among the masses is believed will have a very beneficial effect in extending the practical application of this science to the cultivation of the soil.

Very respectfully, yours,

JAMES DE MOTT.
JOHN R. YOUNG.

The Commissioner of Patents.

Gaines, Orleans County, N. Y.,
December 4, 1852.

Sir: Your Circular of August, 1852, I received from the Hon. L. Burrows. The sowing of corn for pasture, and its value as a green crop to plough under for manure, is too much neglected by farmers. I prefer it to clover for cows in milk; the butter produced from it being as hard as the hardest beef tallow in midwinter. After my cows had been feeding in the corn two or three weeks I found the butter growing hard—if possible, harder than could be produced from ice. What a pleasure to the housewife to have such hard butter in warm weather! That manufactured in the month of August is of such a nature. I think as good an article can be furnished from this as the famous Orange county butter. I should like to have a trial made by some skilful person

The increase of milk is not much more than common pastures; but the flavor imparted to the butter cannot be produced from food of any other description.

Sow one and a half bushel per acre with a drill or broadcast, as the case may be. Sow from 1st to 10th of June. I have practised this mode for the past three years to my satisfaction; and I shall, for the future, continue it. I prefer corn ploughed under to clover, for green manure. Some persons object to green corn for manure, thinking it will sour the land. I think the idea erroneous.

Very respectfully, yours,

O. M. BARBER.

PORTLAND, CHAUTAUQUE COUNTY, N. Y.

SIR: Having received your Circular, I comply with the request contained therein, not anticipating, however, that my reply to your questions will be as full as you desire for your Report.

Winter Wheat.—That section of this county bordering on Lake Erie, of about three miles wide, is well adapted to the raising of winter wheat, the quality of which is not excelled, if equalled, by that raised in any other section of this State.

The ground is seldom ploughed more than once, and, if manured with barn-yard manure, it is spread on the furrow and harrowed in with the wheat. Much of the wheat is sown after oats, barley, spring wheat, and corn, and, if the land is fertile, two crops of winter wheat in succession do well. Barn-yard manure, ashes, lime, and plaster are the manures used. I am not aware that guano has been used here on any field crop. From one and a half to two bushels of seed are sown to the acre, and at all times from the 1st of September until the ground freezes; but from the 5th until the 20th of September is considered the best time for sowing. The ploughing is deeper than formerly, and is now from eight to ten inches. The yield per acre varies from twelve to thirty bushels, and will probably average twenty bushels per acre; but crops of forty and fifty bushels have been raised. The blue-stem white wheat is considered the best, both as to the product and quality, and, being very hardy, it has not been injured by the fly or rust where other varieties have.

A regular rotation of crops is not generally practised; but there are but few farmers who keep land under the plough for more than three seasons without seeding to pasture or meadow.

Spring wheat has not produced so well of late as formerly. It is raised in all parts of this county. The average price, during the last year, has been, for winter wheat, eighty-eight cents, and for spring wheat, seventy-five cents per bushel. Neither the Hessian fly nor weevil has injured wheat, to any great extent, for a few years past. I do not know of any remedies or preventives applicable for farmers, except a good, fertile soil, which sends forth a strong and healthy plant, not easily injured, and a variety of wheat that has a hard straw.

Corn is one of our best crops, on account of the grain and the fodder from the stalks, which, if well cured, are equal to a crop of hay for cattle. It is not cultivated here with so little labor as in the fertile regions of Illinois and adjoining States; but it is cultivated on all land, except undrained swamps, and with much less labor than in the eastern and western part of this State. The land is ploughed but once, and the manure spread and covered. The depth of ploughing varies from six to ten inches, depending upon the quality of soil. After ploughing, the labor is mostly performed with a horse and cultivator, except where the land is very foul, and requires more dressing with the hoe than usual. From the 10th to the 20th of May is considered the best time for planting; but it is frequently planted as late as the 10th of June with success. The hills are generally from three feet to three feet six inches apart. The average crop is about forty bushels per acre. The average price the past year has been seventy cents per bushel. The season has been unfavorable for corn, especially the last planted, and it is generally supposed that the crop of this season is not more than three-fourths of the usual crop. It is now worth seventy-five cents per bushel. It is generally fed in the ear to hogs, and to cattle ground with the cob; but many do not grind it so fine, when they grind the cob, as it should be.

Oats are raised to a considerable extent, especially in the southern parts of the county, (the growing region,) where the average is about 40 bushels per acre.

Barley is raised in some sections, being considered an uncertain crop; but it frequently produces abundantly.

Of oats and barley, from 2 to 3 bushels are sown per acre.

Winter wheat does well after either barley or oats.

Hay.—The quantity of hay cut per acre varies according to the soil and season. Two tons per acre are considered a good crop. Clover and Timothy seed are the best for meadows and pastures, and a mixture of 8 quarts of Timothy seed with 4 quarts of clover, per acre, produces hay and pasturage of a fine quality, for any kind of stock. Clover hay has much dust in it, and it is supposed to be injurious to horses; but I have not known of any injurious effects from it when mixed with Timothy hay; and not having fed much clean clover hay, I cannot state from experience as to its being injurious. As the expense of raising and making hay is materially reduced by the use of horse-rakes, and also by mowing-machines, where the meadows are smooth, the hay can be cut and secured for from $1 50 to $2 per ton.

Dairy.—This business is, and for several years has been, the best agricultural business pursued, and it is increasing; but, like all other pursuits, the success depends upon proper investment and management. But very few, if any, fail of success when they have good cows and plenty of good food for them. The product of butter and cheese per cow varies materially; for, while some cows produce from 180 to 200 pounds of butter in a season, others produce only 125 or 130 pounds. The average is thought to be 150 pounds of butter, or 450 pounds of cheese; and the milk or whey is estimated at from $3 to $5 per cow for fattening pork. Butter is usually put up in firkins, of 100 pounds, and some have commenced packing in tubs of 50 pounds each. Butter is now worth 25 cents, and cheese 8 cents per pound.

Good *cows* are usually worth from $25 to $30, in the spring.

The *cattle* in this section are crosses of the Devonshire, Durham, Hereford, and native breeds, and there are some few breeds of Durham. The various breeds are too well known to require a description; but

although we have comparatively few of the pure blood, we have in this county a stock of cattle which few, if any, of the other sections of this State excel. Three-year-old steers are generally worth from $25 to $30, in the spring.

Wool-growing has been on the decrease for a number of years, which argues that it is unprofitable; but, at the prices which it has brought for two years past, together with the present price of worsted, I think it a profitable business. The French Merinos have recently been introduced by Mr. Patterson, and also by Mr. Pestrhon, of Westfield, and I have no doubt but that they will prove a source of profit to them and to the country, on account of their thick and heavy fleece.

The *Paular Merinos* are quite common here, and are a hardy sheep; much more so than the Saxon, which preceded them. Until recently, it has not been an object to raise lambs for the butchers, but it is now quite a business; and for that purpose the large, coarse sheep are considered the best. With large flocks of sheep, of fine wool, 25 per cent. increase by lambs is about an average.

Hogs.—We have a variety of breeds; some prefer one of them, and some another, and when well kept they fatten well; but if they lack good food, they soon dwindle to the common standard, and lose their identity with the breed from which they descended. I am aware that some hogs are more quiet and peaceable than others, and fatten faster with the same quantity of food; but good care and keeping for a few years have much to do in having a good breed of hogs; and while some are a source of profit to their owners, others are a loss.

Turnips and *carrots* are cultivated to some extent. Our soil appears to be well adapted to the cultivation of carrots, and they generally produce abundantly.

The *Irish potato* has been affected with the rot so much, for years past, that few were planted last spring; but, having done well the last season, we may look for an increased production next year.

The culture of *fruit* is receiving increased attention, and the railroads have opened a market that makes fruit a source of profit. All varieties of fruit cultivated in any of the Western States flourish here. The Isabella and Catawba grape are cultivated to a considerable extent; they produce well, make excellent wine, and the business being profitable, it is increasing.

The blight has destroyed many of the best pear trees, which has rendered their cultivation an uncertain business. I am not aware that any preventive has been discovered; as far as my observation has extended, the blight has not affected the pear trees growing on a clay soil so much as those on the gravel and loam. The early harvest pear has, in some locations, escaped injury, when the later varieties have been destroyed.

We have many of the choicest varieties of apples; but the Rhode Island Greening, Roxbury Russet, and Golden Russet are considered as profitable as any of the other varieties, on account of their keeping well for the spring and summer, and on account of their producing well. The Golden Sweets and Reinette Sweets are rich and profitable apples, for fall apples, and we have a fine flavored sour apple, (a fall fruit,) called the Kirby apple.

The agricultural business is improving in many respects. The land is not generally cropped until its fertility is destroyed, but the tillage and

manuring are intended to increase the fertility as well as to obtain good crops. The low and wet land is being drained and thus becoming our best land.

The stone within reach of the plough are being pushed up and laid into durable fence; and there is quite an improvement in farms and buildings, as well as in farming tools.

The railroads have given an impetus to agricultural pursuits, especially to gardening and fruit-growing.

The distribution of grains and seeds from you Office has been very beneficial. The blue-stem white wheat, the product of a small parcel sent some eight years since, is now successfully cultivated in all of the wheat-growing sections of this State, and in Canada, Ohio, Michigan, Wisconsin, and Illinois. I have been informed that in most of the sections mentioned it is fast superseding all other varieties.

I have some of the Troy wheat growing; but it does not, thus far, do so well as the blue-stem; I intend trying it a year or two longer.

Yours, respectfully,

T. JUDSON.

Paris Hill, Oneida County, N. Y.,
December 17, 1852.

Sir: Having been unable to procure a copy of the last annual Report from your department, and being desirous of avoiding anything contained in my former communications, I shall confine myself in this to replies to your inquiries under the head of

Sheep and Wool.—Having been engaged in sheep husbandry for more than twenty years, I will endeavor to give the result of my experience, so far as relates to the information sought for in your Circular; and a brief review of my own experience will, perhaps, the better enable you to judge whether my *opinions* on this subject will be of value to others.

It may, however, be proper to say, at the outset, that, having generally pursued a course of what may be called *mixed husbandry*, wool-growing has never been a principal business with me, but rather an item in the general account; my flock being a small one, varying from 100 to 200, and rarely exceeding the latter number. It consisted originally of grade Merinos, averaging, perhaps, about half blood.

From this original flock my present is descended, there having been no change, except such as has been effected by what I deemed a judicious course of breeding, with a view to the improvement of the general character of the flock. By keeping this object constantly in view, I flatter myself I have succeeded in making material, though perhaps not rapid, advances. The flock now consists wholly of medium-sized sheep, compact and symmetrical in form, perfectly healthy in every respect, and yielding per head an average of about 4 pounds of fine Merino wool, of good length of staple, uniform in quality, not overcharged with yolk, and showing in opening a good crimp and lustre.

During the first years of my experience in sheep-breeding, I made use of Saxony bucks in my flock, mostly of pure blood; but, after thorough trial, became fully convinced that, although I was producing a more valuable article of *wool*, I was not in fact increasing the real value of the

flock; the improvement in the *quality* of the fleece being attended with a proportionate diminution of the *quantity*, so that, while I was enabled to obtain an advanced price per pound for a given number of fleeces, the aggregate value had in reality decreased, in consequence of the decrease of weight; I also found the animals to be less hardy—less able to withstand the great changes of our variable climate, and, consequently, much more subject to disease. A change, therefore, seemed to be necessary. This was sought to be effected by the introduction of the pure Merino blood, as distinguished from the Saxony, and for the last ten years I have used bucks of that description, to the exclusion of all others, and have reason to be well satisfied with the change.

With the Saxony sheep, the average annual loss from disease and other causes amounted to nearly 10 per cent. Since the change made in the course of breeding, the average annual loss does not exceed *two* per cent., and that arising mostly from accidental causes. I have thus become convinced that, in this locality, (it being on a range of land in latitude 43°,) the Spanish or French Merino sheep is to be preferred to the Saxony, if wool-growing is expected to be made profitable. The principal benefits I have found to result from the change are the following:

1. An increase of the average weight of fleece from about 2½ to nearly 4 pounds.
2. Getting a close and compact fleece, comparatively impervious to the weather, and thus furnishing a more perfect protection to the body of the sheep from wet and cold.
3. Consequently a more firm and vigorous constitution.
4. And in consequence of the preceding, better breeders, and greater success in rearing the lambs.

The only offset to these advantages that I have yet perceived is a slight sacrifice in the *quality* of the wool. But a few figures will serve to show whether, in a pecuniary point of view, there is actually any loss. The account would stand thus—

2¾ pounds of superior Saxony wool, at 56 cents, is............	$1 54
4 pounds of Merino wool, at 40 cents, is....................	1 60

showing a balance in favor of the Merino of 6 cents per fleece in the value of the wool at this estimate, which I have purposely made a very liberal one for the Saxony, having allowed more than the usual average of weight, and put the price at the highest figure any producer in this county has been able to obtain for the last clip. I have, at the same time, put the Merino at the average price paid in the summer for fair Merino wool, including all from three-fourths to full-blood. A more correct comparison would be as follows:

2½ pounds of Saxony, at 56 cents...........................	$1 40
4 pounds of Merino, at 44 cents............................	1 76

making 36 cents per fleece in favor of the Merino.

My object, more particularly during a few years past, has been to obtain, by breeding, that kind of sheep which would yield the most valuable fleece in proportion to the weight of carcass. Had I placed implicit confidence in the statements of those interested in breeding either full-blood, Saxony, or Merino sheep for *sale*, I probably should have disposed of my entire flock, and purchased those represented as possessing the most desirable qualities. It had occurred to me, however, as worthy an experiment to attempt the breeding of a flock that should partake somewhat of the good qualities of both, and, at the same time, be more valuable for the common farmer than either—in other words, a flock possessed of vigorous constitution, and bearing fleeces superior to the Saxony in weight, and to the Merino in fineness. This attempt I have been making, and thus far my success has fully equalled my expectations. True, in two instances, I have been unfortunate in the selection of bucks. The remedy, in such cases, has been my uniform practice of making a careful division of the flock each year, according to the merits or defects of the different animals, retaining such as are nearest perfection, and disposing of all such as have prominent faults of *any* description; at the same time, making it an invariable rule *never* to allow a purchaser to make his own selection. This I consider imperatively essential to success in breeding. With these preliminary remarks, relating more particularly to my own experience in sheep husbandry, I now proceed to answer your inquiries:

1. "Is wool-growing profitable?" For a few years past this branch of business has not afforded so good profits to the farmer as the average. My opinion is, however, that the careful and judicious sheep-breeder *may* realize fair profits from wool-growing, even at the average price wool has borne for the last 5 years. But unfortunately the majority of our farmers are not of this stamp. They are energetic and enterprising, it is true, but, as a general thing, are in *haste* to make money, and require immediate profits from their labor. To make wool-growing profitable, patient and continued care and attention are requisite; consequently the business has been abandoned as unprofitable by a majority of those formerly engaged in it. With the exception of occasional instances, in which the price of wool has been raised by the operations of speculators, the ruling prices, for some years past, have been considered too low to afford the wool-grower a reasonable remuneration. Our grazing lands, generally, in this county, are equally as well adapted to the purposes of the dairy as to those of wool-growing, which has probably decreased in about the same proportion.

To show that wool-growing is not generally considered profitable, I refer to the Census Statistics of 1850, as compared with those of this county and State for 1845.

In 1845, the number of sheep in Oneida county was found to be 194,589, while in 1850 the number was only 70,341, showing a decrease in five years of *sixty-four per cent.*, or an average annual decrease of more than 13 per cent. The same fact appears, in a very similar degree, in relation to most of the principal wool-growing counties of the State, as may be seen by the following comparison, viz:

	1845.	1850.
Otsego..........................	270,642	108,241
Madison.........................	263,132	95,308
Ontario.........................	257,821	149,554
Washington......................	254,856	152,337
Chautauque......................	235,403	137,453
Chenango........................	223,452	88,811

In Rensselaer, St. Lawrence, Erie, Delaware, Yates, and Dutchess

counties, there is shown to be a decrease of half, and in Jefferson, Cortland, and some other counties, there has been a decrease of two-thirds.

In the entire State, the number of sheep in 1845 was 6,443,855, while in 1850 it was about 3,453,241, being a decrease of about 47 per cent. in five years, or nearly 9½ per cent. per annum.

These comparative statistics furnish, in my estimation, the best evidence of the opinion of our New York farmers in relation to the profits of wool-growing. That it is less profitable than formerly, all are ready to admit; while at the same time they may honestly differ in opinion as to the *causes* that have operated against their interests in this branch of agriculture. Some attribute it to western competition; others to defects in, or evasions of, our tariff law. Undoubtedly each of these causes has had its influence.

The fact is apparent, that while our former tariff laws were in operation, there was a constant and gradual increase in the number of sheep kept in the State, showing, for instance, a healthy increase from 5,118,777 in 1840, to 6,443,855 in 1845, being a gain of 25 per cent. in five years, or 5 per cent. per annum. Since the latter period, and more particularly under the operation of the tariff act of 1846, the *decrease* has been in nearly a two-fold ratio. I merely refer to this as a matter of fact, and leave it for others to draw their own inferences.

2. "Cost per pound of growing coarse or fine wool." I consider that it costs *as much* to produce a pound of coarse wool as to produce a pound of fine, other circumstances being equal. In order to answer the inquiry accurately, it will be necessary to estimate the cost of keeping sheep for the year.

By the statistical returns, it appears that the average weight of fleece in this State is about 3 pounds per head for the number of sheep over one year old. This we will suppose to be a fair estimate. I suppose 3 sheep may be summered and wintered from the produce of one acre of ground. My estimate would then be as follows:

100 sheep, at $1 50 per head	$150 00
33⅓ acres of land, at $40 per acre	1,333 33
	1,483 33
Interest on this same at 7 per cent	103 83
Making and storing hay from a portion of the land	15 00
Washing and shearing sheep	6 00
Salt, tar, and summer care	5 00
	129 83

I have added nothing for winter care, as that will be considered as repaid by the manure made.

Receipts.—300 pounds of wool at a cost of about 43 cents per pound. As this is considerably above the average price of wool for several years past, the production would of course be a losing business, were it not for the annual increase of the flock, which, with ordinary flocks, does in fact furnish the only chance for a profit. This may be estimated as averaging $30 per 100 sheep.

The account would then stand as follows:

Cost of production as above	$129 83
Deduct for gain by increase	30 00
	99 83

or say 100 as the cost of producing 300 pounds wool, equal to 33⅓ cents per pound as cost of the wool to the producer. As the average price in market for a series of years cannot be put at a higher figure than 35 cents, it will at once be perceived that the producer gets only a nominal profit after deducting expenses. This I suppose to be a fair view of the case, so far as a majority of the wool-growers of this State are concerned.

It does not necessarily follow, however, that fair profits *cannot* be realized by the wool-grower, even under the existing state of things. As evidence to the contrary, I beg leave to refer to my own case, not because I am vain enough to suppose it to be the most striking one for the purpose, but because it is one of which I can speak understandingly. I find, then, my account to stand thus:

100 sheep at $2 per head	$200 00
30 acres of land at $50 per acre	1,500 00
	1,700 00
One year's interest on this at 7 per cent	119 00
Add other expenses, as in former estimate	26 00
	145 00
Deduct average increase of flock, which I find is	35 00
Leaving	110 00

as the cost of the production of 100 fleeces, averaging 4 pounds each, being 400 pounds wool, produced at a cost of $110, or 27½ cents per pound.

Estimating the value of the wool at 40 cents per pound, (and this is the *minimum* rate, as I have never sold it for any less,) it gives a clear profit of 12½ cents per pound over and above all expenses. But let us take another view of the case—

Receipts, 400 pounds wool, at 40 cents	$160
Increase of flock	35
	195
Deduct expenses as above	29
And we have remaining	169

being but a fraction less than 10 per cent. on $1,700, the amount of capital invested.

3. "Are large or small sheep more profitable, either for mutton or their fleeces?" To this I am only able to say much would depend on location, so far as the market for mutton is concerned. My own experience has shown me that a medium-sized sheep has generally afforded me the

most profit. It is, I believe, an admitted universal law, that the consumption of food by animals of the same species is in proportion to the weight of carcass. This consumption has been variously estimated at from $2\frac{1}{4}$ to $3\frac{1}{2}$ per cent. of their weight daily in dry hay, or its equivalent. Whatever this per-centage may be, it is undoubtedly in proportion to the weight.

Consequently a large animal consumes a greater amount of food than a smaller one of the same species. This should, of course, be taken into the account in estimating the profits. As a general rule in the animal kingdom, those of medium size are more likely to approximate nearest to the standard of perfection; and for my own use, I should certainly give them the preference.

4. "How much more does it cost to raise a pound of fine wool than ordinary coarse wool?" Answer. Not any, if the wool only is taken into the account. In the vicinity of our cities, the advantages afforded of a market for mutton may enable the grower of coarse wool to produce it at a less cost per pound than fine Merino wool could be produced at; the Merinos not being adapted to compete successfully with the coarser varieties in the mutton market. But the main dependence of the great mass of the wool growers of the country must be on the *wool* and not on the *mutton* market.

By this I would not be understood to mean that good mutton cannot be made from Merino sheep. None of these, however, should be slaughtered for this purpose, excepting wethers that have arrived at full maturity. These, with a little extra attention, will make good mutton; sufficiently fat to suit the taste of a majority of persons, and weighing, when dressed, from 40 to 50 pounds.

5. "The proportion of lambs annually reared to the number of ewes?" Answer. In small flocks of coarse-woolled sheep, the ewes of which will bring lambs at one year old, the proportion would be nearly, or quite 100 per cent., as many of the ewes might be expected to rear twins. In larger flocks of fine woolled-sheep, 80 per cent. of the number of ewes allowed to receive the male would be as high as I should venture to estimate the increase. Much, of course, depends on circumstances; the proportion varying considerably in different years. In this climate, the 1st of December is about the time the bucks are usually put with the ewes. This is generally after the flocks are arranged for the winter; and the arrangements should be made with some reference to that object.

The lambs are consequently dropped from the 1st to the middle of May. Should the spring open early, and the weather be mild and favorable, nearly all the lambs may be saved with proper attention. If, on the contrary, the season should be backward, and cold storms prevail about the time the lambs are dropped, serious losses would sometimes be experienced. Much, also, is depending on the condition of the ewes. If healthy, and in good condition, a reasonable degree of care at this time on the part of the owner will usually be well rewarded.

In a flock of 100 sheep, owing to the fact that the wethers are more likely to be selected for mutton, the proportion of ewes will generally be about three-fifths, or sixty. Of these the number suitable for breeders will be about three-fourths, or forty-five. Eighty per cent. of the latter number would give 36 lambs as the number which might reasonably be expected to be reared annually from such a flock.

I have thus endeavored to answer the several questions to which my attention has been directed by your Circular. I am aware that the opinions I have expressed may be found to differ somewhat from those entertained by others, possessed, perhaps, of judgment and experience superior to my own. But such as they are, they are honestly entertained by me, and founded on my own experience and observation. If, in communicating them, I have been able to add anything to the general fund of information on this important subject, I shall feel that I am abundantly rewarded.

I am, sir, very respectfully, your obedient servant,

LORENZO ROUSE.

To the Commissioner of Patents.

Hurley, Ulster County, N. Y.,
December 31, 1852.

Sir: In reply to your inquiries on the subject of agriculture, I answer:

On *wheat*, guano has been but little used in this county, and not at all in my neighborhood. The average product of wheat per acre does not, probably, exceed 20 bushels; but when some pains are taken to improve the soil, we can get 30 bushels, and upwards, per acre. The time of sowing is from the 1st to the 25th of September; harvesting about the middle of July. In preparing my lands for wheat, I plough but once, and that in the early part of September, turning over a clover sod, with a Michigan sod and subsoil plough, which covers up the sod entirely, and completely pulverizes the soil. My yield, the past season, exceeds 30 bushels to the acre: having measured an acre, I had $34\frac{9}{31}$ bushels. My wheat is of the Mediterranean variety, which, with us, is the safest, it avoiding the ravages of both the Hessian fly and the wheat midge or grain-worm. The price of wheat during the last fall has been about $1 25 per bushel. I sow no grass-seed in my wheat field. My rotation of crops is, corn after wheat, and oats after corn, in which I sow my clover seed and clover sod for wheat.

Corn.—The average product of corn per acre, throughout the county, may, perhaps, not exceed 30 bushels; but on our better lands we get about 70 bushels per acre; cost of production, per bushel, about 37 cents. My system of cultivating corn is, to manure the whole ground before ploughing; in ploughing in the manure, plough about 8 inches deep; then harrow down; furrow with the plough, about three feet apart, both ways. As soon as corn-rows can be fairly seen, we work through it with a cultivator; then with plough, before hoeing. When it gets up to about a foot or fifteen inches high, we pass through again with the cultivator and the plough, both ways; then finish hoeing by about the time the spindle-top comes out. The best mode of feeding is undoubtedly that of cooking; but very little of this is done with us. The profits of corn-stalks, as fodder, are not fully appreciated by most farmers. The proper way of managing them is not to cut them till they are quite ripe; but, as soon as ripe, cut and shock them, so that they may become dry before husking the corn. They ought not to be brought in before they are fully dry, when they will be the best of fodder. And when feeding them, another great mistake is generally made—that of throwing out too much

at a time; by throwing out or feeding rather sparingly, cattle can be made to eat the whole of the stalk, which they will not do when more is given. The reason why corn stalks should not be cut too early, is, that when they are cut before fully ripe they will become acid, and the saccharine matter contained in them will become vinegar instead of sugar; and, consequently, much of the nutrition contained in the stalk will be lost; and, of course, cattle will not do well by feeding on them.

Oats.—The average crop of oats per acre, in this county, does not exceed 30 bushels; but, on our best lands we may average about 70 bushels; and extra pieces give from 90 to 108 bushels per acre.

Rye yields no more than about 15 bushels per acre throughout the county.

Potatoes have, for a number of years, been a very bad crop. The past season has been an exception to the general rule: we have this year a good crop of potatoes. I planted more than an acre in the yam variety, from which I have 473½ bushels to the acre. They were very little affected by the rot; and were raised on corn-stubble of last year, which was well manured with barn-yard manure and ashes. Except for the potato crop, no manure was used the past season. The land was ploughed about 8 inches deep, and planted in hills about 3 feet apart. Expense of ploughing, hoeing, and gathering, the acre, about $20—the potatoes now selling for 41 cents per bushel. Of this variety I had about 50 per cent. more than of any other which I had planted.

Yours, respectfully,

PETER CRISPELL, Jr.

To the Commissioner of Patents.

Arkport, Steuben County, N. Y.,
December 25, 1852.

Sir: It is with much pleasure that I proceed to make to you, in conformity to the Circular issued by your predecessor, a report of matters relating to the agricultural interests of this vicinity.

I have delayed doing so till this moment, not from any want of interest in the subject, or the most entire willingness to comply with your wishes, but in hopes of being able to furnish more accurate or reliable information, and a greater variety of details.

Certainly there is nothing which at present more demands the fostering care of government than the subject of American agriculture, and it is truly lamentable how little of that care it receives.

I shall endeavor to answer the Circular only in regard to the subjects with which I am most familiar.

Wheat.—Much more attention is being paid to the production of this staple crop than formerly, and farmers are beginning to find out that it can be raised successfully on something else besides "new land," and that, by proper tillage, the soil is actually growing *better*, instead of *poorer*, in its culture. The usual course pursued here is to "summer fallow" in June, turning under a good coat of clover; plough about 7 inches deep; harrow thoroughly, and cross-plough just before sowing. We usually sow in the last days of August or first of September, at the rate of two bushels per acre. The seed should be previously soaked for twelve hours in strong brine, and then coated with unslacked lime. We use the "Soule" wheat, thinking it will yield five bushels per acre more than any other variety known with us. The average product is about 25 bushels per acre. The quantity of land sown, and the average product per acre, are steadily *increasing*. The average price for the year 1852 has been about 94 cents per bushel. We are not troubled with the "Hessian fly" or "weevil." In seeding down, red clover usually follows wheat. Sow the last of March or first of April, at the rate of ten quarts per acre. And I would here remark, that we invariably have the best success when we sow the seed in the chaff. The covering of the seed seems to afford protection during the late frosts of the spring months. It must be sown *early* to do well. Sow on the snow if possible, as you can then distribute the seed more evenly. "Guano" is not used with us for anything.

Indian Corn.—This valuable crop, which makes the farmer's fields look so rich at harvest time, lays such a solid foundation to his pork, contributes so essentially towards furnishing a supply of warm doughnuts, and loads his table with such healthful and delicious puddings, has, we are happy to say, notwithstanding the unpromising attitude of spring, received increased attention, and been full an average crop the past season. When planted on soil that is suitable, and properly cared for, the average yield is about 50 bushels per acre. Cost of production, including interest on land, about 40 cents per bushel, as follows:

Interest on land, per acre	$5 00
Ploughing once, per acre	2 00
Harrowing	1 00
Seed and planting	1 00
Ashes, putting on the hill	1 00
Cultivating and hoeing	5 00
Cutting up	1 00
Husking and thrashing	3 00
Securing stalks	1 00
	20 00

In this estimate I have made no account of the manure, (20 loads to the acre.) The stalks are worth, well housed, about as much per acre as a moderate crop of hay to feed cattle, besides adding very materially to the next year's supply of manure for another crop. Our best crops of corn are raised on sward ground, ploughing it but once, and turning the upper side perfectly under; plough as deeply as possible, not less than *eight inches;* then harrow lengthwise the furrow until a good tilth is produced. Mark three and a half feet each way, and plant about the 10th of May. As soon as the corn is of sufficient size, start the cultivator, and have a boy follow to see that there is none covered. Immediately after, put half a handful of unleached ashes on each hill. In about a week go through with the cultivator again, each way; follow with the hoe, and thin out the stalks to four in each hill. Cultivate and hoe again before tasseling. This will eradicate all weeds, and is all the attention it requires till it becomes glazed, when it should immediately

be cut up and set in shocks of 25 hills each, and bound firmly round the top with stalks. Husk in October. As soon as the stalks become perfectly dry, draw them in and scatter them around as thin as possible in the barn and shed loft. If well secured, they are better than hay for milch cows. The new crop of corn is now selling readily at 75 cents per bushel.

Oats.—The raising of this crop is considered a money-making business at present prices. Average yield about 60 bushels per acre; worth from 40 to 50 cents per bushel. It is probably the most exhausting to the soil of any crop we raise. Sow in April, at the rate of three bushels per acre.

Barley.—This crop is raised to a considerable extent on good wheat lands. It leaves the soil in a fine state for wheat. Average yield about 30 bushels per acre, and commands 70 cents per bushel.

Rye.—But very little sown; it does not pay. Average yield say 15 to 20 bushels per acre; worth about 60 cents.

Peas and Beans.—Peas are considered the least exhausting to the soil of any crop we raise. Sow from three to four bushels per acre; and if the bugs do not injure them, they are a very profitable crop. Average yield about 20 bushels; worth from $1 to $1 50 per bushel.

Neat Cattle.—The cost of raising neat cattle till three years old will not vary much from $15. In this estimate I have supposed them to be kept (after the first winter) on coarse fodder, straw, corn-stalks, &c., with hay in the spring. At that age they are worth from $15 to $25. *Good* dairy cows are worth, in the spring, $30; in the fall, from $16 to $20. I have never ascertained by weight how much beef or pork 100 pounds of corn-meal will produce.

I have thus touched imperfectly on some of the points suggested in your Circular. If they should be of any service to the Commissioner of Patents in making up his Annual Report, I shall be highly gratified.

Respectfully yours,

JOHN HURLBUT.

VAN BUREN, ONONDAGA COUNTY, N. Y.,
December, 1852.

SIR: Your Circular of August last was put into my hands, and I will briefly reply to a few of the questions contained therein.

Wheat.—This crop is mostly grown after oats and barley. The most common practice is to plough, as soon as the crops are harvested, from six to eight inches deep; the latter depth is considered best. Barn-yard manure is applied broadcast, at the rate of from twenty to thirty-two horse-wagon loads per acre; but a great part of our wheat receives no manure, from the fact that much is wasted, and, frequently, large quantities left in the barn-yard—a bad practice, indeed, but true, nevertheless. About the first of September the two-horse cultivator, or in some cases the harrow, is started, and, after a good stirring, it is considered ready for the seed, which is sown about the 10th, followed by the harrow and a few furrows to carry off water from such places as will be likely to be injured in wet weather. This finishes the work; but, in some instances, summer fallowing is still practised, which is commenced

about the middle of June, and consists of two or three ploughings and harrowing. This practice was formerly considered the only sure mode of wheat-growing, and good crops are still grown in this way; but, when the expense and loss of time are taken into consideration, most farmers are of the opinion that sowing after summer crops is most profitable. Another mode of wheat-growing is to turn over a clover-lay in the month of August; work it well with the cultivator, and harrow and sow at the usual time. This has never been extensively practised in this vicinity; and although there have been some good crops, there have also been many failures. The usual quantity of seed is about two bushels per acre. Harvesting commences about the 20th of July, and the yield is from twenty to thirty bushels per acre. The last harvest was about one-third less. I have never found any remedy for the weevil or Hessian fly, nor have I in forty-three years seen any diminution in quantity or quality, except what was clearly to be traced to unfavorable seasons. It is a fact that, at this time, the oldest fields produce the best crops. The average price is about one dollar per bushel. It is usual to sow clover and Timothy on wheat, at the rate of ten or twelve pounds of the former, and six or eight of the latter, per acre; this is done in the spring, as soon as the snow is off—most commonly in the month of April.

Corn.—We prepare the ground by one ploughing, six or eight inches deep; the cultivator or harrow follows, in order to mellow the surface; but following the same direction with the plough. We mark with a simple instrument, drawn by a horse, which makes three or four marks at a time; the widths are from three feet two inches to three feet nine or ten inches each way (the former I consider best;) and we plant from the 15th to the 25th of May. As soon as the corn is fairly up we start the cultivator, going through once in a row; this completed, we commence across the rows, and follow with hoes, cutting out weeds and thinning the plants, if there should be more than is necessary—four is thought to be about the proper number. The cultivator is continued, and a second, and in a few instances a third, hoeing is done; but little earth is put round the plants. Hilling has become unfashionable, as well as unprofitable; but the cultivator is now the great laborer in the corn-field. It is cut up about the middle of September, and the husking is done as soon as it is fit—generally in October; and the yield is from forty to seventy bushels per acre, at an expense of fifteen to thirty cents per bushel. It has been grown for twelve and a half cents on good land and with good culture. The usual price is about fifty cents per bushel—sixty-two and a half at this time. I have no experience in feeding.

Oats and Barley.—These crops usually follow corn. Barley is sown as early as the ground can be fitted, one ploughing being sufficient sometimes, where barley follows wheat. The ploughing is done in October or November; but this is not so much practised as formerly. As soon as the soil is dry enough it is sown, two and a half to three bushels of seed to the acre—the two-rowed is preferred—the ground well harrowed, and sometimes the roller follows. It is cut about the 25th July with a cradle, and sometimes with the naked scythe, and when sufficiently dry it is thrashed with a thrashing-machine. The usual yield is from twenty to forty bushels per acre; price the present season sixty-two and a half cents per bushel. In some seasons it has been lower, and in a few instances higher. Oats are sown as soon after

barley as the ground can be fitted, with two to three bushels of seed per acre; the whole operation being the same as for barley. They are cut with the cradle, and bound and mostly thrashed by hand in the winter. The yield is from thirty to sixty bushels per acre. The present price is forty-three cents per bushel, which is eight or ten cents above the usual price at this time of year.

Fruit.—There is an increasing attention paid to the cultivation of fruit. Several years ago orchards were cut down, being considered as "cumberers of the ground;" but of late years better counsels have prevailed, and large numbers are planted every year, and will probably continue for many years to come. It is now the opinion of good practical farmers that for feeding, particularly to swine, there is no crop that pays better, according to its cost, being fully equal to potatoes by measure, whilst the expense is not more than three or four cents per bushel. Hogs fatten well on fruit; so do cattle and horses. I feed them raw, and consider them as good as though they were cooked—indeed, from my own experience, I have found but little benefit in cooking food for animals; nature appears to have provided them with the necessary apparatus both for grinding and cooking, and art can add but little to it. I am now feeding horses, cattle, and swine, on raw apples, and they do well on them. The best winter fruit, taking all things into consideration, is the Greening, Swan, Russet, and Spitzenberg. These have the preference; but the Northern Spy is now the rage, and, should it succeed as well as present appearances indicate, it will soon be the *prince* among apples. It is much cultivated, and for beauty, durability, and fine flavor, is not exceeded by any apple with which I am acquainted.

Pears, peaches, cherries, and plums, are also cultivated to a considerable extent; but the latter are attacked with some disease or animal, I know not which, that has prevented the cultivation, and nearly destroyed the whole of the trees, and no remedy has yet been found. Peaches, pears, and cherries, are grown to a considerable extent; but our cold winters render peach-growing a rather doubtful business. The *yellows* is unknown among us. We transplant in the spring, the latter part of April or first of May.

Manures.—We use plaster, which is abundant in our county, and worth at the mills about $1 50 per ton; it is sown in April or May, at the rate of a ton to ten or twelve acres, yearly, on clover and other grasses. I have not found any benefit by using it on grain, although I have tried many experiments; but on clover and other grasses, and a dry soil, the crop is frequently doubled. Nor is there any danger of using large quantities. A bushel to the square rod has been applied with decided advantage, which continued to operate for several years, without any other application. We make, too, large quantities of barn-yard manure, which of late years has been used with a little more prudence than formerly, when it was the fashion to compute the expense of moving the barn or the manure, and very frequently the barn was moved, as the lightest job; and this was only done when the cattle were likely to mire in the dung. We have done a little at tobacco-growing, which draws largely on this bank; and it appears to be absolutely necessary to remove these deposites, or have a light crop; and should we continue this branch of business, we shall be compelled to draw out the manure and let the barn stand.

There is no regular system of rotation practised among us, each having a system of his own, and many no system at all. I will give my own, which is also practised by a few others. I will commence with a green sward: first year, corn; second, oats and barley; third, wheat, with clover and Timothy seed; fourth, mow the first crop for hay—the same season, a crop of seed; fifth and sixth pasture. Plaster is applied each year while in clover, and the crop of hay is usually from one and a fourth to two tons per acre; the clover-seed from one and a half to two bushels per acre. The expense of getting in hay is generally about one dollar and fifty cents per ton; but to all these estimates should be added the interest on the price of land, at sixty to eighty dollars per acre, and taxes, which are increasing at a rapid rate.

Your humble servant,

JOHN BOWMAN.

Pavilion, Genesee County, N. Y.,
December 21, 1852.

Sir: The Circular requesting agricultural information was duly received, through the politeness of Hon. A. P. Hascall, and I have hesitated to reply on account of my limited information; but such as I can give, is cheerfully submitted to your disposal.

Wheat.—The most common varieties are the Soule, Blue-stem, White-flint, and Mediterranean, and they are generally preferred in the order named; though each kind has its friends, depending upon a more perfect adaptation of soil to a particular variety, and consequently their success with it. The Soule requires a rich soil; the Blue-stem and White-flint will succeed on rather poorer soil; the Mediterranean is a coarse, hardy wheat, and not raised much on our fine wheat lands, but is chiefly used on soils where the other kinds would be likely to winter-kill; and as its market value is less, it is not much of a favorite. No guano is used in this section, to my knowledge, in the production of wheat. I judge the average product this season to be 22 bushels per acre; though some fields have yielded from 40 to 50 bushels per acre. Time of seeding, from the 15th of August to the 15th of September; the kind of soil and weather indicating more definitely the time of seeding. Harvested this season the latter part of July. The preparation of seed is by a thorough cleaning and separation of small shrunk wheat and foul seed, with the fanning mill; 2 bushels per acre is generally used in sowing broadcast; 6 to 7 pecks in drilling both ways, (crossing the field the second time at right angles with the first drilling,) and 5 pecks is considered sufficient in drilling one way. The usual method is, to plough grass land but once, from six to ten inches deep; the after-cultivation being done with the harrow and cultivator. Stubble land is sometimes ploughed twice. The yield per acre, in some localities, was larger than usual the past season, and, as a whole, I think the yield increasing. In the spring the ground is seeded with clover, and it remains two or three seasons as pasture or meadow. If the clover is grown as a renovating crop, it should be ploughed under the second season; or if the preceding wheat crop has been injured by worms, it should not remain long, as frequent working of the ground will destroy them. Some practise sowing Timothy seed in the fall, im-

mediately after the wheat, though a more common one is with the clover in the spring. Less Timothy is used on wheat soils now than formerly; the objection to it is, that it exhausts the soil, or appropriates to its own use elements that are essential to the perfect growth and maturity of the wheat plant; and that it serves to perpetuate wire worms, as they are more liable to injure the succeeding crop, where Timothy is used. For the Hessian fly I know of no better remedy than to keep the land rich—not exhaust it with spring crops; prepare it well, and sow at a proper time; give it room to produce rank and vigorous stalks; upon such, flies do but little injury. Sowing near or after the middle of September is considered a preventive, as the season for depositing their eggs has passed, which is usually the last of August or first of September; but on some soils, if sown late, so as not to germinate before the last of September, the injury from the winter and the rust or mildew, of late-sown wheat, would equal that of the fly in the fall, aside from its liability to be attacked in the spring. The weevil has done us no injury yet; a very few were found in this section the past season. The average price at the nearest market (Le Roy) has been 90 cents per bushel.

Corn.—The cultivation of this important grain is on the increase. The most esteemed varieties are the eight-rowed yellow, red-blaze, and Dutton. No guano is used in this section in the production of corn. The average product per acre varies much, some farmers getting 25, others 45 or 50 bushels per acre; an average would be not far from 30 bushels per acre this season. To produce an acre of corn will cost at least $12, if interest on land is included. This fall new corn has sold at 50 cents per bushel. Cost of production on this estimate, 40 cents per bushel: 30 bushels at 50 cents per bushel, would be $15—stalks $4; this would leave a net profit of $7 per acre. The usual practice is to plant on grass land, manured with 12 or 15 loads of good barn-yard manure to the acre; though some depend upon the stimulus of a fresh-turned sod, reserving the manure for wheat land. Plough deep, the first of May; harrow it fine; mark it for rows both ways, 3½ feet apart; plant about the 20th of May, from 5 to 7 grains in a hill. If the ploughing and harrowing have been thorough, the after-cultivation may be done principally with the cultivator and plough, leaving but little work for the hoe. Ashes, lime, and plaster, mixed and sprinkled upon the hills just before or soon after it appears out of the ground, is considered beneficial; if injury from the wire-worm is apprehended, salt is sometimes added. In feeding hogs it is esteemed best to have the corn ground and cooked, or cooked if unground; dry unground corn will increase nearly one-fourth its bulk in cooking, though a common practice is to feed it raw and unground (it is less trouble)—for cattle, ground, but raw. I have no experiment by which to judge of the increased quantity of grain per acre which the manure of 10 bushels of corn consumed by hogs would make, but think it might be 4 or 5 bushels.

Oats are considered an exhausting crop, and are less cultivated than formerly; average yield under ordinary circumstances, 25 bushels per acre: in favorable seasons they will yield from 40 to 45 bushels per acre; 40 cents is the average price. Land ploughed but once. Sow from 2½ to 3 bushels per acre.

Barley is cultivated to some extent; is not so exhausting as oats; it requires a light soil, with a good supply of vegetable matter; 20 bushels may be considered an average yield, and 60 cents an average price per bushel; quantity sown 2 to 3 bushels per acre.

Rye is not cultivated.

Peas but little cultivated as a field crop, though they are not so exhausting to land as others. They are not cultivated as a renovating crop, though I think they would be a good preparatory crop for wheat, on clay and sandy soils, that are lacking in vegetable matter, if turned under with the plough, or suffered to decay on the surface.

Beans.—Their cultivation, I think, is on the increase. Price this season at the nearest market, $1 per bushel; average yield 18 to 20 bushels per acre. They are exhausting to land, as the harvesting removes the stalks, which are rich in the most valuable elements of the soil.

Buckwheat is raised to some extent; time of seeding about the 20th of June; quantity of seed from ½ to ¾ bushel per acre. The past season was unfavorable to its filling. The yield was not large—probably 20 bushels would be an average; price, 50 cents per bushel. If grown as a renovating crop, it should be sown early, and ploughed under while in blossom.

Millet was introduced into this section the past season; how extensive its cultivation will be, I cannot say. It is an exhausting crop, but valuable. If cut when in blossom, though the seed would be valueless, it would produce a number of tons per acre of fodder, as valuable as some of the grasses. Millet seed is rich in nutritive elements. It is also productive; when properly tilled, it is said to yield 65 or 70 bushels per acre. When fed to cattle or horses, it should be ground. Time of seeding, from the 1st to the 15th of June, 8 or 10 quarts of seed per acre. Price, $1 25 per bushel.

Clover and Grasses.—The past season was not so favorable for grass as others have been; probably 1¼ ton per acre would be an average. Plaster is the principal fertilizer used for meadows and pastures. In laying down meadows, clover and Timothy are the only grasses used; from 6 to 8 pounds of clover seed, and 6 to 8 quarts of Timothy, per acre. The cost of growing hay, exclusive of interest on land, would be from $2 to $2 50 per ton. My experience in feeding clear clover hay to horses commenced this fall. The hay appears dusty, and the horses cough some; I attribute it to the dust, but cannot say whether it will prove a permanent injury or not. Perhaps the fault was in curing the hay.

Dairy husbandry is not pursued here to much extent; it is a secondary object, farmers consuming from one-half to three-quarters of their dairy products in their own families. A cow will make from 150 to 200 pounds of butter in a year. Average price of butter the past season, 15 cents.

Neat cattle are raised to some extent by farmers generally; and although a too common practice is, and has been, to keep them on cheap and coarse fodder, yet the actual cost of rearing until three years old has not been much less than $20; an average price at that age is from $25 to $30. Good cows sell in the fall from $20 to $25; in the spring, from $25 to $35 and $40. Cannot say how many pounds of beef 100 pounds of corn would produce. A given amount of food will produce more meat in a Durham or Devon, than in a native animal. There are no Herefords in this section. The interest in rearing cattle is increasing. Within the past season some of our enterprising farmers have obtained as fine specimens

of the full-blooded Durham as any section can furnish. The breaking of steers to the yoke is a rare occurrence; but when attempted, it commences the first winter, by yoking them occasionally, and driving sufficient to accustom them to the yoke and make them gentle. But few oxen are used on farms, and most of them are taken from Western droves, or the adjoining southern counties. Our cattle are principally intended for the shambles.

Sheep and Wool.—Considerable wool is grown here. At our nearest market (Le Roy) over 92,000 pounds were bought; one firm buying over 80,000 pounds, at an average of 38¾ cents per pound. The amount bought by that firm was less by 50,000 pounds than in some previous years. The clip was not less, but more wool the past season was sent to other markets. Most people consider wool-growing profitable; but as opinions are various respecting sheep and wool, and the comparative profit of growing fine and coarse wool, both wool and mutton being considered, I am under the necessity of leaving answers to the proposed questions for those more experienced in wool-growing and rearing of sheep.

Hogs.—New varieties are frequently introduced, but are so soon mixed up, that it is difficult to determine which are the best. A cross of the Byfield and the Leicestershire is generally preferred. Hogs are allowed to range over the pasture-fields and orchards during the summer, and with the milk and slops from the kitchen, thrive well; in the fall they are confined in pens and fed on apples, potatoes, and pumpkins, boiled together in such proportions as our supplies of each will admit, adding meal after boiling—afterwards fed on corn, until time of killing. In packing pork the Onondaga coarse salt is generally used, though some prefer rock salt, from the idea that it preserves meat better. As salt contains water mechanically confined within its crystals, the only source of danger in using it is in its dampness. "Wet salt is entirely unsuitable for preserving animal substances, inasmuch as the principal operation of salt as a preserver is due to its power of absorbing water from the material preserved." [The idea advanced that "wet salt" is injurious to pickled pork, or any meat, is unsound.—Ed.] And if the Onondaga salt is thoroughly dried, its preserving qualities are equal to any foreign salt. There is no bacon made. Hams are cured by moistening them with saltpetre water, then rubbing them with hot salt two or three times in the course of two or three weeks, or by packing in tight casks and covering them with strong brine, letting them remain four or five weeks, then smoking them with sugar-maple chips, or, what is preferred by some, corn-cobs; afterwards kept in a dry cool place until used. Cannot say how many pounds of pork 100 pounds of corn will make.

Potatoes are cultivated generally, though the yield has not been large; 100 bushels is probably an average per acre. The preparation and tillage the same as corn. The round and long Pink-eye and Mercer are considered best for table use, and are as profitable, though not so prolific, as some other varieties. Best system in planting is in drills from two and a half to three feet distant, and from eight to ten inches in the drill, one piece in a place; a light rich soil, free from clay, is best. If manures are used, they should be fine and well rotted; coarse and unfermented manures are considered injurious. During the prevalence of the potato disease, we lost none that were grown on a loose black soil, (re arranged drift, filled with vegetable matter;) but where the subsoil, a light, argillaceous earth, (but not a tenacious clay,) was brought to the surface by the plough, and in levelling the ground, they were much affected apparently in proportion to the amount of clay mixed with the surface soil. No manures were used.

Fruit Culture.—For years there has been considerable interest in, and attention paid to, the cultivation of apples, which still continues; and attention to the cultivation of choice varieties of other fruits is increasing. For late keeping and spring markets, Russets are preferred; Pippins, Talman Sweeting, Greening, Spitzenberg, are some of the common, but good varieties for winter use. In my estimation, there can be apples enough grown on an acre of ground, allowing them to be good natural fruit, to make it profitable to the farmer, as food for stock; if choice varieties are grown, the amount of profit would depend much on location and market. For a number of years we have fed our apples to hogs, considering them equal to potatoes in fat-producing properties.

Root Crops, (turnips, carrots and beets.) In this immediate vicinity they are not much cultivated, yet they are favorably spoken of, and many propose raising, in future, an additional quantity. Average product per acre, cannot say; though a gentleman in the habit of raising some acres of the sugar-beet, each year, informed me they would yield 20 tons per acre. The tops he considered excellent for feeding cows; and I suppose, in his estimated yield per acre, the tops were included.

Answers to some questions proposed are omitted, as I could obtain no definite information as answers. Farming is not pursued with that system and regularity which might be desired. Wheat has been the great staple article in this section, and has received the principal attention of farmers: for years it was almost their only cash article; but lands becoming worn, requiring in some respects a different course to be pursued in its production, the facilities for transportation increasing, thereby furnishing a market for other farm products, the diffusion of agricultural and scientific knowledge is breaking up this exclusiveness and introducing more variety upon the farm, as well as system and economy in its management. Though as for debt and credit, or, in other words, the actual cost of farm operations, this is yet a matter of mere conjecture with many; but if the past is a criterion by which the future can be judged, the careless system heretofore pursued will soon be among the things that are past; and with the stimulus to exertion, of a good market and remunerating prices, agricultural productions will be greatly increased.

Very respectfully, yours,

J. L. CROCKER.

To the COMMISSIONER OF PATENTS.

FREDONIA, CHAUTAUQUE CO., NEW YORK,
December 24, 1852.

SIR: Having for the past twenty years had in constant employ from 20 to 30 horses, I have been led by experience to believe that red clover hay, fed to horses in the usual manner, is injurious, and many times creates a cough and the heaves. It may be fed in small quantities when *wet* or *soaked* in water, without injury.

It undoubtedly makes much difference in the manner clover-hay is made, as it never should be spread, and remain so, until thoroughly dried, but wilted and cured in the cock; and when put into the mow, a little salt applied will tend to keep it in a state in which the dust will adhere to it, and not rise when fed, which I think is the greatest cause of injury.

I am of the opinion that too much hay, of any kind, is not so good for a horse as a smaller quantity of hay, and the balance of nourishment, to keep the horse in condition, in oats. A hearty horse will eat from 25 to 35 pounds of hay in 24 hours; and to keep him in condition to work, 12 or 16 quarts of oats must be added. One-third of that amount in hay, and the worth of the other two-thirds of hay added to the oats, will fit a horse much better for labor, endurance and activity; and a horse fed in that manner, is seldom troubled with the heaves.

Potatoes.—The two best kinds of potatoes I have ever raised in this section, are the early June (a round, white potato) for summer use, and the long, flat, white Pink-eye for winter. The black Pink eye is nearly equal to the white, and I think not quite so liable to rot. The blight or rot in the potato, the past season, in this section, has been hardly perceived. I have not seen in my crop a diseased potato, when for three or four years previous I hardly saw a sound one. It has been a vexed question to the farmer; and if, as some have thought, the blight proceeds from an insect, did not the severe cold winter of 1851–'52 have something to do with the favorable change in the crop? Mercury fell to 12 or 13° below zero here. All kinds of insects which infest plants were almost extinct in this section the past season, such as turnip-fly, striped bug, the large black beetle-bug, grasshopper, &c., &c.

Yours, respectfully,

L. RISLEY.

FREDONIA, CHAUTAUQUE CO., NEW YORK,
January 1, 1853.

DEAR SIR: The culture of fruit in western New York is fast gaining ground, particularly so far as quality is concerned; as for profit, the fruit crop is one of the first, taking the cost into consideration. Many farmers and amateurs are setting young orchards; and most persons in this vicinity are learning better than to go to a neighbor's orchard and dig up sprouts to form an orchard, or to run here and there to get scions of nameless kinds of fruit. I can best illustrate my meaning by stating my own experience in establishing a small fruit orchard. About twenty years ago I commenced to plant an orchard; and intending to have a choice collection, I got most of the trees and grafted them myself, so that I might *know that all was right.*

Having no regular nursery near, I spent much time to pick up scions for a *good collection.* My neighbors were all very kind, and gave me scions of their *choicest* fruit, calling them by names they had dubbed them with themselves, such as "Queen Ann," "Victoria," "Nine-pounders," "Signifieders," and all sorts of large-sounding names, known to nobody but themselves. Well, I grafted about sixty trees with about thirty of the choice varieties, and labelled their names, and sat down to wait for the bearing. Four years came round, rather slow in that time of my life; but nevertheless it did come round, and the fruit too, when I was not a little disappointed to find nine or ten trees of one kind, and nine or ten of another, and so on, until the varieties were reduced to a few kinds, and a good share of those quite common. I marked the trees and commenced the next spring to saw off and graft over. The next time, to be sure, I purchased the scions of a pedler, who had a few more of his very choice kinds than he had promised to Judge Somebody and General Such-a-one. I put in the scions, and again satisfied my patience with a foretaste of fine fruit in anticipation. Four or five years more passed; and when they again bore fruit, I found that I had not changed half of my trees, but had again put in the identical kinds that I had cut off. The pedler had cut his scions where most convenient, and gave names that answered well until they bore fruit.

The third time, after losing ten or twelve years, I applied to a nursery man of reputation, who sold trees and scions true to the mark, and I am now just beginning to reap the benefit. Pomological conventions and societies are doing much to sift out the best varieties of fruit, and persons selecting fruit from the kinds they denominate first-rate will not be disappointed.

From the varieties of winter fruit I have in bearing, I should select as the best the Northern Spy, Swan, Rhode Island Greening, Hubardson None-such, Westfield Seek-no-further, Monmouth or Red-cheek Pippin, and Vandevere.

Very respectfully, yours,

L. RISLEY.

To the COMMISSIONER OF PATENTS.

NEW HAVEN, OSWEGO CO., NEW YORK.,
January 1, 1853.

SIR: The culture of fruit is receiving increased attention in all this region, particularly in the counties bordering the shore of Lake Ontario. This region is very well adapted to the culture of fruit, on account of its proximity to the lake, whose waters becoming heated during the summer, modify the severity of the autumnal frosts, and thus prolong the season for the ripening of our fall and winter fruits; and, on the other hand, the cold north March and April winds retard the opening of the blossoms of our fruit trees until past the period of spring frosts; thereby rendering the climate congenial to the propagation of those fruits cultivated in the Northern States. Among the fruits cultivated here are apples, pears, peaches, quinces, apricots, and nectarines; and of the small fruits are, plums, cherries, grapes, gooseberries, currants, and strawberries. Apples are, however, the principal fruit depended upon for sale and exportation. Large quantities are annually sent to the seaboard towns, Canada, and the Western States. Buyers are always sure of finding a surplus here when the crop fails East or West, or in the interior of the State, as it frequently does; while here it may be considered a sure crop. I believe there has not been a total failure here for the last twenty-five years; but we have had a supply for our domestic wants

and more or less to spare. The varieties best to keep for winter use are, the Esopus, Spitzenberg, and Rhode Island Greening, which latter is a fall fruit in the Southwestern States, but is peculiarly adapted to this locality—always fair, and an almost constant bearer, ripening some ten or fifteen days later than in Western New York, and keeping from January to April or May, and in some instances still later; the Westfield Seek-no-further, Holland Pippin, and Swaar. The later keeping varieties are, the Baldwin, Roxbury Russett, and Northern Spy. All of the above are among our best varieties for exportation. The Newtown Pippin has not been sufficiently tested with us to enable us to speak of its success with confidence; it is hoped, however, that it will succeed upon our sandy loam soils. The pear has not received that attention with us heretofore which it deserves, as a profitable fruit for cultivation. I know of no investment of money, in an agricultural point of view, that bids fairer to be profitable than the planting of pear orchards, consisting of the best market varieties of that fine fruit. One hundred and eight trees, 20 feet apart, can be set out on an acre, which, when fully grown—suppose them to bring half the present price—would amount to tenfold more than any crop of grain, grass, or roots, which we can now cultivate upon the same quantity of land. The blight in the pear tree, which has proved so destructive in many regions, has probably deterred many from going into the cultivation extensively. We have not suffered very much from it here. In addition to the old remedy of cutting off the limb below the part apparently affected, some cultivators here have placed leached wood-ashes around the base of the tree, to the amount of one bushel to a large-sized tree, and in like proportion for smaller trees, with apparent good success. I have tried the same remedy, with an addition of a small quantity of iron filings or blacksmith's forge cinders, and have not had my trees affected with the blight, "leaf or limb." Whether those remedies have been a preventive or not, I cannot say. There has been a little of the blight upon the apple tree and upon the quince here, killing the ends of the branches affected and withering the fruit upon the affected part, but producing no very serious injury.

To your inquiry, "Cannot apples enough be grown on an acre to renden the crop a very profitable one to the farmer?" I would say that next to the cultivation of the pear, would be the cultivation of the apple, on the score of profit.

Possessing, as we do, a somewhat barren, at least an inferior soil, when compared with the best wheat lands of Western New York, and the rich prairie bottoms of the western States, and although a calcareous soil is considered the best for the cultivation of the apple, yet we have one next to it in goodness in that respect—a gravelly, stony, and sandy loam; and together with the climate, as before stated, I think we can successfully compete with most any other region in that department. I would not recommend the course too often pursued by the early settlers of a country, or those planting the first orchards on their farms. I mean the setting of trees one rod apart, or 20 or 25 feet apart, and these of uncultivated or common fruit, and the rows running in zigzag directions. Orchards answering the above description can be seen by a few miles' ride in almost any direction in the country. Their owners undoubtedly were anxious to get fruit a growing, and sought such trees as were the most easily obtained, which were usually seedlings, on which they probably intended

to graft some good varieties; but for want of knowledge how to perform the operation, means to hire it done, being too busily engaged in some other needed improvement upon the farm, or for some other reason, they have been neglected until too large, or too old. To remunerate the expense of working them, they are suffered to remain cumberers of the ground, and eclipsing the same, so that nothing can be cultivated under them, bearing occasionally a small crop of little scurfy apples, covered with a crust of fungi, and so small as hardly to be worth the gathering, provided the limbs were thinned out sufficiently for one to mount the tree to shake them off, for they certainly would not be worth the picking.

In setting an orchard I would select thrifty and, at the same time, hardy varieties, grafted on budded trees of four or five years' growth, and from seven to ten feet in height. I should prefer them worked near the ground on seedling stocks, on the crown of the same, instead of root grafts, as they are usually furnished with a greater number of lateral roots, and are more stocky. I would set them out after the quincunx method, two rods apart, by commencing a row on one side of the field—say one rod from the side or fence—and set them just two rods distant from each other by means of a two-rod chain or pole; commence the next row by setting the first tree two rods distant from the first two trees in the first row, thus forming an equilateral triangle; the next tree two rods distant from the first, and two rods from the second and third tree in the first row, thus making each tree two rods distant from its nearest neighbor. By this method 45 trees can be set on an acre—12½ per cent. more than can be set on an acre when placed in a square form two rods apart, and the trees more equally distributed, and sufficiently far apart as not to prevent using the field for other agricultural purposes, such as raising crops of grain, roots, and hay. It is highly important that the land should be under a high state of cultivation; if it is not so, the holes for setting the trees should be dug larger than the extent of the longest lateral roots when spread out so that there may be a space between the ends of the roots and the undug soil, to be filled with rich garden mould, or, for want of that, a portion of well-rotted manure or compost, half a bushel per tree, well mixed with the soil to fill up the hole; but it would not be best to have the manure come in immediate contact with the roots. It is highly important that the trees should have higher cultivation in the orchard than they receive in the nursery, in order to attain a size to bear a crop of apples as soon as may be. To this end, it would be best to keep the field under the plough, and to raise hoed crops for the first few years at least, using a good supply of manures. With such cultivation and a common blessing, it may not be extravagant to estimate the crop of fruit at the end of 16 or 20 years to average eight bushels of fruit per tree, or 360 bushels per acre, and worth, if of the best leading varieties, 25 cents per bushel; making the crop worth $90 per acre, besides a remunerating crop of grain, grass, or roots, on the same, and the field having paid a fair per-centage on its valuation and outlay in crops and fruit up to this time. I know of many orchards that yield a larger revenue than that, where the fruit is of the long-keeping varieties. I planted an orchard fourteen years ago last spring, of very indifferent seedling trees, and on soil not of the best quality for fruit-growing. They received but little attention except being trimmed for the first ten years. The trees of the best and longest-

keeping variety, in the 13th year after they were transplanted, averaged an income of $3 50 per tree. I expect the crop of last year to pay as well. I know of several isolated full-grown apple trees that yield an annual income of from $16 to $20 per tree.

I am of the opinion that we cannot raise cheaper food than apples for the fattening of swine, horses, and cattle—particularly the former. It has been found, by analysis, that the apple contains as much nutritious matter, weight for weight, as the potato; and certain varieties of sweet apples, I think, contain as much per bushel as the potato, if not more. It also saves the expense of cooking, as the potato would be of little value without the cooking. It is idle to think of making pork from potatoes on the score of profit, as long as they are affected by the rot, (with the exception of those too small for table use, and those partially affected with the disease,) as the average price for the last few years has been about 50 cents per bushel, while the pork they would make would probably not bring half that sum.

I would recommend the planting of the following varieties of sweet apples for the purpose of feeding stock, viz: Early Sweet Bough, Golden Sweet, Brown Sweet, Russeting, and Talman Sweeting. They are, all of them, great bearers, and all come into bearing early—the Bough commencing to ripen in July, and is succeeded by the others in rotation, affording a supply of food for nine or ten months of the year. It is highly probable that the same acre of land could not be made to produce so much food of any other description as the before-mentioned apples, while the same ground can be cultivated to corn, or other grain, potatoes or other roots, if desired. Besides the fattening of swine, they are good to feed to store hogs, excellent to recruit horses, and when fed in regular and not too large quantities to milch cows, it increases their quantity of milk. It is often the pride and boast of the farmer that he belongs to the most independent class in society; that he can raise almost all that he wants to eat, drink, or wear; that he is not as dependent on others as others are upon him; which is probably true, to a very considerable extent. Hence we see farmers generally pursuing a diversified business—something at the dairy business, something at wheat and other grain-growing, fruit-growing, &c.; whether their particular farms, locality, or climate are adapted to the particular business or not, or whether it is a remunerating crop. It may be a question of political economy whether that sort of independence, or system, had better be pursued. For instance, suppose wheat, with us, is a crop that does not pay the expense of growing, while fruit is a sure and remunerating article of production; would it not be better to supply a more favorable wheat producing region of the West, and not well adapted to fruit-growing, with our fruit, and receive their wheat in exchange? Each look to the other for a market for its surplus articles, while the facilities for a quick and cheap transit are constantly increasing, by the improvement of natural water-courses and the multiplication of railroads.

Respectfully, yours,

A. H. BARTON.

To the Commissioner of Patents.

Victor, Ontario County, N. Y.,
December, 1852.

Sir: In answer to the interrogations contained in the Circular that you sent me in August last, I would beg leave to say, that in regard to wheat, guano is not, to my knowledge, used in the production of this crop. If it were accessible, and could be afforded at moderate prices, we should most probably give it a trial. Almost the only manures that we use are red clover, ploughed under, and gypsum. We sow about 8 pounds of clover seed and 1 bushel of plaster to the acre. Now, if we reckon clover seed at $6 a bushel, (which is about an average price) and plaster at $3 a ton, the cost of these manures is not quite $1 per acre, and yet they are, upon most soils, worth twenty loads of barn-yard manure. Plaster alone, at the rate of 1 or 2 bushels per acre, is an excellent manure for wheat. I think that upon my soil it will generally increase the yield from 5 to 10 bushels per acre. The average product per acre is, upon well-prepared summer fallows, at least 25 bushels. They who sow after spring crops, generally get from 5 to 10 bushels of inferior wheat per acre; all over that amount is eaten up by Hessian flies and weevils, though in some rare cases it may do some better. Our time of seeding is from the 20th of August to the 25th of September. Our time of harvesting is generally from the 15th of July to the 1st of August: we are getting in the way of cutting wheat a considerable earlier than formerly. We used to wait until the berry had become quite hard: by that means we lost a great deal by shelling; the bran became thick and discolored, and the straw was almost worthless. We have within a few years adopted the plan of cutting while the berry is yet considerably soft. When wheat is cut in that state, the heads will not break off, nor shell in handling; the bran will be white and thin, and the straw is quite useful for fodder. And when wheat is cut pretty green it will weigh heavier, and sell higher, than when it is allowed to stand until it is dead-ripe. Among the many improvements in farming implements, I would notice the grain-reaper: that implement is truly a useful invention; it comes to our aid when help is the most needed. One man, three horses, and a boy, will easily cut 14 acres in a day. This implement lays the grain in gairls, instead of swaths; it thereby lessens the work of binding (as compared with the cradle) at least one-third. It cuts and gathers grain a great deal cleaner than the cradle: this fact I am sensible of, for I cut this year a part of my grain with the reaper, and a part with the cradle, and easily saw the difference. Another implement—new, at least, with the American farmer—is the grain drill. The plan of drilling in grain, although new, has already come into general use; it saves the tiresome drudgery of sowing by hand, and it distributes the grain even and covers it all to a uniform depth. In grain that is put in with the drill, there are no thin spots to grow up with weeds, or thick ones to smother or blight; and from the fact that it covers the seed to a uniform depth, it is thought that 5 pecks of seed put in with the drill, is as good as 6 pecks sown broadcast. Summer fallows, to be sown with wheat, are generally ploughed in June, so as to turn under the red clover while it is in bloom; it is then harrowed down and lies until August, when it is worked over two or three times with the two-wheeled cultivator. This plan is new, and thought to be a great deal better than our former plan of cross-ploughing. By this plan we do not bring again to the surface the unrotted clover and

other grasses, that we at the first time of ploughing had turned under. The two-wheeled cultivator is an entire new implement, and it gives good satisfaction; it brings the soil to a fine tilth, and prepares it for the seed with much less team work than the plough. We plough from 7 to 8 inches deep. Upon a wheat fallow it would not do to turn under whatever there may be of good, rich soil, and cover it to any depth with a cold and barren subsoil. Seeds of every kind vegetate a great deal better in a warm surface soil than in a subsoil; and a subsoil, when it is exposed, freezes a great deal the hardest; therefore wheat, to grow well and stand the winter, requires that the richest part of the soil be kept upon the surface. It is often, however, necessary upon soils that are underlaid with a close, impenetrable hard-pan to loosen and mellow up the subsoil. The subsoil plough is calculated so as to follow in the track of the plough and break up the subsoil, without leaving it upon the surface. This new implement is oftentimes of very great utility: it has not, however, as yet come into general use. The most approved rotation with us, is to sow wheat upon the same lands but once in three years. The first year of the rotation, I sow wheat; the second, I sow clover seed in March; in July cut the wheat; and the third year I mow the clover for hay or for seed, or use the land for pasture. This system of rotation gives us in three years, and by once working the land, a first-rate crop of wheat, and a good crop of hay or clover seed. The best remedy for Hessian flies is to keep the soil very rich, and sow a moderate quantity of seed. I have never, as yet, seen a healthy and vigorous growth of wheat that was injured by Hessian flies; but they generally commit their ravages upon that which is sown out of season, or upon poor, half-prepared fallows.

An insect that we call the weevil has within three or four years made its appearance among us: it is a very small, red, egg-like insect; it makes its appearance when the berry is first forming; it finds its way to the berry, and seems to destroy it by perforating it and feeding upon its sap. It seems to be the most destructive to late wheat: we are trying to escape its ravages by early sowing.

The greatest difficulty that many of us have to encounter in growing wheat, is its liability to winter-kill: the severe west winds of winter are apt to drive away the snow and leave the wheat bare, when it freezes to death. The best preventive of this difficulty is to keep your lands very rich; for it is well known that manure will enable it, if well applied, to withstand almost any degree of cold. The average price per bushel, for the last year, has been $1.

Corn.—Guano is not, to my knowledge, used in the production of this crop; the only manures with us are stable and barn-yard manures ploughed under, and plaster or ashes applied as top-dressing.

The average product per acre is about 35 bushels. The cost of production per bushel, exclusive of land rent and manure, is about fifteen cents.

The best system of culture is to select a piece of gravelly or sandy soil, and manure it heavily with well-rotted stable or barn-yard manure. After spreading the manure, plough the ground as early in the season as possible; harrow it fine, and mark it for rows three and a half feet apart; be very careful to make the rows both ways, and make them very straight. Plant six or seven grains to the hill; when your corn is up sufficiently to enable you to follow the rows, put on your plaster or ashes, and go through it with your corn cultivator, or corn plough; and let a hand follow with a hoe, to uncover such hills as may get covered by the plough. The old plan of making large hills of earth around the corn is not much practised at present. The most material requisites in the production of a good crop of corn, are a good *soil*, generous culture with the plough, and a good *season*.

To prevent birds and squirrels from pulling corn, take some shelled corn and first roll it in grease, then roll it in arsenic, and leave it where they have been at work. When one of these depredators has eaten of the poison he will immediately alarm his whole kindred; and the consequence is, that they at once leave the field.

Oats, Barley, Rye, Peas, and Beans.—

An average crop	of oats is 38	bushels;	of seed,	2½	bushels.
Do.	of barley 21	do.		3	do.
Do.	of rye 15	do.		1½	do.
Do.	of peas 20	do.		3	do.
Do.	of beans 15	do.		½	do.

Peas are thought to be the least exhausting crop; but they are not, to my knowledge, cultivated as a renovating crop.

Clover and Grasses.—Upon dry lands, clover is generally sown at the rate of eight or ten pounds per acre. The best fertilizer for clover is gypsum, sown at the rate of two bushels per acre. Clover meadows will generally produce one and a half ton to the acre. Low or damp lands are generally sown with Timothy or red-top, at the rate of eight or nine quarts per acre. The best fertilizers for such grasses are ashes or lime; they should be sown at the rate of four or five bushels per acre. This kind of meadow will generally produce from two to two and a half tons of hay to the acre. In this connexion I would notice a new implement of husbandry—*the grass-mower*. This machine and the grain reaper have been combined in one implement; it can be bought for $125. With this machine a man and two horses will mow in first-rate style twelve or fifteen acres of grass in a day. A few of these grass-mowers have been used in this vicinity, and they have given the very best satisfaction. "Is clover hay injurious to horses?" In answer, I must say that I have no reason to think that clover that is cut at the proper season, and well cured before housing, is at all injurious to any animal; and with a plenty of oats with it, I have known horses to get fat.

Fruit Culture.—The cultivation of fruit is receiving increased attention in this part of the country: this is the effect of an increasing demand for good fruit in our rapidly-growing cities and villages. There is no fear of the markets being overstocked with choice fruit for a long time to come. There are some orchards in our vicinity that have, with extra care, produced fruit to the amount of $50 per acre.

An orchard, in order to produce well, should be set upon a deep, rich soil. The ground in a bearing orchard, in the spring of the year, should be covered with straw, to prevent it getting too dry to sustain the fruit; and it is best not to crop an orchard oftener than once in four or five years. It will pay well, in an orchard of valuable fruit, to plough the land and harrow it fine, and leave it without sowing. In answer to the question, "Do you know any preventive for the blight in pear and apple trees?" I would say, that the disease here known as the blight seems to be be

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effect of a very hot sun upon a quick and tender growth of wood, before t has become sufficiently matured to withstand the heat. Such trees as have been stimulated to a rapid growth, either by severe pruning or a too liberal use of manure, are very liable to this complaint.

I have about fifty young pear trees that have commenced bearing, which have heretofore exhibited strong symptoms of this disease. I have checked it by heading them low and thick, and staking them, so as to turn their heads to the south; by this means the bark upon the bodies and large branches has been protected from the rays of the sun, and the trees saved.

In regard to transplanting, budding, &c., I would beg leave to revise my remarks as published in the Patent Office Report for 1850–'51, at page 430.

Transplanting.—Land that is intended for an orchard should be ploughed very deep or subsoiled: it should be ploughed late in the fall, or early the next spring. When your land is entirely ready, get your trees, and set them the same day that they are dug, if you can. Do not buy trees that have been dug some time, and especially such as have been dug over winter, and lain in heaps "by the heel." Trees that have been treated in this way may, indeed, live, but you lose the growth of them for the first year; whereas, by good management, transplanting will scarcely put them back at all. I have often had peach trees that grew four feet the first season. In taking up trees to transplant, great care should be taken. I have seen trees most horribly mangled by pulling and twisting to get them up, when a very little careful digging would have saved them. Apple trees should not be set less than forty feet apart. Holes should be dug of sufficient width and depth to extend the roots to their full capacity. When the trees are placed in the holes, spread out the lower roots and cover them with fine earth; then spread out another layer of roots, and cover them as before; and so continue until the roots are all got under. The practice of thrusting the roots of a tree into a hole, all in a heap, then piling on hard earth, manure, &c., and stamping it down hard, is sometimes successful, but no scientific cultivator would recommend it. The season after trees are set, the ground around them should, every two or three weeks, be stirred with the hoe; and if great drought should prevail, they should be watered. This should be done by making holes around them with a stick, then pouring on a pail of water.

Budding.—Plum and cherry trees should be budded in the latter part of July or the 1st of August. All other trees should be budded in the month of September. They should be budded late enough, so that they may not grow the same season. The plan of operation is to select a shoot of the present season, with good buds, and cut off each leaf within half an inch of the leaf-stalk; then hold the shoot in the left hand and the knife in the right, the lower part of the blade resting on the shoot, about half an inch above the bud, the thumb of the right hand resting on the shoot, at the lower extremity of the bark to be removed with the bud; the knife is then drawn towards you, parallel with the shoot, smooth and level, so that the bark and a small portion of the wood may be taken off. The stock to be budded should be of the previous year's growth. A T should be made in the bark with the knife, and the bark raised with some convenient instrument; the bud is then inserted, and the bark is

brought back and tied down over the bud, letting the leaf-stalk project out of the seam in the bark.

Grafting is performed in the spring. The last of March is the proper time for plums and cherries, and April for all others. The operation is simple, and consists in cutting off the stock at the point where we wish to insert the scion, and splitting the stock, if small, down the centre; and if large, splitting the bark down the sides. The scion is cut at its lower end in the form of a wedge, and inserted in the split in the bark; the inside bark of the scion should fit nicely the bark on the stock. Our men who practise grafting in old orchards are getting into the way of grafting into very large limbs; they very often graft limbs that are four inches in diameter: they saw off such limbs, and set the scions around in the bark, about three inches apart. I have seen some that had been worked in this way, and I am of the opinion that it will be a very great improvement. The advantages are, that you can greatly reduce the height of large trees by cutting the large limbs, and getting the new top down near the body of the tree. Some that were worked in this way some ten years ago, near this place, have done well—their heads are the finest, for old grafted trees, of any that I ever saw. We use for grafting a salve made of one pound of beeswax, six of rosin, melted with one pint of linseed oil. This salve is used to cover the seams made in the operation, so as to render the whole air-tight. The salve should be looked to occasionally, and kept smooth and tight on the seams, for it sometimes gets open and lets in the air, which will destroy the scion.

Grape Culture is, in this vicinity, confined to the raising of a few vines in gardens for family use. I am not aware that there has been any attempt made at making wine. It is generally agreed that native grapes do extremely well here—they produce most abundantly. I have seen four bushels of Isabellas upon a single vine. There are several varieties of native grapes cultivated here; the Catawba and the Isabella are considered the best. Ground that is to be set with grapes should be trenched to the depth of three feet, and the trench should be filled with various kinds of earths and manures; the vines should be set at least eight feet apart. A trellis for each vine should be made; it should be eight feet wide, and the same in height; beyond which limits it should not be allowed to extend. Every vine, upon such a trellis, should be trained so as to have about eight main shoots. All new shoots should be annually cut off, in the month of November.

Forest Culture.—The Commissioner of Patents could not, in my opinion, have suggested a more important inquiry than that of forest culture. Our forest lands are failing rapidly. Fire-wood in this part of the country has, within the last ten years, risen from $1 50 to $2 50 per cord. It is selling in our nearest cities for $4 50 per cord. In our rich grain-growing county we have reserved but a small supply of forest land, and we have been in the habit, for the last thirty years, of using it for pasturage. By this means almost every young shoot has been annually destroyed. In passing over such forests, they appear to be almost destitute of young trees, and swarded over with grass. It is very easy to see that a piece of wood-land will fail for timber entirely, if there is no young timber allowed to grow. Our plan of forest culture may not entirely rob the present generation of fire-wood; but it will be sure to send our posterity to the Lackawanna or to the Rocky mountains for fuel.

There is another bad practice with us in managing our wood-lands; and that is, we cut large trees promiscuously over a wood-lot. In felling, working up, and drawing away a large tree, we must unavoidably destroy a large amount of young timber. I am fully of the opinion that it is better to cut timber on a wood-lot as clean as you can, than to cut in every part of the lot, and so haggle it all over. There might be some advantage in taking out such trees as had begun to decay, if it were not for the liability to destroy the young timber; but the loss of young trees is a greater evil than the loss of a few scattering old ones. If you cut clean as you go, you give the young growth a chance to start all together, and it is not overshadowed by trees of a larger growth. Forest trees make the most rapid growth while they are young; probably before they are forty or fifty years old. I have seen a great number of young groves of forest trees of a second growth; they would, in my opinion, at the age of forty years produce fifty cords of wood. A family would consume of fire-wood about ten cords a year. An acre of fifty cords would last five years, and eight acres would last forty years. Every family should have at least eight acres of good forest land; it should be well fenced against cattle and sheep. Then begin on the back end, and cut all as you go. Time your cutting so as to get over your lot in forty years. An acre of land will produce, if managed right, one and a quarter cord of wood in a year. That sold at $3 a cord would yield but a small profit; but there is every prospect that in time, timber of every kind will sell dearer by far than it now does.

Manures.—For my views in regard to the best plan of saving manures, see Patent Office Report for 1850–'51, at page 431.

Very respectfully, yours,

GERSHOM WIBORN.

To the Commissioner of Patents.

Big Flat, N. Y., *November* 6, 1852.

Sir: I received an Agricultural Circular from your department a few days ago. So far as I am able to contribute anything that will be useful, I will cheerfully do it, as I regard the Report of the Commissioner of great importance to the agricultural community.

In the first place, I cultivate an alluvial soil, situated on river flats; consequently my experience will be mostly confined to that.

I regard it as of great importance to the farmer to have a rotation of crops in a regular system. My first crop after clover is corn. I plough up well and thoroughly, with three horses, about 10 inches deep. I then plant my corn in hills about 3 feet apart; use as manure in the hill, plaster and ashes mixed together, and drop the corn on it. Then, after it comes up, plaster alone, once. Then cultivate thoroughly by keeping the weeds down and moving the ground often—keeping it loose and free to absorb the dews, particularly when it is dry. The yield is from 70 to 75 bushels to the acre; and the price in this market is 63 cents per bushel.

The spring following I sow barley or oats on the corn stubble. By proper cultivation, without any manure, the yield is 40 bushels of barley and 60 bushels of oats per acre. The price in this market for oats is 37½ cents; for barley, 62½ cents; and always ready sale.

In the fall I sow with wheat on the stubble; and in the spring following sow with red clover—the large kind on the wheat ground, which I pasture for one year—or two is preferable—before ploughing up again, to pursue the same system as before mentioned. Wheat is worth $1 per bushel.

I keep mostly cows to eat my pasture, except what my teams eat. Average yield of butter per cow, during eight months of the season, is 200 pounds; price this year, from 20 to 25 cents per pound.

Neat Cattle.—I keep none, as I think they are not profitable on lands worth $50 per acre, as long as there is so much cheap land near market which is worth just as much to keep cattle on.

Hay.—Timothy grass is the best in this latitude. My experience does not show that clover is injurious to horses; but, on the contrary, is good for pasture, and, if properly got and cured, also for hay.

Rearing horses and mules is undoubtedly profitable, for it costs no more to rear a horse until he is four years old, than it does a steer; and then he is worth four steers, on an average.

Sheep are not profitable on low, flat lands; but do better on the hills that surround them.

Tobacco.—It is now reduced to certainty that this crop is well adapted to the river flats in this region of country. Any information with regard to the culture, curing, and management of this crop, would be thankfully received by the farmers here.

Roots, potatoes, beets, carrots, and turnips, of all kinds, do well here, and yield a good profit to those who cultivate them.

Manures.—Guano is not used here, as other manures are plenty, and cost less. Lime would be good for the land here, as well as on all alluvial soils, but it costs too much to use it as a manure. Plaster is extensively used on grass of all kinds, in particular. Price here at the mills, $4 50 per ton.

Fruit.—Apples grow well here, and are paying well those who cultivate them. I consider them good food for hogs, if cooked; and would here remark, that all food for hogs, if cooked, is worth 50 per cent. more, from the fact that a hog does not masticate his food very well; consequently, his digestive organs do not extract the nutriment from it; and grain should be ground for all animals—it richly repays for the trouble.

I would here say, that the system I have pursued in regard to rotation of crops has increased the yield of my crops steadily, from year to year, for the last eight years; consequently I can speak with confidence of the method. I take care of all the manure that is naturally made on the farm; but buy none but plaster and ashes.

If anything I have said will be of any use, I shall be happy to think I made the effort; and if not, I shall be satisfied, hoping that others will be actuated by the same spirit, the advancement of the greatest interest of the American people—agriculture.

Yours, respectfully,

JOHN HAGGERTY

To the Commissioner of Patents.

SCOTTSBURG, SPARTA, LIVINGSTON CO., N. Y.,
November 27, 1852.

SIR: Having received your Circular, and feeling an interest in anything that tends to enlighten the cultivators of the soil, I proceed to give you what little information my limited experience may have produced.

Wheat.—The average product of wheat per acre varies with soil and culture, but I think a rough estimate will set the average at from 12 to 20 bushels per acre. Time of sowing, from first to the last day of September—about the middle. I think the best time of harvest from the 20th of July to the 10th of August, according to time of sowing and location of soil. No particular preparation of seed, more than cleaning from foul stuff; quantity per acre, from a bushel and a peck to a bushel and a half. I prefer a bushel and a half to the acre. Farmers usually plough twice, various depths—from four to eight inches. Yield increasing. Price has ranged from 87½ cents to one dollar per bushel. Sow clover and Timothy for meadows—clover for pasture; sow in the spring.

Corn.—So little raised, and product so uncertain, that it is difficult making an estimate. I prefer grinding corn for feeding; and for hogs, scalding the meal.

Oats.—The yield varies from 20 to 50 bushels per acre. Our best wheat lands will not produce oats very bountifully, without being well manured; our swampy grounds, that have been ditched and made dry, bearing much the heaviest oats, though usually the grains are not so heavy and plump as on high ground. Sow from two to three bushels per acre.

Barley requires loose, rich ground, and on such usually pays well; produce, from 20 to 30 bushels per acre; seed, from 2 to 3 bushels.

Rye, scarcely any sown. *Peas,* very few. *Beans,* as a field crop, not usually planted. I have planted in drills, the way I prefer. The yield varies much with ground and season; I consider 12 or 15 bushels the acre a tolerable yield, although more may be grown. Sowing in drills requires from two to four bushels per acre, according to thickness.

Clover and Grasses.—The yield of hay varies, like everything else, according to soil and season, from 1 to 3 tons per acre—average, about 1½ ton per acre. Plaster is used on meadows with decided advantage, about one hundred pounds to the acre; clover and Timothy, about eight pounds clover-seed to four of Timothy seed the acre. Hay, when made in barn or stack, is generally worth from $5 to $10—average, about $7.

Dairy.—The average yield of butter per cow depends much upon breed and keep. I consider six pounds per week for six months a good yield, although individual cows, with more than common keep, do much better. Butter has ranged from twelve and a half to twenty cents at our nearest markets.

Neat Cattle.—Young cattle, unless kept mostly on straw, will consume more, at a fair market value, than they will bring at three years old; yet I consider it better economy for farmers to raise stock to consume the produce of their farms, than sell it off, even if the stock does not net them anything. Average value of three-year old steers and heifers, about $20. Good dairy cows—that is, the average that farmers keep—sell for about $20 in spring, and $12 to $15 in fall.

Horses.—I consider the growing of horses profitable. I think a colt can be raised, simply considering the amount he will eat after weaned till three years old, for but little more than a steer, and will sell for three times as much.

Sheep and Wool.—I consider wool-growing, where a farmer is prepared for it, decidedly profitable. Good-sized Merino sheep I think, taking all things into account, the most profitable. A pound of good Merino wool can be grown for about the same as our common coarse wool, and is worth nearly twice as much in market. Where a farmer is prepared for raising sheep, and takes care of them, he can raise ninety out of every hundred lambs dropped in his flock. But understand me when I say *prepared;* I mean, he must have plenty of grass and good hay, and good sheds, and must keep up his bucks and take good care of his sheep, and must take care of them himself.

Hogs.—The raising of hogs, any more than will consume the wash of the kitchen and coarse food, with a little grain to finish off, is a losing business at the present price of grain.

Potatoes.—Irish, average yield about one hundred bushels to the acre; but this season, on good land, they have doubled that amount. The best kinds with me are pale reds—some call them Sardinia reds. Potatoes have rotted so for a few years past, that few farmers planted more than a few in the garden, and potatoes sold last spring for $1 per bushel for seed. This season they have not rotted, to speak of, and sell for about 30 cents.

Fruit culture is receiving increased attention, both by setting out trees and grafting old ones. I think it may be made a very profitable crop, decidedly. More worth of first-rate fruit can be grown on an acre than there can be of any kind of grain. I consider good apples worth as much for feeding hogs or cattle as potatoes; and more, if both are in the raw state. (The value of potatoes is materially increased by cooking.) Northern Spy, Swaar, Roxbury Russet, and Newtown Pippin, seem to be considered the best long-keepers in this section. It seems strange, when we consider the many ways that apples can be used profitably, that farmers do not raise more; but apple trees require care and attention to do well, and this a great many do not understand. Many seem to think they require as little care as the trees in the woods; and with such, apple-trees are not very profitable. The many ways they contribute to the comforts of the kitchen, gives them a decided prominence in my estimation.

Thus, sir, I have given you a hasty sketch of my notions on some of your queries; of many of them I am wholly unable to say anything interesting, and therefore have omitted them altogether. I think your inquiries should have extended to soil nearest market, railroad, or water communication, and in this way affording a history of the country, including price of lands, &c. This would give those wishing to change location a good chance for choosing a place to suit.

COLLINS GARDNER.

To the COMMISSIONER OF PATENTS.

CLINTONDALE, ULSTER COUNTY, N. Y.,
December 15, 1852.

SIR: A Circular from you has been received, and I proceed to reply as follows:

Wheat.—This crop in the early settlement of Ulster county was considered the safest and most remunerating of all the grains then raised on the newly cultivated lands. But a continued cultivation, without any regard to rotation, in process of time exhausted some of the elements necessary to its production, and introduced to us an increased number of insects, which, by nature, appear to acquire their life and growth almost solely from the wheat plant. From these discouraging causes, the farmers, after many years of fruitless toil, were compelled in a great measure to abandon the cultivation of this favorite grain, except in isolated cases, and on highly fertilized soil. The cultivation of rye was substituted, and for many years was considered the staple crop of this county.

For the past ten years, the cultivation of wheat has gradually increased, and at present, in its turn, bids fair to supersede rye. Now, the cause of this change may, to some extent, be accounted for by a reproduction of the elements necessary to its growth during the time it was withheld from occupying the soil, and also a corresponding decrease of insects from a lack of food to subsist on during that period. Be that as it may, we farmers of Ulster hail the return of the wheat crop with feelings of gratitude.

I believe the average production of wheat to the acre in this county to be about 20 bushels, and annually increasing. In some instances 40 bushels and over have been produced from the acre, but these instances are rare. The seed is generally sown without preparation, at the rate of from 1½ to 2½ bushels to the acre, from the 1st to the 20th of September, on fallow ground, with twice ploughing, or immediately succeeding a crop of oats; in the latter case, after manuring. This system of rotation in crops varies with us; but most generally a crop of grass is succeeded by Indian corn, followed the next season by oats; the ground is then manured and sown with wheat or rye, and seeded down with grass. The season for harvesting our wheat is from the 10th to the 20th of July. Various trials and experiments have been resorted to in order to remedy the evils of the Hessian fly, but so far without effecting any worthy of consideration. The manures chiefly used for fertilizing our land are barnyard and stable manures. Lime, plaster, ashes, hen and hog manures, and muck, are all applied to lands when obtainable. The subject of renovating our soils after a rotation of exhausting crops is claiming the attention of our farmers more than formerly, and manures and stimulants are sought after and applied to our lands whenever practicable. Guano is not yet brought into general use in this county, except in gardening and horticultural operations. I applied Peruvian guano to a part of my wheat, sown this fall as an experiment, at the rate of 250 pounds to the acre, sown broadcast, and immediately covered; the increased growth and vigorous appearance of the wheat plant where the guano has been applied, over that manured with other fertilizers, augurs very favorably for the guano. Another year I may be enabled to give you the particulars of the experiment in profit and loss. The average price of wheat at our landings along the Hudson river is about $1 12½, ranging

from $1 to $1 25, controlled by the demand for wheat-flour in New York.

Corn.—This crop is extensively cultivated in this county, and is considered the most remunerating at present. It seldom fails with us to produce a fair yield, except in seasons when the *larvæ* of a beetle are prevalent in our lands. When these *grubs* prevail to a considerable extent, neither good husbandry nor high manuring can secure us a crop; and perhaps no other county has for the past twenty years suffered more loss from this source than Ulster. This formidable enemy to agriculture appears gradually to be leaving us, in all probability to appear in some other place, and there to renew the same destructive process practised on us. In order to give this *beetle* a slight introduction to whom it may concern, I will give a brief description of its general appearance and habits. The bug or beetle is about three-fourths of an inch in length, of a dark brown color, and may be seen in large numbers flying through the air, in the early part of the evening, about the last of April or first of May. They deposite their eggs generally in the month of June, on grass land, on soil that is light or loamy. The larva is hatched from the egg during the month of August, and feeds upon the roots of vegetables until the ground becomes frozen; it then descends below the frost, and there remains in a state of torpidity until the following spring. As the frost leaves the ground it ascends to the surface, (exhibiting no increase of growth during the winter,) and again resumes its former mode of living, carefully secluded from the rays of the sun; feeding on the roots of almost all kinds of grasses and vegetables. Its movements are slow and sluggish; its color nearly white, with the exception of the head, which is red; it has six legs, three on each side; it is at this age about one inch in length. It continues its destruction of all green vegetable matter with which it may come in contact, until the ground becomes frozen again. This is its most destructive season through its progress of change. As the ground becomes frozen, it again descends below the frost, (in some instances six feet below the surface,) as before; remains torpid until the next spring, when it again appears at the surface, being now about 1¼ inch in length. It continues to feed as usual on vegetable substances until about the middle of June, when it ceases to feed, descends deeper in the earth, and becomes torpid until about the middle of August, when a complete change occurs. It opens lengthwise from the head, back near one-half its length, and forthwith appears in the chrysalis state, in which it remains nearly inactive until about the last of September, when it changes into a perfect state or beetle, and still remains in a nearly torpid state until the following spring, when, about the last of April, it ascends to the surface and immediately commences to reproduce its species.

It has thus far baffled the ingenuity of man to prevent its ravages. Whole fields of Timothy have, within a few weeks, been entirely destroyed by this grub; and thousands of acres of corn have been totally lost in this county by its ravages.

The white and yellow flint corn are usually planted by us—most generally on land that has been lying under clover for the two years previous, when manure is applied, and the ground ploughed early in May, generally about 6 inches deep, made level with a harrow, and marked out in squares for planting, about 3 feet each way. We plant usually from the 5th to the 25th of May, and cultivate with the plough, hoe, and

cultivator: (some crops of corn have been successfully produced by planting in rows, but not considered as safe.) We cut and shock our corn from the 10th to the 20th of September; shocks containing from forty to sixty hills. It remains thus secured until the middle of October, when it is gathered and housed; generally yielding from 25 to 50 bushels of corn to the acre, and occasionally from 50 to 100. This crop is more remunerating than all others, from the value of the stalks as food for stock.

I have used guano as a manure for some of my corn the past season, and, probably from my ignorance in applying it, received no benefit. I applied about one teaspoonful (as directed by some of my books on agriculture) to each hill, and covered it immediately with the soil, a gravelly loam. In a few days my corn received a fine rain, and the corn to which the guano was applied then appeared more vigorous than other parts of the lot. The corn at the time of applying the guano was about two feet high. This rain was succeeded by a protracted drought, which continued until the ears had acquired their full size. At this time, my corn experimented on with guano (as, indeed, all my corn manured in the hill) turned a pale color, lost its vigor, and filled out the ears very indifferently. I shall experiment further with this fertilizer next season. I believe the safest way of applying manure for corn, is spreading it broadcast over the land. The nature of the corn-plant is such that it draws the greatest amount of nourishment from the soil quite remote from the hill. In bestowing my attention to the corn-plant, I find the centre, or tap-root ceases to afford nourishment to the plant after six weeks old, when the growth is sustained (as far as vegetable and mineral elements are concerned) from roots extending far away from the hill, and beyond the possibility of assimilating any great amount of the manure placed at, or immediately surrounding, the plant. Hence the sudden transition from a bounteous supply of nutriment afforded by the tap-root, to a meagre supply, by the horizontal roots in the adjacent impoverished soil, affects, materially, the vigor of the plant at a time when it requires the greatest assistance; and the consequence is, a fair growth of stalk and a light yield of corn.

The cost of producing corn with us varies according to the value of the land, and its productiveness agreeably with my farm book. I find my experience in producing a crop of corn, averaging 40 bushels to the acre, was about 40 cents to the bushel, including interest on land, at $50 per acre. The price of corn, at our nearest market, will average about 55 cents per bushel.

In answer to your query respecting the value of manure made from feeding 10 bushels of corn to hogs, as a fertilizer for a corn crop, I have no data on which I can rely. I will, however, make an estimate that will very nearly approximate the truth. A full-grown hog, enclosed in a yard, will be about eighty days in consuming 10 bushels of corn, with no other drink but water. The whole area of the yard should be under cover, and secured from draining. One load of muck should be placed in the yard in such a manner as to receive and absorb all the droppings, liquid and solid; which, in ten days, should be removed in a heap, under cover, and a like quantity placed in the yard. This, at the expiration of the next ten days, should also be removed to the heap. This process continued until 8 loads of muck (which will embrace the time of feeding)

shall have been saturated with droppings of the hog. This compost, properly attended to, will, in a short time, undergo a slight fermentation, when it should be applied to the land and immediately covered. This will manure the one-half of an acre sufficiently to produce 10 bushels more corn than the adjoining half acre, not manured. I am convinced, from experience, that the value of the manure produced from a hog, when properly cared for, will be equivalent to the cost of the food.

Oats.—This crop is cultivated quite extensively in this county, and is considered to be a remunerating one; in our system of rotation, this crop follows corn. It is generally sown as early in the season as the ground will permit, at the rate of from 2 to 3 bushels to the acre; the ordinary yield about 40 bushels, although in some instances from 80 to 90 have been harvested from the acre. It is an exhausting crop; but the early returns it affords us for our labor, and its convenience as a food for almost all kinds of stock, induce our farmers to produce it quite extensively.

Barley.—Very little of this grain is raised in this county; it does not, generally, on our soil, afford so profitable a return as oats; therefore, it is not cultivated.

Peas and Beans.—These are seldom raised in this county beyond family consumption. Peas are considered rather a renovating crop.

Rye.—This grain is adapted to all our soils, and affords a good return for the labor bestowed in producing it. In our rotation of crops it generally follows oats, and is succeeded by seeding with grass. We sow about 1½ bushel to the acre, and the yield varies from 12 to 35, and in some instances more; it probably would average about 16 bushels. The great demand in the New York market for rye-straw the present season (being from $1 to $1 12½ per cwt., pressed,) will induce a greater area of ground to be sown with rye than usual. Rye is generally worth, in our nearest markets, about 62½ cents per bushel; at present it is worth 90 cents. The present high prices paid for rye and straw will make it a more remunerating crop to the farmer than wheat, and consequently will be more generally sown.

Clover and Grasses.—The extraordinary increased demand the present season for hay, will produce a change in the routine of farming in this county. Our location on the banks of the Hudson, and our convenient access to the city of New York, will induce our farmers to turn their attention more to the production of hay than heretofore. Clover has formerly been considered the most valuable grass for seeding, on account of the luxuriance of its growth and the fertilizing properties it contains. It affords an excellent pasture for stock, and is a good renovater of our soils. We generally sow about 12 pounds of seed to the acre. Timothy has also been considered by us a valuable grass, but not so good a fertilizer as clover, and has generally been sown for its value as pasture or hay. We generally sow about 4 quarts of seed to the acre; probably more seed could be applied to advantage. It is a question worthy of some consideration by our farmers, whether the cultivation of hay for market will not ultimately exhaust our soils without an increased application of manure. The best fertilizers we now apply to the production of hay are decomposed stable and barn-yard manure and ashes. Guano nor bone-dust has not been used for this purpose; and plaster, or

gypsum, as a stimulus, is used much less than formerly. From various experiments with plaster for the past fifteen years, I have been induced to abandon its use. Either our soils already contain a sufficient quantity, or some of the elements formerly valuable in the soil have disappeared. I believe the cost of producing hay will not vary much from $6 per ton.

Neat Cattle.—We have bred in this county, to some extent, several varieties of cattle. I am more particularly familiar with the Durhams, Devons, and natives, having bred no others. I believe the Durhams are most valuable for feeding, and will yield more beef in proportion to the feed given them than any other variety that I have fed. Good selections from native stock are probably as valuable for dairy purposes as any of the improved breeds. For working-cattle I think the Devons unsurpassed. The usual price of good dairy cows in the fall is $25, and in the spring about $35. The cost of raising a heifer until three years old would be about $20, and its worth in market would not much exceed that price. Steers are seldom raised in this county; and heifers should come in as milkers at two years old to pay their raising. The high price of veal in the New York market, and the value of our pastures for dairy purposes, render the raising of stock a losing operation.

Dairy.—Cheese is not made in this county to any extent. Our butter is packed in tubs containing from 12 to 25 pounds, and sold weekly in the New York market. The average price for the present season is about 22 cents per pound; and the sour milk is fed to pigs for early market. The average produce of butter per cow is about one hundred pounds; but if properly cared for, will double that quantity.

Hogs.—The most approved breeds of hogs we have are Berkshire and Suffolk, and their crosses—the former for heavy pork for barrelling, the latter to be taken to market at about six months old. The preference of breeds of hogs is generally determined by the locality or proximity to market. With us along the Hudson river, who cannot compete with the West in producing heavy pork, where grain is cheap, there is a preference for a breed of hogs that mature young. Our cheapest method of making pork is by feeding sour milk, apples, roots, bran, &c.; pork made by feeding grain is less profitable.

Sheep and Wool.—Sheep were formerly bred in this county quite extensively; but the value of our land for other agricultural purposes rendered wool growing an unprofitable business. At present but few sheep are kept here, and those principally for the purpose of furnishing the market with mutton and lambs. Very few but the coarser breeds are now kept.

Potatoes.—This crop was formerly considered one of the most profitable produced on our land; but since the *potato disease* has been prevalent, this crop has materially decreased, although a greater area has been planted the present season than for many years preceding, and the tubers are generally sound and healthy. Many varieties are raised by us without any decided preference. I have cultivated sweet potatoes successfully for several years, and have not found them inferior to those raised at the South. For these I use ashes as a manure, placed in the hill.

Fruit Culture.—The cultivation of fruit is receiving decided attention in this county. Much labor and expense are appropriated in producing the best varieties of fruits, grapes, and berries. These articles are now furnishing no inconsiderable commerce in this county.

Yours truly,

DAVID L. BERNARD.

To the COMMISSIONER OF PATENTS.

BYBERRY, PHILADELPHIA COUNTY,
January 13, 1853.

SIR: Having received one of your Circulars, soliciting agricultural information, I proceed to give some account of the crops and management of farm land in this vicinity.

The farms in this section are generally small, a majority containing less than 100 acres. The land is in a high state of cultivation, and sells for from $90 to $130 per acre.

The rotation of crops which is generally practised is, first, corn; then oats, wheat, and grass, three years.

Corn.—A Timothy sod is ploughed in the spring, five inches deep, rolled and harrowed; the corn dropped about the 1st of May in hills four feet apart each way; four grains in each hill. Some farmers prepare a compost during the winter and spring, of rich earth, manure, lime, and plaster, and place it on the hill at the time of planting. Others spread the manure broadcast upon the surface during the winter. The corn is worked principally with the cultivator and hoe; three stalks being left in each hill. During the latter part of September the corn is cut up at the roots, and placed in shocks of thirty-six hills, where it remains about one month, when it is husked and cribbed, and the fodder tied up in bundles and stacked near the cattle yards, to be fed during the winter. The stalks from an acre of corn, if properly cured, are equal in value to one ton of hay. The gourd-seed variety is generally planted, and the average product is about 50 bushels per acre; worth, this season, 65 cents per bushel.

Oats are sown after corn, as soon in the spring as the weather will permit, three bushels of seed per acre; and yielding an average crop of 50 bushels per acre. Occasionally much larger crops are raised. The price at present in Philadelphia market is 45 cents per bushel. Some farmers sow clover among oats, and put it down with wheat the following season—others plough the oats stubble; cart on the manure; plough second time; roll, harrow, and sow two bushels of seed per acre. In latter years guano has been used to considerable extent. About 400 pounds are generally sown broadcast, and ploughed in with the wheat; this quantity is considered equal in value to fifteen loads of barn-yard manure.

The Mediterranean *wheat* is universally sown, as it has been the least affected by the weevil, and yields, upon good ground, from 20 to 25 bushels per acre. It is worth, at present, $1 15 per bushel. Clover and Timothy seed are both sown with wheat.

The quantity of *hay* raised is from one to two and a half tons per acre. The clover is generally fed to stock, and the Timothy hauled to Philadelphia, where it is, at present, worth $23 per ton.

The *dairy* business is not very extensively carried on, though most

farmers make some butter to sell. A good cow will produce 200 pounds of butter yearly, worth 25 cents per pound. It is generally sold while fresh, in lumps of one pound each. The usual price of a good dairy cow, three years old, is $30.

Very few *sheep* are kept for their wool. The Southdowns are considered the most valuable. There are but few flocks of this kind in the county. A considerable number of common sheep are purchased from droves, and fattened during the fall and winter.

Hogs.—The best breeds are the Berkshire and Chester County. They are not much raised for market; but are usually kept to consume the offal about the farm. They usually weigh at one year old, if well fattened, 300 pounds. Pork is at present worth $8 25 per hundred pounds.

The cultivation of *root crops* appears to be increasing. The rutabaga or Swedish turnip is the most valuable for feeding stock, and, with proper cultivation, from 600 to 800 bushels may be grown upon an acre. Flat turnips are frequently grown amongst corn, producing from 200 to 400 bushels per acre. Beets, carrots, and parsnips are sometimes grown as field crops.

Potatoes are not very extensively cultivated. The early planted appear perfectly sound, while those that were planted late are more or less affected with the rot. The most esteemed variety is the Mercer, which finds the most ready sale in the market; producing, in a favorable season, 200 bushels per acre. The average price the present season has been 65 cents per bushel.

Manure.—As I have mentioned in a former communication, the main source of manure is the barn-yard, where the straw, corn-stalks, and refuse of all kinds, are collected. Some farmers feed cattle during the winter, which helps increase their stock of manure. Compost is often made of swamp-muck, loam, &c., mixed with lime, plaster, and salt. Lime is used in considerable quantities, and is generally applied on wheat stubble, at the rate of 40 bushels per acre. Plaster, or gypsum, is universally sown on clover fields, when the grass is four inches in height, with astonishing effects. It is a valuable agent in absorbing manures in the form of gases, and is used very profusely about manure heaps, cattle-yards, and stables. Guano is coming into use generally, and is used principally for wheat and turnips, and, even at present prices, is considered by many farmers the cheapest manure they can apply.

Respectfully,

JAMES THORNTON, Jr.

To the Commissioner of Patents.

Lower Heidelberg, Berks Co., Penn.,
December 20, 1852.

Sir: In responding to the interrogatories of your Agricultural Circular, handed to me by David L. Wenrich, esq., I submit the following suggestions:

The land of Berks county is generally of a good quality, the greater part being limestone clay, interspersed with tracts of a rich sandy soil; the northwestern part, however, consists chiefly of undulating ridges of gravel. I might say, with propriety, that it is nearly all susceptible of the highest state of cultivation.

Wheat and corn are the staple products of this section, and are the principal rewards for our labors; and, as a natural consequence, more elaborate efforts are made in contributing to the culture of these two products than any of the minor branches of husbandry. With these preliminaries, I will endeavor to give you a descriptive account of our present mode of culture, leaving to others better informed in agricultural matters a full discussion of the important inquiries you make.

Wheat.—There are many varieties of wheat grown in this section, some of which are designated by local names; but those most generally used are characterized as White-Blue-stem, Red-chaff, Mediterranean, and Blue-stem. The White-Blue-stem is an esteemed variety; it is a white wheat, with a round and plump grain, weighing from 62 to 66 pounds per bushel; it is rich in farinaceous qualities, yielding from 4 to 6 pounds of flour more per 60 pounds than the other varieties. The Red-chaff is a beardless wheat, with a white grain, and is much cultivated; though it is subject to early blight or mildew. The Mediterranean is generally preferred when it is desired to raise a second crop of wheat from the same land, as it requires but a moderately rich soil, and is not subject to the depredations committed by the fly.

Our general system of rotation is—first, corn, upon Timothy or clover sward, well turned, from 6 to 10 inches deep; second, oats, upon corn ground; third, wheat, upon oat stubble, well manured, the oats being very exhausting; fourth, either wheat or rye, with Timothy and clover. The land is prepared for wheat by two ploughings; the first we perform immediately after the oats have been removed, and the land well manured with common stable-manure. Guano has not been used in this county to my knowledge. The second ploughing is performed about the beginning of September, and in such a manner as to present a grooved or serrated appearance; the wheat is then sown broadcast, and the land harrowed, covering the seed from 2 to 3 inches. The patent drill, however, has been used extensively of late. Our average yield is about 18 bushels per acre; this is not exaggerated, as average yields generally are. The quantity of seed used per acre is from $1\frac{1}{2}$ to 2 bushels, nicely cleaned, without any other preparation. The time of harvesting this crop varies from the 4th to the 12th of July, as the season proves favorable to its growth. The average price at Reading, for 1852, is $1. The yield per acre is increasing.

Corn.—The yellow varieties are most generally cultivated, and are better adapted to the wants of our market than the red or purple varieties. The average yield is about 54 bushels per acre; though not unfrequently 80 to 100 bushels have been harvested by our best farmers. Experience shows that the land most prolific of the corn crop is a clover or Timothy sward that has been in grass for two or three successive years, having produced annually from $1\frac{1}{2}$ to 3 tons of hay per acre. This we plough, in the fall, to the depth of eight or ten inches; the latter requires the combined force of four strong horses in stiff clay. Fall ploughing is preferred, as the soil becomes more compact and susceptible of retaining a proper degree of moisture, and thus protects the corn from the

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scorching sun of July and August. By fall ploughing, also, ample time is secured for the decomposition of all vegetable matter ploughed under and contained in the soil, which furnishes indispensable nourishment to the healthy growth of young corn. We generally lime the corn ground at the rate of 100 bushels to the acre on limestone land, and about 60 on gravel, thoroughly mixed with the soil. In the spring, as soon as the ground is sufficiently dry, we give it a good dressing with the harrow and cultivator. About the 10th of May, (the usual time of planting,) the land is set off in furrows, leaving about 16 square feet to the hill; we then plant from 3 to 4 grains in each, and work with hoes and the cultivator till it has attained the height of 10 or 14 inches. It is then ploughed and dressed with hoes; after which the work is considered complete, notwithstanding the pulling off of suckers, if any should appear. Some work the crop during its growth only with hoes and the cultivator. Our method of feeding corn to fatting stock is, to have it ground; average price 65 cents.

Rye is principally sown for the utility of the straw, and is not so generally grown as it was some years past. Ordinary yield, 25 bushels; quantity sown, 1½ bushel per acre; price 75 cents.

Oats are grown extensively, and occupy a permanent place in our rotation of crops. This crop was unusually good this year, and the yield is above an average.

Among the varieties used is the Berks county oats, (so called from the circumstance that it was raised from a few grains, by one of our farmers,) which promises to displace most other varieties in the course of a few years; it comes to maturity one week earlier than the other kinds, and weighs from forty-four to forty-six pounds per bushel. A farmer in this vicinity sowed three bushels of this grain last spring, and obtained sixty bushels of cleaned oats; others have been equally successful. Ordinary yield of different varieties, forty bushels per acre; price thirty-five cents.

Peas and beans are not cultivated as a field-crop.

Clover and Grasses.—The quantity of hay cut per acre varies from one and a half to three tons, and a mixture of Timothy and clover is preferred. In laying down meadows, Timothy is commonly selected as the most efficient seed, and the quantity used from six to eight quarts to the acre. The best fertilizer is fine stable-manure, spread over the meadows in the fall.

Dairy Husbandry.—There is considerable attention paid to this branch of industry, though I cannot give any particulars in regard to it. The price of butter is from 12 to 20 cents.

Sheep and Wool.—Wool-growing was formerly a very lucrative business, but it has been nearly abandoned.

Potatoes.—The Irish only cultivated, as a field-crop. The varieties most profitable are the Mercer and Pink-eyed. Average yield about two hundred bushels, on a productive soil. This crop has been very full this year, and will amply compensate the husbandman for his labors. The rot, so destructive to this valuable artic e in our household economy, has not excited much attention this season, though it has made its appearance in a few localities. We know no remedy for this great evil.

Meteorology.—Our thermometrical registers present no interesting phenomena for the last season; the temperature of the atmosphere was ranging about the degrees common to localities in 40° 30′ north latitude.

Very truly, your obedient servant,

BENJAMIN SAYLOR.

To the Commissioner of Patents.

Columbia County, Pennsylvania,
December 18, 1852.

Sir: I received one of your Circulars, (agricultural.) I do a little at farming and feeding cattle. More pleasant food for the mind (setting apart that of the body) is produced by agriculture than by any other pursuit allotted to man. I could almost grow fat, dwelling on the bountiful productions of nature, directed by the art of man. I will pass over all your queries, believing that abler pens than mine will give you all the information that you desire, except as to turnips. I have raised from 400 to 500 bushels of fine turnips to the acre, for many years; I have sold as high as $100 worth from an acre, and had turnips left. If there is not ready sale, I feed them in winter with a little corn-meal; the effect I am pleased with. The turnip crop is almost clear gain. I take a sod that I intend for corn next year: after I have taken off my crop of hay, I turn the sod over as smooth as I can, then put a light coat of manure on the ploughed ground; after which, I give it a harrowing two or three times over, then let it rest a week or two, then cultivate it with a stout cultivator, and as often as the grass appears. I give it a harrowing about the 10th or 12th of August; by this time the manure will be well mixed with the surface, and every sign of vegetation will be destroyed. I sow a little over a pint of seed to the acre, mixing three times the quantity of sand with the seed, as I can sow the seed more evenly on the ground in this way; I then begin to harrow for the last time, and *follow the harrow,* sowing the seed. In this way, about half the seed sown falls on the harrowed ground, and the other half is passed over by the harrow next round. In this way about one-half of the seed is harrowed under, and half remains on the surface. If the weather prove very dry, a portion of the surface-seed perishes; but by sowing in this manner, with the ground prepared as above described, I have never failed having a large crop of turnips. I do nothing to them until pulling time. Four or five acres prepared in this way will bring from 1,500 to 2,000 bushels of fine turnips, which is nearly clear gain, as it leaves the ground in nice condition for corn in the spring.

Yours, respectfully, J. P.

Hemphill, Westmoreland Co., Pa.,
November 8, 1852.

Sir: No work, in my humble opinion, which issues from the prolific press of the country, is so admirably adapted to the wants of that class of people for whom it is mainly intended, as the agricultural part of the Patent Office Report. Containing, as it does, the opinions and ex-

perience of practical men in every section of the Union, it conveys information upon many topics which are overlooked by others, and which commend themselves to the attention of the American farmer, because they are the results of patient toil endured by his fellows, and cheerfully endured for the benefit of all. They must eventually produce the most beneficial results, wherever they are read and properly understood and appreciated. I have for several years been much instructed by a careful perusal of them; and it affords me much pleasure to respond to the call you make upon me for my mite toward the common fund.

Wheat.—Guano is not used here in the cultivation of this crop.

The soil of our immediate vicinity is rich, and the great abundance of limestone and bituminous coal affords great facilities for keeping up and improving the fertility of our farming lands. The average product per acre may be set down at 25 bushels, though we sometimes obtain 40. Seeding, from about the 10th of September till the middle of October; seed thoroughly cleansed, without any other preparation. Harvest, early in July. We sow 1½ to 2 bushels to the acre. Plough generally but once, from 6 to 10 inches deep. The yield per acre is steadily increasing.

Rotation.—Clover or other sward, turned down in winter or early in spring, for corn. Lime broadcast or upon the hill. Oats next spring. All the manure and composts upon the oat stubbles. Plough but once, if little oats spring up before seeding for wheat.

Timothy is sometimes sown on the wheat in the fall, but succeeds best with us in the spring, mixed with clover.

The latter grass most frequently sown alone. Sometimes the wheat crop is followed with rye, and occasionally a second crop of wheat is taken off before putting down to grass.

The fields intended for mowing are rolled immediately after the harrow. Mow one or two seasons, and pasture one or two more.

The Hessian fly is troublesome occasionally in early-sown wheat; my practice is to pasture down (if the crop is too rank in the fall) with young cattle and sheep, but only when the ground is dry.

The wheat crop of this section was materially injured the past season, by an insect not inaptly called the "milk weevil," from the fact that its depredations are committed upon the growing crop while the grain is in the milky state. The injury has been almost entirely confined to the "white" varieties, the Mediterranean escaping altogether. The grub (frequently four and five to each grain) is of an orange color, about one-eighth of an inch long. My entire crop was destroyed by it, having sown none of the Mediterranean last fall. There seems to be no remedy for it; and we must avoid risks by abandoning, at least for awhile, those kinds which seem to be its special favorites. Wheat is now worth 70 cents per bushel. We sell our surplus wheat to the millers in the vicinity; and the flour manufactured from it is taken to the Philadelphia market on the Central railroad, which passes through the centre of our county.

Mediterranean Wheat.—Much prejudice appears to exist in some sections of the country against this variety of our great staple; indeed, some farmers have condemned it *in toto.* The seed obtained by me several years ago was apparently very little better than rye. But a great change has come over it; attributable, no doubt, to change of climate and im-

proved culture. It is now much fairer, more plump, and *thinner skinned* than it was when I made my first adventure with it. The flour obtained from it now is much whiter, and the bread it makes is of the best quality. Is it not fair to infer that the grain may be still further improved? Latterly I have had it to weigh 68½ pounds to the bushel. What better favored varieties will beat that? Do not the croakers who are too apt to jump at conclusions, know that science and skill, aided by the genial influences of sunshine and temperature, effect great changes in the vegetable as well as in the animal economy? Davy and Liebig, Cuvier and Reaumer, St. Clair and Johnston, and a host of other distinguished writers, may be considered "fools for their pains," if we do not profit by the wisdom which their researches teach us.

Corn.—The average product is about 50 bushels to the acre. The furrows are drawn at right-angles with a small plough, three to four feet apart. Plant, during the first week in May, four or five grains to the hill, thinned out to three. When up, pumpkins are planted in alternate hills and rows, then harrowed and frequently ploughed to keep the ground perfectly clean and mellow. Cultivator used occasionally also. It is fed, generally on the cob, to our horses and hogs, and worth 40 cents per bushel.

Oats.—Average yield is from 40 to 50 bushels to the acre; considered an exhausting crop. Sow about 3 bushels to the acre. Worth 30 cents per bushel.

Barley is not cultivated to any extent; it yields well, but the market is very uncertain.

Rye, since the temperance reformation, is very little attended to. Does not do so well as formerly. Worth 50 cents per bushel.

Clover and Other Grasses.—We cut 1½ to 2 tons to the acre. Cure the former in the cock, and find it the very best hay for our stock. If properly managed, I consider it superior fodder for horses. The prejudice against its use for these animals arises entirely, I am persuaded, from improper treatment in the process of curing. If suffered to parch in the sun, as is the common practice, the leaves crumble into powder; this the beast inhales, which produces a cough, and ultimately the heaves. My horses, eleven in number, are fed exclusively upon it, with a small allowance of corn or oats when at work. They are always in good condition, and are able to draw heavy logs to the saw-mill, at which they are generally employed in the fall and through the winter. Upon every ton of hay, as it is housed, I scatter a peck of salt.

Dairy Husbandry.—We make only a few cheese occasionally for family use, and have made no accurate estimate of the yearly produce per cow, either of that or of butter; our cows being generally kept as breeders, and the calves allowed a free run at the udder. I was the first to introduce the improved Durham Shorthorns into this county, and keep no other breed now. After various experiments with the best native stock, and a few individuals of Devon, Hereford, and Alderney blood, I am satisfied that for all purposes, and under most circumstances, the improved Shorthorns are the best. With proper care and good keeping, (which all animals ought to receive,) they make a larger return for the food consumed than any other. We have had no difficulty in making our half-bloods, at four years old, (reared upon grass and hay alone, and fed for a few weeks before slaughtering upon a full allowance of meal,) weigh

from 800 to 1,000 pounds net. Those of purer blood are not altered, but are sold for breeders.

Our butter is sought after, and brings always a little more than the common market price in Greensburg. When below a fair remunerating figure, each roll is enveloped in a cloth and thrown into a barrel of strong brine: there it keeps perfectly sweet, and is suffered to remain until the price is up. Our process for its manufacture does not differ materially from that observed in all well-regulated dairies. Everything about it must be kept clean and sweet.

Horses are profitable when the requisite facilities for their rearing and management exist upon a farm. To begin right, the best brood-mares must be obtained; large, well formed, sound, of good disposition, yet spirited. Great care must also be observed in the selection of a stallion: above all things let him, too, be of gentle temper, yet, at the same time, no *slouch*. The mare will be all the better and foal all the easier if she be worked gently all the time, except a run in the pasture for a week or ten days after foaling. The colt should be haltered when three or four weeks old, and kept in the stable while the mare is at work in the fields; she must be taken at intervals to the colt to suckle. At six months the colt should be weaned, being previously supplied with a small allowance of clean oats, twice a day, as soon as it shows a disposition to eat. After that, we give a couple of quarts of buttermilk, or thick milk, with a handful of bran, or shorts, thrown in to form a kind of "slop," three times a day, and a pint of oats with a wisp of good hay. Upon this treatment it thrives astonishingly, and requires nothing else till spring. If milk be scarce in the winter, we give gruel instead; in the spring it is turned out to graze with the other stock, and suffered to run until fall. The second winter feed it in an open shed upon well-cured hay, (clover if you have it to spare,) and the following summer put the harness upon it and use it gently at light work, but do not mount it. Be careful that the harness fit, and do not pinch it. Feed now with the work-horses. If it should be restive, plunge, kick, or rear, do not whip it—let it alone. If hitched at the off-wheel of a four-horse farm wagon, it must go along with the team; provided the leader and saddle-horse are steady. In a day or two its shoulders may get a little galled; bathe them with cold spring water. Let it rest a couple of days, and then hitch it again. It sometimes requires a week or two before it will begin to pull; but it will at the end of that time, if you do not try to make it before by applying the lash. The spring that it is three years old it may be broken to the saddle without any trouble. A colt treated in this way will never prove balky, never hurt itself, and may always be depended upon on a pinch.

Mules and oxen are not used on our farms.

Sheep.—Common stock does not pay very well here; my present flock is a mixture of Dishley or Leicester, Southdown, and Cotswold. The Dishley has fine points, is thrifty, but coarse-woolled. The Southdowns were introduced to correct this fault. There being some danger of the other extreme, at the expense of the carcass too, a fine Cotswold buck was procured two years ago. The young part of the flock is now equal to any I have ever seen. Last year the clip averaged six and a half pounds to the fleece. Next year it will, I think, do a good deal better. In the winter we feed in an open shed, upon clover hay alone; in summer, pasture and salt.

Last year all the ewes had twin lambs, of which we lost but *one*. The cost of keeping the flock over winter was a mere trifle, as they had access to a piece of meadow ground where they got at the grass, except for a short time when the snow was too deep. These sheep are profitable every way. This year's clip brought 37½ cents per pound at home.

Hogs.—The English graziers are the kind we prefer. The Berkshires are a good breed, but the color is objectionable. We do not make pork for sale, except to a very limited extent, and keep no account of the cost of rearing or fattening.

Bacon and Hams.—The philosophical apparatus and the tedious manipulations recommended by some purely theoretical writers for *sugar-curing* hams, are their humbug. There is no more necessity for *sugaring* a ham, than there is for sugaring the words to tell the "*modus operandi*," to adapt either to the taste of a man of sense. If it must be sweetened to adapt it to an over-fastidious palate, why not sugar it in the process of cooking?

Our process is simple, cheap, and as good as the best. When the meat is cooled we pack it into open hogsheads, covering each layer with Conemaugh salt, placing the hams always in the bottom of each cask, then the shoulders, and lastly the sides. In about a week or ten days draw off the pickle, which the salt has now formed, boil it to render it pure again and free from blood; skim it carefully, and add to it as much more strong brine or pickle as is necessary to cover the whole. A little saltpetre is sometimes added. If the hogs weigh 200 pounds or less, let it stay four or five weeks, and no longer; then hang it up to dry, and smoke in a house in which there are plenty of chinks, with a fire partially smothered with green oak sawdust. Do not smoke it in wet weather. When thoroughly smoked and dried, prepare a strong decoction of black walnut hulls or bark, and immerse each piece into it, to prevent damage by skippers or bugs. Pack in boxes with *dry* sawdust, and it will keep as long as you wish, if kept in a dry place not too warm.

Fruit.—The cultivation of fruit of all kinds is receiving great and increasing attention. The crop in this region, I should think, could be made a very profitable one to the farmer. The great degree of *refinement* to which the propagation of some varieties has been carried, has probably been a prolific cause in producing the diseased apples, as it unquestionably has in the case of the "indispensable potato;" and we shall very likely be obliged, in a few years more, to resort to the original sour crab in the first case, and the bitter little tuber in the other, if we wish to restore them again to health.

This season the scabby, knotty, distorted appearance of the pippins, the Rambos, and, indeed, of all our fine varieties of apples, has almost totally unfitted them for a respectable display among our desserts. It is generally attributed to the prevalence of late frosts in the spring; but I apprehend that a very different cause, perhaps the one to which I have alluded, will ultimately be found to be the true one.

Downing's plan of cutting off annually, during the whole life of the peach tree, one-half of the previous year's growth, in connexion with manuring and the cultivation of the soil around, will, in most cases, prevent the yellows.

The borer and other worms must be sought after at the roots every

fall, and extirpated, or all our other labor will be in vain. Leached ashes, and cinders from the smithy, are the best manures we have tried.

Pears on quince stocks are less liable to blight than others. The same heading back as for the peach, with root pruning, will, I have reason to believe, prevent this disease, or at least stay its progress.

The liberal application of stimulating manures to young apple trees is literally "killing them with kindness." If the winter set in early, and the frosts be severe, the sap freezes in the trunk near the ground, before its active and exuberant circulation permits the legitimate formation of woody fibre. The next spring the bark peals loose, and the tree dies. I have lost many fine trees in this way.

The holes to receive the young trees should be large enough to admit of the natural spread of the roots. Where the soil is good, no manure ought to be applied for the first two or three years. Mulching only is necessary to make them grow fast enough.

We have most of the fine varieties of domestic and foreign production which are deemed worthy of cultivation; and we have many seedlings which deserve to take the places of some others with very high-sounding names. I have bestowed much attention to this department of rural husbandry, and am amply compensated for the time, labor, and money expended.

Three years ago, I accidentally came across an apple which is entirely without a core. I obtained cuttings from the original tree and had them engrafted by an experienced nurseryman, and have now several young trees. The fruit is quite large, juicy, and tender when fully ripe, a little acid, but, in the winter, delicious eating. They deserve to be extensively cultivated.

Forest Trees.—The common locust, indigenous to many portions of our country, is one of our most valuable trees for many purposes; for posts, in the construction of fences, it is superior to all others. This tree is very easily propagated, and, in favorable situations, grows with great rapidity. To insure a full supply of healthy young trees, procure in the fall the beans, (which almost every tree bears in abundance,) put them in a suitable vessel and pour boiling water over them; let them remain in it twenty-four hours, and then plant where you want them to grow. If you keep the weeds and grass from smothering them, they will grow 6 or 7 feet high the first season.

The chestnut is another valuable forest tree. Plant the nuts as soon as they fall from the tree, in nursery rows; transplant the second or third season. For posts, when from 6 to 10 inches diameter, they are nearly equal to locust. They grow very rapidly.

The white-walnut, or butter-nut, when it can be obtained of sufficient size, bears a very close resemblance to mahogany when used in the manufacture of household furniture; it is susceptible of a very high polish, and is not inferior to mahogany in brilliance of shading and fineness of texture. The tree is easily propagated from the nut.

Buckwheat.—Considerable quantities of this grain are cultivated here, as well for the delicious cakes which are made of the flour, as for the pasturage which the blossoms afford for our bees. The crop is, however, a very uncertain one, sometimes yielding 30, 40, and even 50 bushels to the acre, and often not more than from 5 to 10. I have always succeeded in having a fair average crop by sowing a month earlier (say about the 1st of June) than is common. By doing this, the plant obtains sufficient size before the hot weather sets in, which frequently destroys the farina or fecundating principle, and it ripens early enough to escape the first frosts in the fall. If the crop is likely to prove abortive, we turn it under with the plough, and sow the ground with wheat. It acts as an excellent fertilizer in this way. This plant is, contrary to vulgar notions, an ameliorator.

With facilities for procuring lumber afforded by a steam saw-mill upon this farm, I have been making a cheap fence, out of rough materials, which I would describe to you, for the benefit of those who need such defences against the roving herd, if I had time to make the necessary drawings to render the description intelligible, and did not fear that I have already occupied more space than you will be willing to afford to this hasty communication. Suffice it for the present to say, that it is so constructed as to be easily repaired, the posts having no mortises, and no nails used about it; it is at the same time strong and neat, and every panel may be used as a set of bars.

I am, with great regard, &c.,

F. J. COPE.

Now that the home market for our surplus products is in a great degree destroyed by a mistaken policy, are the farmers of the country to be left to shift for themselves in all future time?

When the vast wilderness of the West shall be made to "bloom and blossom as the rose," and when "two blades of grass shall be made to grow where but one grew before," who is to consume this immense addition to our productive industry?

Are these things not worthy of the consideration of those we send to represent us at the American capital?

F. J. C.

TURBUTVILLE, NORTHUMBERLAND CO., PA.,
November 8, 1852.

SIR: I have just completed a thorough perusal of the last two Agricultural Reports of the Patent Office, and, feeling a desire to become a scientific farmer, have no hesitation in pronouncing them valuable documents. A portion of the proceeds of the public lands should, doubtless, be annually applied for purposes of this kind; and no sum could be better appropriated than to publish such information. My opinion is, that the lands of the United States might easily be made to average a valuation of one hundred dollars per acre. All that is wanting is an intelligent industry with regard to seasonable culture, and a judicious application of fertilizers, in order to secure ample returns for the toil of the husbandman. Having noted the following incidents, I submit them to your disposal, in hopes of contributing a mite to the fund of agricultural science, to wit:

There is an obvious analogy between the animal and vegetable kingdoms—hence we find the constitutions and habits of animals adapted to the climates in which they originate; and so with plants: where they are

originally found, the soil and climate will be most congenial; although, by proper culture and attention, they may thrive as exotics. From this it appears important for the farmer to make suitable selections of crops for each variety of soil, climate, and locality. Most kinds of grain may be cultivated to advantage, though not equally productive, in every part of the United States. On the western prairies Indian corn grows to the height of sixteen feet; yields more than one hundred bushels per acre, and one and a half bushel of ears will make one bushel of shelled corn. In the more sterile soils of the North and East it seldom grows more than eight feet; does not often yield more than forty bushels per acre, and it requires two bushels of ears to make one bushel of shelled corn; it likewise requires three times the labor and amount of manure that it does in the West. Still, the farmer feels as well compensated in New York and New England as in the West. In the West, where it is so exuberant in growth, the price is often less than twelve and a half cents per bushel, while in the less productive regions it often brings seventy-five, and seldom less than fifty cents. The grain in the North is likewise more solid, contains more farina, and is more nutritious. In the West there is enough corn-fodder burned every spring to feed sufficient cattle during the winter to supply every poor family of the vicinity with a cow. And in the North, where cattle are wintered on wheat, rye, and buckwheat straw, and every vegetable product kept for winter forage, owing to a want of shelter, there are as many cattle perish as would be sufficient to feed the poor and to remove the poor tax. A proper attention to agricultural economy, and a little legal suasion with regard to humane attention to dumb animals, would do more towards benefiting the poor than a row of almshouses from Maine to California.

While there is so much ado made about home manufactures, it is really surprising to find that millions of acres of land are left unoccupied that might prove highly profitable as pasture for sheep. There is not a man in the United States of sufficient bodily strength to cut half a cord of wood per day, who could not amass a fortune in a few years with moderate industry, added to honest and frugal living. Uncultivated land may still be had in each of the Middle and Western States for one dollar and twenty-five cents per acre, or for less, and that, too, on a credit of five years. A healthy man, with or without a family, and no other property than an axe and hoe, might thus get possession of one hundred acres; the first year he might erect a cabin, and clear and sow with wheat ten acres, besides earning sufficient in the vicinity for his subsistence; the second year he would have a crop to dispose of that would be sufficient to enable him to buy a cow, a yoke of oxen, twenty sheep, some hogs, a plough, and a harrow, besides increasing his household furniture and supporting his family; the third year he could clear fifteen acres more, and every subsequent year continue to clear and cultivate, and on third-rate land could keep the increase of his flocks, until, in ten years, his one hundred acres would be cleared and fenced, and he might have ten cows, two yoke of oxen, ten hogs, and two hundred sheep. After which, suppose the profit of each cow to be annually twenty dollars; that of each sheep, including the lambs, to be one dollar and fifty cents; there would be two hundred dollars for the cows and three hundred dollars for the sheep—making five hundred dollars; the other proceeds would, doubtless, support his family.

The keeping of sheep is especially adapted to poor, hilly lands—high ground being their natural resort, and briars, roots, and boughs their choice food. But sheep should be nightly put in an enclosure; by which means sufficient manure could be collected during a winter to manure several acres and make them productive. And beans, which grow abundantly on poor ground, are a favorite and especially nourishing food for them.

Hemlock boughs should be plentifully supplied to sheep during the winter; and where they cannot be procured, some spirits of turpentine should be sprinkled on their hay twice a week.

Yours, very respectfully,

HENRY MILLER.

To the Commissioner of Patents.

Warren, Warren County, Pa.,
December 20, 1852.

Sir: In compliance with the request of the Circular from your office, and thankful for the small favors extended through it to the all-important interests of the agriculturist, I proceed to reply to some of its interrogatories.

Wheat.—Our county cannot rank as a wheat-growing county. The eastern and southern portions, yet partially cleared, will grow fall or winter wheat, and also the valleys of the Conewango, Brokenstraw, and Alleghany; while the northern and western, now more generally inhabited, produce good spring wheat. The average yield I placed higher last year than it will bear—probably fifteen bushels is nearer the average yield than twenty bushels. Winter wheat is sown in the early part of September, and spring wheat as early as possible in the spring. The yield per acre is rather increasing. We have not yet adopted any system generally, but some of our best farmers are beginning to see the importance of it. We sow Timothy and clover-seeds. This crop generally succeeds corn and potatoes. The Hessian fly does not affect the crop; but rust or mildew occasionally affects us seriously.

Guano is not within our reach, owing to our remoteness from the seaboard. Winter wheat brings an average price of one dollar twelve and a half cents, and spring wheat ninety-four cents per bushel, at Warren, where, owing to the great lumber business of our county, it affords one of the best markets in the United States for this, as well as all other kinds of grain; which makes us more a consuming than producing community, and offers a fair opportunity for the settlement of those who will content themselves to cultivate the soil on wild or timbered farm land, varying from five dollars to one dollar per acre.

Corn.—Our valleys produce good crops, and sure and certain returns. The average product per acre is about 40 bushels, and many now get 50 bushels. The price is 75 cents per bushel, which is sold in the ear to the lumbermen, who get it ground in that state, and prefer it so fed to their working cattle. It will cost probably 25 cents to produce a bushel. The best crop of corn I have had has been grown after fall ploughing and manuring, and ploughing down in the spring, planting fully 4 feet

apart each way. I think I gained in the number of ears what I lost in the quantity of hills, as almost each stalk had two ears, and some of them three. This was a larger variety of corn than the common eight-rowed. But the great majority of our farmers plant on sod, either ploughed in the spring or fall. It is pretty difficult to ascertain properly the results from the feeding of ten bushels of corn to hogs; yet I have never doubted the great importance of the economy of manure, which, till lately, has been very much neglected, and does not now get anything like the attention it deserves. But so well am I convinced of its primary importance, that the trouble of experimenting in the matter would never enter my mind. There is no animal that will convert so much coarse straw to a fit manure as the hog, and they should be largely supplied daily.

Oats, Barley, Rye, Peas, and Beans.—The first, oats, yield, on an average, 35 bushels; price, 37½ cents. Barley, little cultivated. Rye, 30 bushels. Peas, not much cultivated; and beans, some 16 bushels—price, $1 25 to $1 50 per bushel. Peas least exhausting.

Clover and Grasses.—One and a half ton to the acre; our best yield two tons; best fertilizer, gypsum. Timothy is the most preferable kind of hay, with a small portion of the larger kind of clover, as it comes nearer the time of maturing the crop. Red clover, well cured, will never prove injurious to any horse or other animal; but this is the fault with it generally.

Dairy husbandry we are particularly and generally better adapted for than any other. Our rich, close, natural pastures, and well-watered lands, furnish us with facilities of the most natural and desirable kind. Average produce of butter to each cow will probably fall short of my last year's statement—150 pounds—and 100, I think, of cheese. The other details I am unable to furnish, but would say that more care in the treatment of cows, especially in winter, is clearly shown, and with their usual good results. Butter has sold as high as 22 cents, and cheese at 8 cents per pound, in Warren, the county seat.

Neat Cattle.—Cost of rearing till three years, nearly all they are worth at that time, if you do not put a proper value on their manure—worth at three years old from $25 to $27; dairy cows in fall, $20; and in spring, from $25 to $30.

Horses.—We have no mules, but would rather incline to think well of them for farm-work. The cost of rearing a colt till three years old would be from $60 to $70. Brood-mares should be more carefully treated than they generally are, and none should be kept but the very best, with a good warm shed, accessible at all times in the winter and fall, and plenty of good water also; dropping a foal each alternate year, and giving them the full chance of suckling through the first winter, then weaning on the beginning of grass. Best way of breaking: make them well accustomed to the bridle-bit, by bitting, and then gentle exercise and care. The further discussion of this subject would take more time and space than this communication will allow.

Sheep and Wool.—Wool is profitable, but coarse-woolled sheep have the decided advantage, as being profitable in wool and carcass, and the finer grades of wool bringing a far less proportion to the coarser grades than they ought to in this section, so far from market for the first grades, and having a home market for coarse grades. This, with the comparatively

less value of their carcasses, renders the finer the less profitable than the coarser, and I have come to this conclusion reluctantly.

Hogs.—I still hold to the Berkshires as the best; the cheapest are those produced from the dairy refuse, finished off with the soft corn.

Roots.—Carrots are on the increase as a field crop, and considered a good vegetable for horses or cows.

Potatoes were good this season—no disease, and assume all their original qualities; the most prolific is the Mercer.

Fruit culture is, I am happy to say, receiving much attention. I was told to-day by one nursery man that he had sold 4,000 apple-trees in our small county of 15,000 inhabitants, and had never been into our county before to try to sell. There are two or more nurseries that send their trees into this county, and pears and other fruits are more generally called for than heretofore.

Last, though by no means the least, *manure.* My plan is to use up all the straw I raise in bedding, in and out doors, and dusting on lime and plaster of Paris, or gypsum—the latter in particular. Plaster is used here to great advantage, and to good effect. I have thought that cheap sheds might be made of slabs from our saw-mills, to cover our manure from sun and rain, and would like to see the results.

Yours, respectfully,

F. FALCONER.

COCHRANVILLE, CHESTER COUNTY, PA.,
December 10, 1852.

Before answering particularly the inquiries of your Circular, I will briefly describe the character and capabilities of the soil in this neighborhood.

The surface of the country is moderately rolling. The ridge dividing the waters of the Susquehannah and Delaware rivers passes through it; and in our immediate vicinity a subordinate ridge diverges, separating the waters of the Elk and Octoraro. The soil varies in its character from a light sandy loam to a rather heavy clay. There is also a large amount of clay slate, the natural quality of which is generally good; the natural character of the sandy loam is also good. The heavier soils are not so desirable, but by skilful management, in favorable seasons, will produce good crops. In comparison with other parts of the county, our soil may be called middling; though its capabilities have not yet been fully developed.

Within my recollection a large amount of the land in this vicinity was old fields, which had been cropped by the first settlers as long as they would produce anything, and then left to lie in commons. At one time sufficient grain was not raised to supply the wants of the inhabitants; but an entire radical change has taken place. Those old worn-out commons and russet-colored pastures have been changed into fertile fields, and have proved mines of wealth to many who undertook their renovation. The principal agent employed in producing this change was lime. Its application often produced magical effects; and the crops of hay and straw thus produced, afforded the means of making considerable

barn-yard manure. This advantage was maintained, and subsequent applications of lime increased the means of making manure; and thus improvement advanced until those old fields, which were purchased for from $5 to $10 per acre, would now command from $40 to $60 per acre.

A corresponding change has taken place in the character of the farm-buildings. The forlorn, dilapidated old log tenements and stables have been torn down and replaced by comfortable and substantial stone and brick dwellings, and large and commodious frame barns.

A like change has taken place in the character of the stock. Instead of the stunted "land-pike" hogs, diminutive sheep, forlorn-looking cows, and frames of horses, that might be seen shivering round the old stables on a cold winter's day, with tears in their eyes, may now be seen stock of a superior character; and the sleek and contented appearance of the animals indicates that they are well fed and well cared for.

The system of rotation mostly practised here is, first, corn; then oats, wheat, and grass. Commencing with the first, we usually plough up old pasture-land for corn—and the stiffer the soil the better prospect of a crop. The ground is ploughed as soon as it becomes dry enough in the spring; often there are thaws during the winter which afford opportunities for ploughing that are mostly improved; and sometimes the ground intended for corn is ploughed in the autumn preceding. The frosts of winter, besides destroying insects in freshly ploughed lands, which injure the crop, are found to ameliorate the condition of our heavy soils, pulverizing them, and causing them to work up mellow.

In preparing the ground for planting, it is first thoroughly harrowed; and if the weather be dry, it is then rolled, when it is intended to drill in the crop, which is getting to be a common practice. In planting with a drill, the rows are made about four feet apart, and the grains of corn dropped either singly, or two or three in a place; and the drill is made to regulate the distance between the grains, or hills, according to the wishes of the planter. Single stalks are allowed to stand a foot or 15 inches apart, and the hills 2½ or 3 feet, with two or three stalks in a hill. When the corn is intended to be planted in hills, by hand, the ground is marked out one way with a light plough, making the rows 4 feet apart, and then crossed, either with the plough or some other contrivance, making the rows from 3 to 4 feet apart, according to the quality of the soil; the corn is then dropped at the crossings of the rows and covered with a hoe, and two or three stalks are suffered to remain in each hill. The corn is cultivated almost altogether with the cultivator, which is passed through it four or five times, so as to keep the ground loose, and completely destroy the grass and weeds.

The advantage of planting corn in rows both ways is, that it may be harrowed and cross-harrowed. When the corn is ripe it is cut off near the ground, and left to stand in shocks of from 36 to 50 hills each, until it is dry, when it is husked and cribbed. The average yield per acre may be set down at 40 bushels, though the best cultivated farms, in favorable seasons, mostly produce more; and over 100 bushels per acre were produced recently on a farm in this neighborhood, then occupied and cultivated by Thomas Lamborn.

The cost of producing Indian corn per bushel may be set down at 28 or 30 cents, when the yield reaches 50 bushels per acre. This includes

the interest of the price of the land, and one-fifth of the value of the lime and manure, (a coat of each being put on at each rotation,) in addition to the price of the labor.

Guano has not been much used for corn here. I tried a little in 1850, by way of experiment; it was ploughed in at the rate of about 300 pounds per acre; and although the corn to which it was applied was perceptibly better than the rest of the field, the gain, I thought, was not sufficient to induce a continuance of the practice.

It is much more advantageous to feed corn ground into meal, than in the whole grain, and I have no doubt it would be much better cooked than raw; but its economy would, in some measure, depend on the abundance of labor the farmer could command, as well as the price of fuel.

Oats are sown on corn-stalk ground as soon in the spring as the ground can be prepared in good order. From two to three bushels of seed are sown upon an acre, and the average product is about 40 bushels. Immediately after they are sown, the ground is rolled. They are considered an exhausting crop; but that it is really so, more than our other crops, I think is doubtful. They will grow on thinner land than other grain; and being sown after so exhausting a crop as corn, it is not wonderful that the ground is not in condition for another crop without manure.

Barley and *rye* are very little sown; *peas* and *beans* never as a field crop.

Wheat.—After the oats are harvested, the barn-yard manure is hauled out and spread so as to cover the ground pretty well all over. I usually put on about twenty two-horse loads per acre. Sometimes the ground is ploughed twice and sometimes but once, to a depth of from six to eight inches. When it is twice ploughed the manure is mostly put on after the first ploughing. Ploughing twice is found to be beneficial to the succeeding crop of grass. From one and a half to two bushels of seed are sown on an acre; and the time of seeding varies from the first of September to the first of October.

The most common method of sowing wheat is with the drill. The time of harvesting varies according to the season and exposure, from the last days of June till the middle of July. We do not prepare the seed in any way previous to sowing, but are careful that it is thoroughly cleaned of all trash; and we find this practice a complete remedy against chess. If perfectly clean wheat be sown for a few years, chess will be completely eradicated; we have no more fear of our wheat turning to chess, than we have of our corn turning to mulleins. The average yield per acre is about 20 bushels, leaving out some seasons when the crop is destroyed by the fly. On a farm adjoining mine, last year, then occupied and owned by George Palmer, the crop of wheat averaged 40 bushels per acre; but such yield is uncommon. The yield per acre is increasing. The variety mostly sown is the Mediterranean, which, as a general rule, succeeds better than any other; it ripens early, and thus mostly escapes rust. When first introduced it was a very dark, inferior wheat; but it has so much improved by cultivation, that it makes as white and as good flour as any other red wheat.

We know of no remedy for the Hessian fly, and are not much troubled

with other insects injurious to wheat. The average price of wheat in 1852, was 90 cents per bushel.

We usually sow Timothy seed in the fall, at the time of sowing the wheat; it is sometimes harrowed once, or sown before the drill, and sometimes it is sown after all is done. Some drills are so constructed as to sow wheat and grass seeds at the same time. In the spring, usually in March, the clover seed is sown.

Guano is getting to be used to some extent in this neighborhood for wheat, but I know of no experiments sufficiently accurate to determine the gain in bushels per 100 pounds; and as its use is increasing, it must be considered remunerating. I have used it to some extent, mostly to finish out fields that I could not cover with barn-yard manure, and the yield usually has been as good where the guano was, as where the best manure was put.

The system of rotation which I have described, I think is the best here; for although it is sometimes deviated from, I know of no experiments in that way sufficiently successful to warrant a long continuance therein.

Some, instead of sowing wheat on oat stubble, have sown clover seed with the oats, and the next year ploughed up the clover sod for wheat. This method will almost always produce better wheat than by sowing it on oat stubble; yet it is more difficult to get the grass to take well, which here is an important matter. From one to two tons of hay are usually cut per acre. In this neighborhood no kind of fertilizers are often used on grass lands except lime. The grass land is mown two or three years, pastured one or two more, and then ploughed up for corn. Occasionally barn-yard manure is spread on grass land where it is intended to lie longer in grass. Clover and Timothy are the kinds of grass seeds mostly sown, and at the rate of from five to six quarts of each per acre. Timothy is considered an exhausting crop, and in other ways is objectionable; but it turns off a large amount of hay. I wish we had a substitute that would mow well and make good pasture. One of my neighbors has introduced rye-grass, which I think will make good pasture; but it is doubtful whether it will turn off a large amount of hay.

Pasture, however, is a great object, as most of our farmers grass-feed cattle for market, and find it one of the most profitable branches of their business.

Red clover hay is injurious to horses that have not sound wind, and some think that very dusty clover hay will produce heaves. But if clover hay is properly cured and "got in" without rain, it will keep horses in better condition than any other.

Root crops are not much cultivated in this neighborhood. I planted a patch of the ruta-baga this year by way of experiment; the size of the patch was something less than half an acre, on which I applied 125 pounds of guano in the rows, and the produce was 260 bushels. The ground was first ploughed and harrowed, then furrowed out nearly three feet from row to row, then the guano was sprinkled along the furrow, and the dirt thrown into it from each side with the plough, when the seed was planted on the top of the ridge thus formed.

N. LINTON.

LUZERNE, WYOMING VALLEY,
October 29, 1852.

SIR: Your Circular came to hand about the 1st of September last, and I cheerfully comply with your request, as far as my ability renders me competent to the task. Luzerne county is naturally divided into three divisions or qualities of soils: the first quality, being along the Susquehannah and other large streams, being very fertile and productive; the second quality being upland plains, remunerating to the careful cultivator; the last division being hilly and new, though naturally productive.

Wheat.—Average yield, taking the two first named divisions, is about 20 bushels per acre; last named, 10 bushels; all on the increase. We use no guano, or very little, in the valley; we depend mainly upon the barn-yard manure, together with clover, which is our main fertilizer, though lime is coming into use on clay soils, and with very good results. We generally plough twice for this crop, taking care to do it well both times. We sow one bushel and a half per acre. We are beginning to use the drill, with the first usually, as it prevents winter-killing, and is a saving of seed, putting the wheat all in an equal depth. The yield of wheat is increasing per acre. Our rotation of crops varies according to the state of the soil; commonly taking off three crops before seeding to grass. I cannot be particular here at this point, as we cultivate wheat, corn, oats, potatoes, &c., alternately, observing the three-field system with the above named crop. Average price of wheat $1 at home. As we have a home market, our prices of all kinds of crops average about as high as the city of New York the year round. Best variety, White-Bluestem. We sow Timothy and clover after wheat; generally sown in the spring, about six quarts of seed per acre. Not troubled with Hessian flies or weevils.

Corn.—We usually plough sward land for this crop. Average yield about 50 bushels, in the valley, per acre; very little grown on the back lands. We plough deep in the spring; harrow thoroughly; mark the land three and a half feet each way; use a marker instead of the plough, making three marks at a time, with two horses attached, as to a sled. We plant from the 5th to the 20th of May. Harrow, plough, cultivate, and hoe, according to our fancy, taking good care to keep it clean, and have it done by the 4th of July. We usually plough twice or thrice, harrow once or twice, cultivate about once, and cross up each line with the hoe. We always drop plaster on corn at the time of planting.

The best method of feeding is, I think, to have your corn for horses and cattle crushed; for milch cows and working oxen it is better than the clear meal. If the crushed meal is mixed with chaff of any kind, it is a cheap and very nutritious food. Average price of corn is about 62½ cents for fifty-six pound corn. All sold at home, as we live in a mining district.

Oats sown after corn. Average yield in the county about 40 bushels per acre. Very little rye sown; yield about 15 bushels. Barley, none sown. Beans are coming into culture. Oats are said to be exhausting to the soil. Rye is not an exhausting crop; and, with good management, I do not think that oats are. Peas are not cultivated as a renovater. We usually sow two bushels of oats per acre; one bushel of rye. Beans we plant in the drill, about four inches apart in the row, and

cultivate with the plough and cultivator. Oats worth 40 cents; rye, 75 cents; beans, $1 25.

Clover and Timothy.—Average yield this year is not above one ton and a quarter, owing to an early drought. The average yield for the valley in good years is about two tons per acre; the back lands about one ton and a half. The back lands are on the increase, many acres yielding two tons per acre when they have been properly cleaned of stones and stumps. Lime is the best fertilizer for meadows; apply from 50 to 100 bushels as a top-dressing in the fall, and it will work wonders. For meadows and pastures we usually mix Timothy and clover, about equal. Red clover is not injurious to horses. Timothy hay is worth from $9 to $10 per ton in Wilkesbarre; though this year it is worth $12 up to this time.

Dairying.—There is not much done at this branch of business in the valley; but on the back lands it is on the increase. I have conversed with dairymen recently; they estimate the average yield of butter per cow at about five pounds per week during the milking season, from spring till fall. Average price of butter, 18 cents; it is now worth 22 in Wilkesbarre. Dairying is good business if properly attended to.

Neat Cattle.—Very few are permitted to arrive to the age of three years—only those which are preserved for cows. Our cows are fine grades; the Durhams are not sought after much, owing to their tenderness. A good cow will command in the spring from $25 to $30, and not much less in the fall. The Devon blood appears to be the favorite stock. Our beef is mostly made on grass; very few stall-fed cattle, except some old oxen, which are fatted after the fall work. The average price of beef is about $7 per hundred; choice cut is often up to $12 50. The Durhams will pay best in beef, but are not so good as milkers.

Horses and Mules.—Very few horses raised. The growing of horses is profitable; a good young horse at a proper age will command from $100 to $150, and even more; and by judicious management a colt will pay his keeping after three years old, and improve on it. The expense of raising a colt is not more than that of raising a steer. Colts should never have a handful of grain until near three years old, and then fed sparingly and worked lightly until they mature for service. I usually raise one or two colts every year. I work my mares lightly up to the time of foaling; I then turn them off to grass and let them run a few weeks. Put the mares to work again, taking care not to heat their blood. Shut the colt from the mare half a day at a time, which will prevent accident. Brood-mares should never be fed heavy; in fact no horse ought to consume over 15 quarts a day of oats, even at hard work. My rule is, if a horse will not keep in fine condition on 12 quarts a day, I will let some one have him that will feed him more. My mode of breaking a colt is this: commence handling early after weaning; put him up the winter after he is two years old and commence using him, and by spring he will be able to do light work, being broken during the winter season almost imperceptibly. Colts should always be provided with the best accommodations as to shelter, litter, &c., and fed on hay during the winter; allowed to run in the yard or stock-field during the day; provide early pasturage.

Sheep and Wool.—Both are profitable: very few sheep raised. Mutton is in great demand; worth as much as beef, or more.

Hogs.—Men differ as to the breeds. The red hog from the State of New York is quite a favorite with some; others prefer the Chester county white hog; and from what I have seen of both, I think a cross would produce the best breed. I have now some of the finest pigs I ever had of this cross, though the red blood is far from pure.

My experience in fatting pork is this: if your hog is worth $10 when put up, it will take nearly $10 worth of corn to make him worth $20, so there is not much gain; though if your hog-pen is liberally supplied with straw, they will make a liberal supply of fine manure. Pork is worth at the butcher's stall 10 cents—about 8 cents from the farmer; it is rarely less than $5 50 to $6 in the pork season. Farmers raise very little more than they want for their family consumption.

The best mode of putting up pork is this: cut up your hog; take out the chine; salt the hams and shoulders in a clean cask with rock salt; let it remain about 48 hours, then pour on cold water enough to cover the hams; put on a weight, and let it remain about four or five weeks, then smoke with maple or hickory. Manage your pickle pork much in the same way, taking care in both instances to remove the bloody pieces. My mode for pork is this: I cut my middling in convenient pieces for handling; pack down close with rock salt, packing in the hocks and side-meat together, excluding everything else; make a brine strong enough to bear an egg; pour it on after it has been packed about twelve hours; add saltpetre, about four ounces to 1,000 pounds, or thereabouts; put on your weight, keep it under the brine, and all will be right.

Potatoes are a fine crop this year. Average yield about 125 bushels per acre, fine sized, clear of disease, and worth 37½ cents from the field. After sorting, refuse worth for pork 25 cents a bushel; cooked potatoes worth nearly half as much as a bushel of raw corn in the ear. We plant about three feet apart; work much as we do corn. Most prolific variety is the Peach-blossom, introduced a year or two ago. Every man has his hobby in potatoes as well as in many other things; each one preferring some peculiar kind.

Fruit Culture is rapidly improving. Apples are a profitable crop for the farmer. The refuse apples are fine food for hogs up to the time they are ripe enough for other purposes. Sweet apples for hogs are supposed to be as good as cooked potatoes. I have observed some of my neighbors' hogs in high condition on apples alone.

Manure.—Farmers in general are too careless in this matter. My mode of preserving manure from waste is to scatter gypsum liberally on the barn-yard during fermentation; haul out as soon as fit, and apply to my crops.

Root Crops do well, but, owing to the scarcity of laboring hands, very little is done in this branch of business.

Cotton, Cane, Rice, Tobacco, and Hemp.—None raised.

M. F. MYERS.

QUAKER BOTTOM, LAWRENCE COUNTY, OHIO.

SIR: Your Circular was duly received, and I proceed to answer some of its inquiries.

Wheat.—Guano is not used in the production of farm crops in this

county. Average product per acre, 15 bushels; time of seeding, October; May wheat has been cut on last day of May; middle of June, usual time of harvest; seed seldom brined and limed, though considered beneficial; 1¼ bushel seed to the acre; used to plough three inches deep: product, 8 to 12 bushels; we now plough from 6 to 8 inches: product from 12 to 20 bushels—occasionally, 30 to 40.

Rotation of Crops.—Among old-school or anti-book farmers: corn, corn, corn, forty years in succession, and then move to the Far West. Among the progressives: clover, two years; potatoes, corn, wheat, clover. Rich land, well pulverized, best preventive for Hessian fly; thrash soon after harvest, to avoid the weevil. Average price of wheat this fall, 65 cents. We sow clover on our wheat in February.

Corn.—Average product per acre, 40 bushels; cost of production, 12½ cents per bushel.

Culture.—Break the ground deep, as early as dry enough; harrow well; roll, if cloddy; furrow 4 feet wide each way; leave three stalks in the hill; go through with cultivator as soon as the rows are perceptible; the opposite way with same six or eight days after; next, with a long bull-tongue, as deep as possible; next, the shovel-plough; finish by passing again each way with cultivator.

Best method of feeding corn to cattle and horses, corn and cob crushed together; for hogs, ground and cooked, or fermented into thin slop.

Oats.—But few raised by our best farmers; considered unprofitable and exhausting; average product, 25 bushels.

Clover and Grasses.—Average cut, 1½ ton per acre. Best fertilizer on dry sandy lands, ashes and gypsum; on damp clay soils, barn-yard manure and lime. Pastures should never be grazed short, and meadows not at all, unless frequently manured. Clover and Timothy mixed, is preferable for laying down both meadows and pastures on dry land; red-top on wet; two quarts of each to an acre.

I have witnessed no injury to horses from eating first crop of clover; second crop frequently causes saliva.

Hogs.—Best breeds, Bedford, China, Byfield, Russia, and Sussex, all have their admirers. The cheapest method of making pork is to give the pig the run of clover and stubble fields, and of the fruit-orchard that abounds in the very best sweet apples, peaches, &c., until he has nearly attained his growth; then put him up in a close pen and feed on corn-meal. If cooked or fermented, all the better. Pork for bacon should be well rubbed all over with salt, and packed in bulk; coarse salt is best; a small portion of saltpetre should be added. After lying two weeks, it should be overhauled, again rubbed with salt, and re-packed. At the expiration of five weeks after first packing, provided the pork is not large, wash clean, hang up, and before the surface is quite dry, completely saturate the whole volume of air in the smoke-house with quicklime. This may be done by violently stirring or throwing very fine dry lime in the smoke-house. This will effectually prevent injury from skippers, bugs, &c. Smoke well with sound hickory wood. Let your bacon hang as long as you please.

The *Irish potato* is a staple crop on our river-bottoms, in this county; large quantities are shipped to New Orleans, and find ready sale, at fair prices. Our best market, however, is at the iron-works, in this county, for much the greater portion of our farm products. Average yield, 100 bushels; cost of production, 10 cents a bushel. Best varieties for table

use, Meshannock and Pink-eye; most profitable for Southern market, Flowers of Edinburg, Orange potato, and Baltimore Blue. The most productive of all is the red Meshannock. Over 570 bushels to the acre have been produced, the past season, in this (Quaker) Bottom, and over 544 last year on the same ground; and that, too, without manure. The land had been under a grass lay for nine preceding years. These extraordinary results have, as yet, only occurred with members of well-organized farmers' clubs. Four competitors this year (members of the Rome and Union Farmers' Club) produced as follows: 300, 320, 416, and 572 bushels to the acre.

Situated as we are, on the very southern verge of the State, the potato seldom suffers from the prevalent disease, except when planted on wet land, or when shaded by weeds, or otherwise. We are about as far south as where the potato will succeed well, and is much less subject to the rot than in cooler climates. The sweet potato also succeeds well here, when rightly managed. It requires a warm, rich soil, and early forcing. Grounds upon which large quantities of straw or chaff have been nearly decomposed are good, and have produced with us over 300 bushels per acre, of the common yellow variety.

Fruits.—Apples, comprising some 400 of the best varieties extant, are cultivated here for home consumption and for export. There is no crop that pays so well as our best sorts of apples. An orchard of Rome Beauties, ten years old and upwards, well cared for, will average an annual profit of $200 per acre. One of my neighbors, this fall, gathered and sold 11 barrels from a tree which is thirteen years old—worth $1 25 per barrel, equal to $500 per acre. Apples, and especially our best sweet sorts, are very cheap food for every description of farm-stock and poultry. The Rome Beauty stands pre-eminently ahead of everything yet fairly tested, for profit or exportation, and combines more desirable qualities, everything considered. The Roxbury Russet, Newtown Pippin, Bell-flower, and Rawle's Genitor, are valuable for export.

The *Peach* succeeds well here, and very many of the finest sorts in the world are cultivated in our orchards and nurseries. We feel quite confident that no portion of the country can excel us in the production of fine apples and peaches.

Grafting or *budding* should be performed some two feet or more above ground, as the seedling stocks are generally much more hardy than our finer sorts, and as severe heat or cold usually affects the trunk of the tree, just above the surface of the ground. Hundreds of root grafted trees were killed last winter, in this vicinity, by severe freezing; while seedlings, and grafted and budded trees, that were worked high, almost universally escaped uninjured; other chances equal in all respects.

H. N. GILLET.

VERMILION, ERIE COUNTY, OHIO,
December, 1852.

SIR: Your Circular was duly received, and I am thankful for an opportunity of contributing my mite towards the mass of information annually disseminated from your office. I esteem the Agricultural Reports

very highly; and it is more from a desire to possess them, than from any expectation of contributing anything essential to their completeness, that I now write. I shall not attempt to answer your inquiries in detail. The readers of former Reports have been made acquainted with the peculiarities of our location, and the methods of farming here. Although there is a preceptible improvement made from year to year in nearly all departments of agriculture, still it is difficult to point out the particular items of which it consists.

Our crops of *wheat* have been large for three consecutive years, partly owing to the seasons and partly to improved tillage, more thorough drainage, and hardier varieties of wheat. The Soule and White-Blue-stem have nearly driven the Illinois, Mediterranean, Red-chaff, Bald, &c., out of cultivation. The Blue-stem is said this year to have outdone all other varieties from 5 to 10 bushels per acre. It is an excellent wheat for flouring also, bearing the highest price. Our lands generally do better back-furrowed into about eight-paced lands than to be left level; and if the ploughing is performed so as to give the proper declination to the dead furrows, and passages cut for the water to pass off freely, there is much less danger from winter-killing as well as from drowning. Very deep ploughing and subsoiling have not been practised to much extent; though when done, the results, I believe, have been satisfactory.

Corn, the next crop in importance to wheat, has proved a short crop this year, owing to excessive wet all through the proper time of preparing the ground and planting. Very little was planted till June; much seed rotted, and replanting continued till July; then haying and harvesting prevented suitable after-cultivation; and although the favorable fall ripened nearly all that set for ears, still there is a great falling off from former crops.

There is at present a tendency to seeding down lands to grass. The low price of wheat, and the increased demand for beef, mutton, wool, and swine, are fast decreasing the quantity of land in wheat; and as "one extreme follows another," it is to be expected that wheat and corn may soon bear a high price in proportion to other farm products. The advocates for an equilibrium of prices are probably doomed to everlasting disappointment, or at least as long as men are free to cultivate the crops they think the most profitable, and he appears to be the most successful in money-making who shapes his business so as to be a little ahead of his neighbors in meeting the vacillations in the markets. Some may sneer at the idea of money-making being regarded as a part of good farming; but with all due deference I submit if that is not, in our country at least, the main point in farming, mechanics, and the sciences—in church and State? It is this consideration which induces us to prefer purchasing more lands to graze our flocks and herds upon at $10 or $20 per acre, rather than double the produce of the old homestead by under-draining, subsoiling, and manuring, at an expense of from $30 to $50 per acre. These outlays for improvements so highly recommended, and no doubt very beneficial, will of necessity be delayed in any country, till population becomes dense and lands high-priced.

In looking over your former Reports, I have been amused as well as instructed. Some will figure up wonderful profits on sheep husbandry; others on this or that crop. One, I recollect, apparently a very intelligent gentleman of Illinois, says he can "raise a pound of fine wool as

cheap as any man can raise a pound of pork." His location must be a sort of sheep-paradise; and, since Illinois is famous for corn and pork, it would seem that a man might get rich very quick at wool raising there, at the present prices. I am no great farmer: what little bringing up I had in that line was in the woods, and among the stumps, where scratching the ground was about all we could do, and about all that was necessary, to insure enough to eat and drink; and as to the surplus, it was little matter whether we had any or not, where nobody wanted to buy. We made no great profits then; and although I have since tried almost every kind of crop suitable to our country, and have been about as successful as my neighbors, and my neighbors about as successful as "*the rest of mankind;*" still, I have never found any kind of farming that would much more than pay expenses, if the work was all hired and paid for. It is as true now as in "Poor Richard's" time, that—

"He that by the plough would thrive,
Must either hold himself or drive."

We cannot reasonably expect more than a moderate per cent. profit, one year with another, in any branch or all the branches of agriculture; and I believe, in nine cases out of ten, those do best who pursue the even tenor of their way, taking care to have a "little of all sorts," so that if one or two kinds fail, there will be others to fall back on—slacking up on those branches which are overdone, and "letting out a link" on those which promise better—carefully adopting new improvements, and experimenting, on a small scale, with a view to new discoveries. Raising extravagant expectations, by overdrawn estimates, sends many people from one branch of industry to another, in a sort of jack-o'-lantern chase after wealth, through the bogs and quagmires of disappointment and poverty. Those of my acquaintances who have for a series of years patiently pursued their course—carefully doing *well* whatever they have undertaken, and practising frugality and *sobriety* withal—have attained to competence; while those who have been chasing one scheme after another that held out the promise of sudden wealth, have "*come up*," like the Dutchman's hogs, "among the missing."

Fruit Culture (especially apples) is growing more and more into favor. From expriments made this fall, and previously, we think apple orchards are very profitable for making pork, and a good sour apple is much better for that purpose than a poor sweet one. Hogs permitted to run at large in an orchard from the time the apples begin to fall till winter, with a little corn to finish on, make excellent pork, and at small expense, when compared with corn-made. They are good also for other stock, especially young colts; and so well do our people now understand this matter, that this season scarcely more cider has been made than will suffice for vinegar—apples being mostly used for feeding.

I threatened the New Jersey peach-growers with competition from our lake region, in a few years, in my former communication. I beg leave to withdraw the promise till further advised. The most popular varieties of peaches have not stood our climate very well for two seasons past, and the *curculio*, also, appears to have an excellent taste for them—discriminating very nicely between a late sour peach and a fine-flavored "Honest John." We know of no remedy for this pest. The peach worm may be kept under in various ways. Digging them out about 1st of May, 1st of July, and again in November, I find the surest and about

as little expensive as any way. The extreme cold of last winter destroyed some trees, and utterly ruined the fruit-buds. This is the second time, in thirty-five years, that the cold has been so severe. The thermometer indicated, in December, from 10° to 12° below zero, which killed nearly all the fruit-buds of the largest and best varieties of peaches; and in January the mercury went down to 18° and 20° below zero, which, I believe, was about the climax of cold weather ever known here, and destroyed even the hardiest kinds, which had stood the former cold unharmed.

For the benefit of orchardists, I will relate my experience with the fire-blight on apple and quince trees: About fifteen years ago it made its appearance in this vicinity. It attacked a corner tree in my orchard, and gradually spread from branch to branch, till, in six or seven years, the whole tree was nearly dead. It spread to the adjoining trees, till it had overspread an acre or two, more or less. Having learned that cutting off the infected branches and burning them was the only reliable way of getting rid of it, I commenced doing so, although it seemed a great task. I cut down the corner tree, and lopped off most of the tops of others, and followed the scourge close for two or three years, cutting off every little twig I could find infected, and committing them to the flames, twice or thrice during each season. The result has been most satisfactory; and for two years past I have not seen a blighted limb in my orchard. The labor was much less than I expected, also; and I would urge it upon all to apply the knife and fire to their blighted trees, for their own and neighbors' sakes. I conclude, from the manner of its progress, that the insect which causes the blight does not itinerate far in one season, and may be successfully combatted as above described. The curculios, on the contrary, seem to circulate extensively; they have wings, and know how to use them, as any person may satisfy himself, if he will place one in an uncomfortably-warm place for a short time, though they are not over-fond of displaying their aerial capabilities on common occasions.

The displays of stock, crops, manufactures, improved implements of tillage, &c., at our State and county fairs, which are becoming quite common in Ohio, are doing very much to foster a spirit of improvement. Very many attend, and, by contact with others and their improvements, a spirit of generous competition is promoted; the rust of home-born ideas is rubbed off; new acquaintances and new attachments are formed; the scholar learns from the clown, the clown from the scholar, and all are mutually benefited. It would hardly be supposed that any who are able, and like to enjoy the pleasures and profits of such exhibitions, would be so parsimonious as to refuse to contribute their mite towards their expenses. Experience shows, however, the contrary; and many are content to let their neighbors bear the expense, while they reap equal benefits with them. This parsimoniousness has compelled the managers to fence the grounds, and demand an entrance-fee to meet expenses, which, to some extent, excludes the poor. If all who are abundantly able would contribute their dollar a year, (and how could they expend a dollar to better advantage?) there would be ample funds; the fencing might be dispensed with, and the high and low, rich and poor, enjoy their benefits equally. But we read of a time, "There were giants in those days." I suppose there were *little men*, too, as there are in these days. However, we may charitably conclude it is more from want of reflection on the subject, than from intrinsic littleness, that so many stand aloof from bearing their share in the burdens incident to this means of improvement.

Yours, respectfully,

BENJ. SUMMERS.

BUCYRUS, CRAWFORD COUNTY, OHIO,
December 29, 1852.

SIR: In answer to your Circular, received some time since, I will submit the following: In the culture of *wheat* there is no manure except barn-yard used in this vicinity, and that, if fresh and applied directly to the wheat, is as often an injury as a benefit; the preferable mode is to apply it to a previous crop. A good sod of clover, Timothy, or blue-grass, turned the middle of August, harrowed until well pulverized, sown about the 10th of September, with 1¼ bushel of seed, is, I think, the surest and cheapest way to raise wheat with us; the favorite varieties at present are the White-Blue-stem and Mediterranean. Should suppose the average yield, with good cultivation, to be 20 bushels or over; the last crop was not half a one, owing to injury done by red weevils, the Mediterranean escaping with least injury. Sowing early varieties is thought to be the only way of escaping their ravages. I am inclined to think the yield per acre increasing. The average price for the last year at Sandusky city would be near 72 cents per bushel; and at different points along the Cleveland, Columbus, and Cincinnati railroad, a few cents less. Our best farmers seed their wheat in the spring, with clover or a mixture of clover and Timothy seed. The culture of wheat has been rapidly decreasing for several years; stock-raising being more profitable and congenial to the soil.

Corn I think our most important grain crop; and when connected with wool-growing or stock-raising, the fodder judiciously saved and fed will more than pay the entire cost of the crop. In a former communication to your office I gave the details, and will not repeat them here; but I have raised a crop that cost less labor per acre the past season, equal in quantity and better in quality, on the same piece of ground; and it is nothing more than any man can do. It is an expensive way of doing business to raise 15 or 20 bushels of corn to the acre. The premium at our county fair was awarded on a crop of 126 bushels per acre, raised without the application of manure, the ground never having been ploughed before; it has been worth 40 cents per bushel the last year.

As the culture of wheat declined, wool-growing increased, and this county ranks among the first for quality and quantity; all concede that it is profitable. As far as my experience goes, I would say that it costs equally as much or more to raise coarse wool as fine. Coarse-woolled sheep are not so healthy when kept in flocks of 100 or more, and appear to suffer more from cold rains than fine ones. My calculation is, that it costs about 24 cents per pound to grow wool. From 8 to 10 tons of good hay are sufficient to winter 100 head well. There are probably 50 lambs raised for every 100 ewes annually—rather less, I should think.

The *culture of fruit* is extending rapidly. Apples are produced of rare excellence, with the smallest amount of care. Pears, cherries, and grapes, as far as proved, leave nothing to wish for. I have had the Julienne,

Bartlett, Andrell, Leehel, and other pears. Fruit, for several seasons, fairer or finer flavored, have not been produced in the country, East or West. The finer varieties of cherries have failed but little, being of recent introduction, but promise well. The Catawba grape is as sure a crop as are currants, (our most hardy fruit.) The varieties of apples cultivated are numerous; nearly all the varieties that have much reputation in various localities have been tested. Some are suitable for culture here, but the majority are rejected. The Rambo, (late apple,) Sweet Bough, Yellow Harvest, Fall Pippin, Golden Russet, Sweet Putnam Russet, Danvers Winter Sweet, and Phillips's Sweeting, and perhaps a half dozen other varieties, would be worth all the rest. I think that for feed, apples are valuable for working-horses; a half bushel of sweet ripe apples per day, are worth more than that quantity of oats for calves and sheep. In the winter, when confined mostly to dry food, good apples are the very thing they want. An acre of good orchard, taken for 10 years, will make as much pork as two of corn, I am confident.

I tried an experiment in seeding with potatoes the past season, on four rows equal in length and quality.

No. 1.	Planted with large potatoes, produce............	75	pounds.
2.	Planted with very small potatoes, produce.......	67	do
3.	Medium size, cut in two, produce...............	76	do
4.	Medium size, quartered, produce...............	70	do

All were planted at the same time, and same distance apart.

Hoping the day will soon come when agriculture will take the position its importance demands, and wield the influence it is justly entitled to in our glorious Union,

I close by subscribing myself yours, respectfully,

BENJAMIN SEARL.

To the Commissioner of Patents.

Kelley's Island, Ohio, *December*, 1852.

Sir: Your Agricultural Circular for 1852 was duly received. In answer, I send the following observations:

Wheat.—Guano is not much, if any, used on our rich Western soils, where manure of most kinds is wasted, or removed from barn-yards, only because it is cheaper than to *remove the barn;* but more attention must soon be paid to manures. The average yields on old land are less per acre, instead of being better, as they ought to be, under good cultivation. The average yield of old wheat harvested this year in this township, will not exceed 14 bushels per acre—worth, for white varieties, about 80 cents; red, 5 or 6 cents per bushel less.

The best remedy for Hessian fly, known is this vicinity, is late sowing. Wheat sown in November is rarely much injured; and I have never known it wholly destroyed by them. The following recipe will always prove a specific for smut: Soak the seed in strong brine or lime-water (at temperature 100° when first put in) 12 or 14 hours; strain off the pickle, and sift on dry slacked lime. It may lie in this condition two or three days, if not sooner wanted for sowing, without injuring the vitality

of the seed. The system of rotation that has obtained here has been, two crops of corn and two or three of wheat; then corn, followed by wheat, when the necessity of seeding to grass and clover is seen. The soil is a clay loam.

Clover and Grasses.—I have found 6 quarts of Timothy and 2 quarts of clover to be a good proportion and quantity per acre sown on wheat, in March, on light, thawing snow. I have uniformly had a good *catch*, and hear of no complaint from my neighbors, who do likewise.

Corn.—For this crop I plough as deep as possible with the *furrow* plough. Then (on old land) follow in the same furrow with a subsoil plough 3 or 4 inches deeper. Thoroughly pulverize the ground as well as may be; then ridge—*i. e.* throw two furrows together 4 feet from centre to centre. On this plant the seed, in rows 4 feet apart and about 4 inches deep, leaving the seed a little below the average level of the ground. The deep planting prevents birds from pulling it up, and the ridging prevents water from standing on the seed, and is equally a preventive of injury from drought. The best time for planting here has been from the 10th to the 25th of May. Price in this market (Sandusky City) may be quoted, for 1852, at about 42 cents per bushel. The crop for this year is a light one, not exceeding two-thirds of an average yield. I have omitted further details on cultivation, as but little difference prevails with different farmers, unless it may be in hilling when hoeing it; which should never be done—*i. e.* with the gourd-seed variety, which is the only kind that I have much experience in. The best method of feeding it to hogs is to begin early—as soon as it is nearly out of the milk—while the weather is warm and favorable for fattening them, so that they may be ready for the butcher as soon as the weather is cold enough for packing.

Sheep and wool, like neat cattle, are unprofitable where land is worth $20 per acre, except to a very limited extent. The Paular or French Merino—those with fleeces that are gummy on the outside—I consider the most profitable, as the fleece is fine, long, and heavy, commanding the highest price in market, and the sheep are the hardiest variety that I am acquainted with. I do not think that land will yield $2 per acre per year net profit to raise sheep; and not so much for neat cattle, unless for fancy stock and prices.

Grapes are receiving increased attention in this vicinity. The only obstacle to extensive cultivation seems to be a want of knowledge in the management of them—trimming, training, &c. The Catawba and Isabella are the principal kinds raised. From such information as can be obtained from German and French vine-dressers who come to this country, the grape thrives as well here as in their own countries, and the wine made from them is equal to the foreign article. The fruit finds a ready market here at from $2 to $2 50 per bushel of 45 pounds, and is worth more to make into wine. Two hundred bushels per acre may be considered an average crop, yielding over $100 per acre net profit per annum on a capital of $250.

Yours, respectfully,

ADDISON KELLEY.

Federalton, Athens County, Ohio,
November 21, 1852.

Sir: The Circular from the Patent Office of August, 1852, has been received; and in answer to some of the queries therein contained, I make the following observations:

Wheat.—No guano is used in the production of this or any other crop; yield, from 10 to 45 bushels per acre—average about 15 bushels; time of seeding, fore part of September; of harvesting, first of July. As we are not troubled with smut, our seed needs no preparation except thorough cleaning. Quantity used per acre from 1 to $1\frac{1}{2}$ bushel—the latter quantity is none too much on strong soils. Plough once in August, (if green sward or stubble land) ten inches deep; but a great deal is sown among standing corn the last of August and first of September, and ploughed in with the shovel-plough. This mode produces good crops on bottom lands. I am confident the yield per acre is increasing. We have no regular system of rotation in crops. On our bottom lands, corn succeeds corn forever, or wheat and corn alternately forever, without any sensible diminution in the yield. As to the best remedies for Hessian flies and weevils, perhaps it will not be proper to say I *know* of any; but I have an opinion, a speculative belief—a mere fancy, perhaps—in support of which, from the nature of the case, it may forever be impossible to array facts, tangible facts, sufficient to convince this fact *vs.* theory age that it is anything but the veriest whim. However, I will now state what I conceive would be a complete remedy for these mischievous insects, if it could be made available, (of which I have no doubt) and in fact what has always been the chief means of preserving the wheat crops of the whole country from utter destruction by their devastating energies. I have raised wheat on the farm where I now reside for the last forty years, and have never, except one year (about six years ago) been injured by the Hessian fly, nor by the weevil but once, and that was in 1827. This insect, I believe, has never visited this vicinity except at the time alluded to, when its ravages were extensive and terrible. But I hear frequent complaints of the "fly" almost every year. And now for the remedy: This consists in nothing more nor less than the fussy and feathery tribes of the air; and whilst it appears in the distribution of useful employments assigned, by a common Parent and Governor, to every order of animated nature, to the swallow in general, but more particularly to the chimney swallow, is assigned the duty of waging successful and incessant war during the warm season, and until late fall, upon those immense armies of insects which float in the summer breeze, the weevil and "fly" included. These birds, as is generally well known, procure all their food, consisting of insects, upon the wing. After their broods have been reared they partake of but two meals a day, breakfast and supper. In the morning, they range further; in the evening, they procure their food nearer their domicil. When feeding their young they are busy all day.

Now, if these birds can be multiplied to any desirable extent on every farm, I submit, whether their being so multipled would not insure our wheat crops against the ravages of all insects? That they can be so multiplied, there is in my mind, at least, no doubt, and with very little expense and trouble. They always build their nests and rear their young in chimneys. Wherever a chimney stands through the summer unused,

there you will find a colony of swallows; and if permitted so to stand a number of years, the colony will increase in numbers from year to year, until emigration becomes necessary for want of room.

That chimneys made of boards and attached to barns and out-houses, in imitation of real chimneys, at small expense, will attract their proper and natural denizens, is reasonable to suppose; then if the first great prerequisite to the increase of all beings is a place to be; and the next, food sufficient for their support; it follows, of course, that beings so provided for must increase in numbers agreeable to unalterable laws. I can muster but few facts to prop this theory, two of which have already been produced, viz: the swallow takes its food, consisting of insects, upon the wing. I have been but little, if any, troubled with the "fly." One more fact will finish the array. The house I live in has been built twenty-seven years; it has two stacks of chimneys, with two flues in each, from the second floor. One of these chimneys, and one flue of the other, is every summer and fall exclusively devoted to the use of the swallows: here they are permitted to breed undisturbed, and all available means are resorted to, to remedy accidents; as, when a nest is washed down by a hard shower of rain with its unfledged occupants, it is placed in the crotch of a stick and carefully replaced up the chimney. Thus encouraged and cared for, my colony of swallows has become quite respectable in numbers, amounting to something like one hundred in October last. With such an effective corps of champions, I feel quite secure from the ravages of the Vandal fly.

In this connexion it may not be amiss to observe, that whilst affording shelter, protection, and encouragement to one class of birds, the rights and privileges of others are not forgotten; and so far as the influence, jurisdiction, or authority of the writer extends, no bird of any kind is allowed to be killed or injured in any way, or unnecessarily disturbed, excepting always such as prey on poultry or smaller birds. But there is great complaint in some parts of the country of the depredations on cornfields in the spring season, committed by some birds—the black-bird for instance—and no remedy seems to suggest itself to some minds but the destruction of the birds themselves. That is a sure remedy, so far as the individual bird killed is concerned. That a dead bird can pull up no corn, is a clear point; and that it can destroy no more worms, bugs, or other insects, should be equally clear, however much this last and most important fact may be overlooked.

This killing of birds for pulling up corn, resembles somewhat the biting of the hand that feeds us. What! kill your most devoted servant; your only efficient laborer in securing your crop from utter destruction; one who has toiled through the whole spring—has followed close upon your heels in every furrow you have turned; and when you have retired for rest and refreshment, still pushes its unremitting labors, crossing and recrossing in every direction the newly-turned furrows—all to clear the soil of those sure harbingers of fate to your crop, the worm? Such conduct would be better designated by any other appellation than one that denoted good economy, sagacity, or self-interest. But how to preserve the crop without killing the birds, seems to be a mooted point with some farmers. Many plans have been tried, and a number have proved successful; but the writer knows of but one that does not compromise the rights of any of the parties concerned, and that is to sow corn broadcast

through the field just as the planted corn begins to appear above ground, the amount to be regulated by the demand. In addition to this, if it should be suspected that there are many worms in the land, plough a furrow or two between the rows. I am sadly digressing; but, under a strong conviction of the importance of the subject, feel not much inclined to apologize. The price of wheat here is 60 cents per bushel, with an upward tendency. None of the grasses, technically so called, succeed well sowed with wheat, as a general thing; but clover does, if sowed in February or March, as the season is more or less forward. *Varieties:* The Mediterranean is generally preferred, on account of its supposed hardy qualities in resisting rust. The weight of this year's crop is 66 pounds per bushel. Several white varieties are being introduced, among which the Michigan or White-Blue-stem is the most highly recommended. In the opinion of the writer, a sad deficiency exists in the cultivation of wheat. He can see no good reason why 50 or more bushels may not be the average product per acre, instead of from 10 to 20; his mark is made at 40, with a margin for 10 more. To this end, a more prolific variety, as well as improved modes of cultivation, may be necessary.

Corn.—Average product per acre, 60 bushels on bottom, and 30 or 35 on upland; cost of production, when harvested, 14 cents per bushel; market price 37½, with a prospect of higher rates. Best system of culture I do not exactly know. A very good one for bottom land is to plough deep, by which I mean from 10 inches to a foot; harrow thoroughly; and if there are many lumps remaining, roll with a short but heavy roller; mark out with a shovel, or one-horse plough, 3 feet apart, east and west, and a little wider (if the variety of corn be large) north and south. This work should be done with skill and care, as much depends, in the ease and cheapness of after-culture, upon having the rows perfectly straight. When the corn is up three or four inches, plough it out, two furrows in a row, with a one-horse plough; run the plough close to the hills, turning the furrows from the corn. It will not do to intrust this work to a boy, as it will require the whole skill of a first-rate ploughman to do it well; a boy may follow to uncover and adjust the corn. So soon as may be required to keep the weeds in check, plough it the other way, and with a shovel-plough in case the corn has attained a sufficient size to admit throwing dirt into the hill without breaking off the stalks; if not, plough as at first. The next, or third time ploughing, should be done with the shovel, run close to the corn; the fourth time with the shovel, and three furrows to the row, and as shallow as possible. By this time, perhaps other work, as wheat harvest, &c., must be attended to. But if you would raise a heavy crop of corn, it must be attended to also; for which purpose a steady, careful boy, with a horse to match, may be put into the field with a cultivator, which, for the first time, can now be used with advantage, and kept there until the ears generally begin to set, when the corn may be "laid by." If the corn be of a large variety, but two, or three at most, stalks should be left in a hill; if small, four may be admissible. It will be observed that I have not mentioned hoeing in the process of raising corn. The reason is, I do not consider it necessary, but rather that all the hoeing done to corn after it is planted is time and labor thrown away.

For feeding cattle and horses, I think it better to grind the corn and cob together.

Clover and Grasses.—Quantity of hay cut, per acre, from 1 to 4 tons; average this year 2 tons. Timothy and red-top preferred for meadow, sown half and half. Cost of growing hay about $2 per ton. The mode of laying down meadow preferred, is to prepare the land as for wheat, and sow the last of August and first of September; or a better way, perhaps, should the fall prove dry, is to sow among corn in the first or middle of August. In either case, we always calculate on a heavy crop of hay the next summer. Heavy seeding is considered best; but cannot tell how much seed per acre is, or should be, used, as I always sow in the chaff.

Neat Cattle.—Cost of rearing till three years old, is $9; price of steers at that age, $20; of heifers, $15. Value of good dairy cows in spring, $20; in fall, if fresh, the same, or more; if dry, say $16. Steers should be broken to the yoke whilst quite young, say nine or ten months old. When first yoked, let them run in the yoke in a yard or small lot two or three hours every day, until they become habituated to the yoke, and to being yoked; if they turn the yoke, which is generally the case, tie their tails together, which will soon break them of this habit. They should be yoked up several times through the summer and fall. After they are a year old, and practised in all the evolutions you would wish performed by oxen, the succeeding winter they should be yoked once or twice a week, and put to drawing light loads. The third winter they should become thoroughly broken in, so that they understand the word and obey it.

Remarks.—In selecting steers for the yoke, judgment and skill are necessary; in temper, motion, build, and size, they should be alike; docility, mild temper, rather quick motion, a tight and heavy build, and large size, are the desirable qualities of a work-ox. If the opposite of any of these qualities are found in a steer selected for the yoke, dismiss him at once, and substitute another.

The task of breaking steers is commonly, but often improperly, assigned to the boys. It requires not only much skill and some science, but a great deal more patience than is allotted to boys in general, and to too few men. Steers, when under the tutorage of the teamsters, should never be struck a hard blow—should never be treated harshly, either by word or action; but the reverse. They should never be permitted to get away and run from the driver; but should this occur, let him be in no hurry to catch them; and when caught, treat them with the utmost gentleness, as though nothing wrong had transpired. They should never be hitched to a load they cannot draw easily—never should be "stalled"—never hurried when manifesting impatience and disinclination to pull or go ahead, but caressed till their "pet" subsides. When unyoked, it should be done at the time they are calm, and appear inclined to do the behests of their master. They should be put to constant hard labor before the age of six or seven years, when, if well cared for, they can perform as many days' work in a year as a man, without injury, and continue to do so until from fourteen to twenty years old.

Horses.—The growing of horses is undoubtedly profitable. The expense of rearing a colt until three years old is about $15. The best way I have ever found to break young horses for service, is to break them to the

halter when young—say in the winter after weaning; and occasionally habituate them to the bridle until three years old, then break them to the bit by reining their heads up and fastening the bridle-reins to a crupper with a girth and martingale properly adjusted, and turn them loose into a lot by themselves. Do this an hour or two for a few days, until they appear to feel somewhat easy; then add lines and drive them about, until they have measurably learned all the evolutions necessary to a carriage or wagon horse. They (or he, more properly, for but one at a time can be thus handled) are now ready for the saddle or gears. For the gears I prefer using him alone, to putting him by the side of another horse. When properly geared, hitch to a light plough, and go to ploughing on light land, with a double line. Have a hand to lead him around a few times, and walk by his side a few times more around, and he will soon be manageable alone.

The remarks upon gentle usage to steers, apply to the breaking of colts with double force. Neither a stick, whip, harsh word, nor angry look, should ever be employed in breaking a colt; nor should he ever be jerked by the bridle or lines. Much care is necessary to prevent his acquiring the habit of breaking away or slipping the bridle when hitched to a post, by always fastening him with a halter which he can neither get off nor break. Other bad habits must be guarded against, by preventives; for when once acquired, the difficulty of eradicating them verges upon impossibility.

Potatoes.—Sweet potatoes only raised for the table. Of Irish potatoes, the average yield per acre is about 100 bushels; cost of production 25 cents per bushel. The best variety for table use (but not most prolific) are what we called in Vermont, when I was a boy, Blue-noses; cost of culture 25 per cent. more than other varieties; worth 50 per cent. more. I have been acquainted with this variety fifty years; in this time it seems not to have degenerated in yield or size. Whatever manure is best, leached ashes in the hill, and a handful of unleached ashes on the hill, are in most soils necessary.

Respectfully submitted:

ELMER ROWELL.

To the COMMISSIONER OF PATENTS.

CANTON, STARK COUNTY, OHIO,
November 24, 1852.

SIR: Your Circular is received; and, in reply, I would say that there is no guano used in this region. The average yield of wheat in Stark county for the last three years is about 20 bushels per acre. *Wheat* being our principal staple, many efforts have been made to increase the product, the most successful of which is the ploughing under of *clover crops.* The usual method is as follows: First, ploughing in May for fallows; re-ploughed or "stirred" in September, and wheat sowed or drilled in from 1¼ to 1½ bushel per acre. In February or March next succeeding, it is sown with clover-seed, from 8 to 10 pounds per acre. The usual practice is to pasture the clover after harvest. The next spring, in May, gypsum or plaster is applied, from 60 to 80 pounds per acre. In June, or early in July, about 2 tons of hay per acre may be made. The field may then

be left for seed, or for pasture, or again mowed for second-crop hay, or turned under for wheat. The usual method is to plough under the clover and seed with wheat, without any second ploughing. This method makes a crop of wheat every third year, and gradually improves the soil. If the soil becomes foul, or has a heavy sod upon it, one well-worked crop of corn will make it mellow. It may then be sown the next spring with oats, and then be in good order in the fall for seeding with wheat. We usually put stable-manure upon fields intended for corn, and lime, also, if there is much sour grass. The quantity of wheat produced per acre is gradually increasing. We have very few weevils of late; the Hessian fly, rust, and late frosts are our most serious evils, for which we know of no effectual remedy. Early-sown wheat is less liable to rust, because it ripens earlier, but is more likely to be injured by the fly, especially if the fall is late and warm. The best varieties of wheat are the Soule or Yorkshire flint, the Genesee white, and the white Blue-stem. These varieties, for extra flour, are worth from 3 to 5 cents per bushel more than the common red wheat, and from 6 to 8 cents more per bushel than the Mediterranean. The red varieties, however, are all more hardy than the white. The Mediterranean is so hardy and of such vigorous growth that the ravages of the Hessian fly have very little effect upon it; but they are all so much lower in price that they are rapidly giving place to the varieties first mentioned. There is another subject connected with wheat-growing worthy of remark: it is of great advantage to procure seed-wheat from a distance, even though the distance be but a few miles and though the same variety of wheat be procured, experience having fully established the fact that wheat will deteriorate unless a different variety is sown, or new seed obtained. Average price this season per bushel of 60 pounds, 70 cents at Canton, and 75 cents at Cleveland; price now, 83 to 88 cents.

Clover and Grasses.—Our average is about 1½ ton of hay per acre. Timothy and clover mixed make our best upland meadows. Red-top and Timothy are considered the best for low lands. Red clover is not injurious to horses.

Dairy Products.—We make very little cheese in this county. A good cow will yield 200 pounds of butter per year. Our best butter-makers have what we call a "spring house"—a small building of stone or brick, with large shallow troughs, through which run streams of spring-water. After milking and straining, the pans or crocks of new milk are placed in these water-troughs, and the cream soon rises to the top. The barrel-churn is the kind in general use here. To preserve butter in warm weather for a week, it must be worked over until the milk is all expelled; to peserve it for winter use, it may be packed in stone jars, containing about 20 pounds each, with 1 pound pulverized rock-salt, ¼ pound loaf sugar, and ½ ounce saltpetre. The crock or jar should then be covered, first, with a clean white cloth, and then with drilling or heavy muslin, dipped into a preparation of melted tallow and beeswax, and bound round tight with wire, to exclude the air, and then deposited in the spring-house for winter use. I assisted in preparing butter on the above plan for the California market, and it was sold there, fresh and sweet, for $1 50 per pound. Butter here is worth from 10 to 12 cents per pound in May and June, and from 15 to 16 cents per pound in the winter.

Cattle.—It is worth about $15 to raise cattle to 3 years old, and they are then worth about $20. A good cow is worth $20 in the fall, and $25 in the spring.

Horses.—It is worth $35 to rear a colt to 3 years old, and it is then worth from $45 to $55; at 5 years old, $75 to $100 each.

Hogs.—Best breeds, Berkshire, and Berkshires and Leicestershires, or grass breed crossed; cheapest and best food, grass and corn.

Sheep and Wool.—No wheat-grower should be without sheep; it is profitable to grow wool, and the business is rapidly increasing. Our native sheep are the most hardy, and yield the heaviest fleeces; yet, taking the price into consideration, the growing of fine wool is the most profitable. Large sheep are the most salable for mutton, but they generally produce a coarser fibre of wool.

Potatoes.—Long reds most productive; average yield, 150 bushels per acre. Meshanocks and Pink-eyes, best for table use. But few sweet potatoes raised.

Fruit.—Quantity and quality improving. Fruit-growing would be quite profitable here if it were a certain crop—frequently injured by late frosts; sweet apples are about as good for hogs as potatoes, but not so good for cattle or horses. A free use of urine will prevent blight on pear-trees.

Yours, truly,

MADISON RAYNOLDS.

CUBA, CLINTON COUNTY, OHIO,
November 1, 1852.

SIR: I offer to you a few remarks on crops, as I am a friend to agricultural science, and am always willing to give any information in my power.

Wheat is the principalcrop raised in this (Clinton) county. The principal varieties are the Mediterranean, the Red chaff bearded, the Rock, and the Golden straw. The first named was generally raised in this section till last fall, when farmers concluded to sow the Rock wheat, which is, in my opinion, the best variety we have; it does not weigh quite so much per bushel as the Mediterranean, but produces more and better flour, and is harvested about the 4th of July; the Golden straw ripens a little later than most other kinds, and is therefore liable to rust. The best manure for wheat here is clover sod and lime; the land in this county lacks lime for wheat. The average yield per acre is about 12 bushels.

Oats.—I have tried the common black oat and the large white oat. Both kinds answer well; the former grows taller on poor land than the latter, ripens a little later, and weighs heavier, but does not look so well, owing to its color. The cultivation of oats is becoming unpopular among our best farmers, believing that it impoverishes the land more than Indian corn; but upon the whole I think it the best and cheapest feed for horses and oxen. Average price at Cincinnati market, 25 cents per bushel.

Rye not much cultivated; therefore, can say nothing of it.

Indian Corn.—There are many varieties of this grain raised in this county. The large white is mostly grown for bread, but the yellow flint is the strongest feed for stock, containing 5 per cent. more nutriment than any of the white. The average per acre is 40 bushels. Corn is worth at this time 40 cents per bushel at our nearest market. Corn blades are excellent food for sheep, cows, and horses; for sheep they are superior to the best hay.

There are a great many meadows in this county. Timothy is extensively raised for seed; herdsgrass and red top are grown for the market; and hundreds of tons are taken in bales on the cars from Westborough to Cincinnati, where it brings from $9 to $18 per ton.

Clover is raised for manure and for seed; the seed bring $4 per bushel. Clover makes an excellent manure; it should be ploughed under in September, while in blossom; and for wheat crops it is better than plaster. Many are burning lime to spread over their fields, which has raised the fertility of the soil so that 75 bushels of corn may be as easily raised on an acre as 25. The average in this county, as stated above, is 40 bushels of corn to the acre; but we think it will increase.

I am, respectfully, your obedient servant,

S. S. G. FRANKLIN.

To the COMMISSIONER OF PATENTS.

MARION, MARION COUNTY, OHIO,
November, 1852.

SIR: Your Agricultural Circular, directed to my address, was received in due time. My remarks will be brief, and confined to a few items in which I have the most *practical experience* and *success*, and will be limited to the products of this county.

Corn.—Guano is not used for this crop. Our average product per acre, taking the whole county, is known to be between 40 and 45 bushels per acre; for this year I put it at full 45 bushels. Whilst this is the average, there are some few whose annual crops are 80, 90, 100, 110 bushels, or more, per acre. My own crops, for eight years past, have ranged from 80 to 110 bushels per acre, whilst some of the adjoining crops, on soil equally good, have not exceeded one half that amount; and I attribute this difference wholly to the *care* and *attention* bestowed in the one case, and neglect in the other. I haul out my barn-yard manure in winter, generally on a sled; plough early in the spring, with four good oxen, and go as *deep* as they can well go through; when a little dried on top, I harrow well, and mark out 3½ feet each way; plant from 1st to 10th of May; much depends on the quality and productiveness of the *seed:* this I select when gathering my corn in the fall, using no ear having less than 16 rows, some as high as 22 to 24 rows, and having from 800 to 1,100 good kernels; carefully drop, in the right place, 5 to 7 kernels, covering full two inches deep. When fairly up, I run a small mould-board plough, two light furrows in a row, throwing the earth from the corn; in five to six days, I again plough (crosswise) in the same manner, and *this time* hoe carefully, and where more than four stalks of corn are in a hill, thin them out, leaving the *four most vigorous;* in ten days more I plough, third time, and now throw the earth *to* the corn, and plough some deeper, also use the hoe to right up corn and remove all the weeds; in ten days I again (fourth time) run the plough twice in a row, and throw the earth to the corn, and this time plough *deep;* if the

weather is dry, in eight days more I again run the shovel-plough through *once*, each way, (5th time,) and plough as deep as the horse can well draw. It is now done with until it is dry enough to cut up. I haul out 8 loads manure per day, enough for one acre: cost, $2; ploughing with 4 oxen and 2 hands, $2 75 per acre; harrowing with 2 horses, 33 cents per acre; planting, 75 cents per acre; a boy and a horse will plough, twice in a row, 4 acres per day: say 5 ploughings and 2 hoeings, $2 25 per acre; cutting and stacking, $1 25; whole cost, $9 33 per acre. Crops thus managed will average—say 90 bushels per acre, and is worth in the shuck 25 to 33 cents per bushel—this year 33 cents; if sold for feeding, it is not husked; if husked, the fodder will well pay for husking; (10 acres of this fodder will well keep through the winter 15 head cows and steers;) 90 bushels at 33 cents is $29 70; deducting expenses, will leave over $20 per acre. This will pay taxes and interest on $300, though the value of this land is about $25 per acre. These lands are "plain," (prairie,) and will give 33 per cent. more corn, generally, than cleared woodland. Our corn crop is the most certain crop we raise; more profitable, and far more *certain,* than a wheat crop, and is less affected with the early drought than the hay crop.

Hay crop.—Our *average* crop of hay is between 1½ and 2 tons per acre. Seeds preferred for "plains" are Timothy and clover, two-thirds of the former and one-third of the latter, sowing 6 to 7 pounds per acre. Counting the grass at $2 per acre, hay, in the stack, *costs* about $2 50 per ton.

My experience is that "red clover hay," cured in the *sun*, is injurious to horses. Where my grass is *all*, or nearly all, red clover, after being cut and well wilted—say five to six hours in the sun—I put it into small cocks that will make 60 to 70 pounds hay, when cured, and leave to make four to five days. If showery, put green clover or fine grass on top of the cocks to shed the rain. When well made turn the bottom of the cocks to the sun two to three hours before hauling in. Clover hay thus made will retain nearly all its leaves and blossoms, and is, I think, much better.

Natural Meadows.—Our *plains*, as also most of our uplands, afford the best natural meadows I have ever met with. There is a very large spontaneous growth of blue grass, June grass, Timothy, red and white clover, red-top, &c., &c., which give a continuation of the most nutritious pastures, from early spring to hard winter; and, where cattle are shut off from the 1st of September to the 1st of December, they afford tolerable pasture through the winter, when not covered with snow and ice.

Neat Cattle.—"Cost of raising till 3 years old," I put at 40 cents per month, or a cost of $14 40; 3-year-old steers are worth $25 to $30; heifers, $15 to $18; good dairy cows, in the spring, $20 to $25; in the fall, $15 to $18. Permit me here to add, that for eight years past I have practised raising *calves* from grade Durham and *good* common cows, got by full Durham bulls, leaving the calves, as soon as they can suck *all* the milk, to run with the cows in good rich natural pastures until they are 6 to 7 months old. At this age they generally weigh from 600 to 750 pounds, live weight, and are worth from $15 to $25 each, and are readily sold at these prices, even to the butcher when retailed at 6½ cents per pound for meat; hide and tallow, they come to from $20 to $25. A heifer calf of my raising, 7 months old, killed a few days since, averaged over 80 pounds per quarter; the two kidneys, cut from the hind quarters, with the usual tallow attached, weighed 45 pounds. The calf had nothing but the milk of its dam, and she no feed but the usual pasture. Is not this much better than to *stint* them for 18 months, then send them to New York, or Brighton, and there to sell at $7 to $9, the present quoted sales of yearlings in those markets?

In August I lost four calves, (from an unknown disease,) the largest and fattest of the herd. The first one, I opened and examined carefully, (I had refused an offer of $30 for it a week before;) the centre of its heart and part of its liver was mortified. In a few days I lost two more: one showed as healthy and beautiful meat as I ever saw; the other, though opened in 30 minutes after death, had its entrails so mortified as to drive us away. I then bled and gave physic to the balance, (10 of them,) but lost one more in a few days. Those that died were two Durhams, one three-quarter and one one-half blood; the four were worth at least $100. I attribute their death to their great fatness, and the extreme heat of the weather; my thermometer ranged from 94° to 98° in the shade, some days. I first discovered their illness by their refusing to suck. They died in 18 to 24 hours after being taken. My intention now is, in future, to bleed them once or twice during spring and summer.

Oats for Milch Cows.—In November, 1851, I had a cow come in fresh. She was old, but an excellent milker. I fed hay, corn fodder, and corn in the ear; most of the corn passed through her whole. She lost flesh and fast shrunk her milk. I quit feeding corn, and fed six quarts of oats per day; in five to six days she increased her milk from 50 to 60 per cent. Oats at 20 cents a bushel made a day's feed of six quarts, four cents per day, while the *increase* of her milk was one gallon and a pint per day, equal to 17 cents; this was a daily interest of 300 per cent. on the oats fed.

As I fed and milked this cow, and do a daily portion of the work on my farm, I profess to know something of what I have here written.

I will now close my remarks by copying a few items from my "annual report of Marion county" (just written) for the "Ohio State Board of Agriculture."

Wheat, average crop this year, 15 bushels per acre.
Corn, average crop this year, 45 bushels per acre.
Oats, 30 bushels per acre.
Clover seed, 4 to 5 bushels per acre.
Timothy, 5 to 8 bushels per acre.

Sheep and Wool.—100,000 sheep and 285,000 pounds of wool; average value, 40 cents per pound.

Pork.—Quantity uncertain from constant sales and transportation.

Beef annually raised in this county, 6,500 head; average value at four years old, $35.

Beef annually *fatted* in this county, 11,000; average value at four years old, $35.

Horses annually *raised* in this county, 1,200; average value at four years old, $70.

Horses annually kept in this county, 7,500.

Respectfully.

JOSIAH S. COPELAND.

JEFFERSONVILLE, FAYETTE COUNTY, OHIO,
December, 1852.

SIR: In compliance with your request in the Agricultural Circular of August, 1852, I proceed to make such suggestions as may be profitable to the agriculturist in our part of the world. The soil in Fayette, as well as in some of the adjoining counties, is generally very deep and rich; its greatest fault is in being too low and wet, which, however, can be speedily remedied by draining at a much less cost than soil in more dry and sandy localities; the past experience of agriculturists in this county proves that deep draining and a proper rotation in crops will not only keep up our soil, but make it produce better and better every year without manure of any kind.

Wheat.—This crop is not cultivated to any considerable extent in this county, our soil not being very well adapted to its growth; the yield, however, is on the increase as our soil becomes older and better systems of cultivation are introduced. It is a common practice among farmers to seed corn land after the corn is cut up, which is generally later than it should be sown, as it is more liable to winter-kill than that which is earlier sown. The better plan, however, is to seed fallow land which should be broken up the forepart of summer, stirred again just before seeding, pulverized with the harrow, then sow and harrow in well, and if a heavy roller be run over the ground, it is the better, as it "spews" up less in time of freezing. Average yield per acre, about 15 bushels; best variety, Golden shuck and Mediterranean.

Corn.—This crop is more generally cultivated than any other with us, our soil being well adapted to its growth, and the cost of production not exceeding 9 or 10 cents per bushel, clear of ground rent. Mode of cultivation, on sod and other strong lands, is to plant, by means of drilling machines, in rows 3 feet apart, stalks from 6 to 12 inches apart; two ploughings with a cultivator are thought to be tolerable tillage; average yield, 60 bushels per acre; average price, 25 cents per bushel, in the field. A great portion of our corn is bought up annually for the purpose of feeding cattle. Manner of feeding is to haul out corn and fodder together, scatter them abroad on the ground, and let the cattle help themselves, while at the same time two hogs to the bullock thrive and do well on the litter. This causes the feeder to have two feeding lots, that, while the cattle are in one, the hogs are in the other; and thus change every day.

Barley not cultivated.

Oats limited; thought to be very exhausting to land; average yield, about 40 bushels per acre; average price, 20 cents per bushel; quantity of seed to the acre, 1½ bushel.

Rye is coming into general favor among farmers; is thought to be a great renovator if it is (as we term it) "hogged down on the ground." Some prefer it to clover, as it affords good fall and spring pasture, and gives hogs a fine start after harvest before corn-feeding. Rye two years, and then corn, is a good rotation.

Clover not much cultivated for anything except hog pasture, and as a renovator. Whether it is injurious to horses or not I cannot say; but it is not to hogs I am certain.

Timothy is generally preferred in laying down meadows; quantity of seed per acre, one gallon; quantity of hay, from 1½ to 3 tons per acre, without any other manure than the droppings of the stock necessary to eat off the fall pasture, and such of the hay as is not fed to horses in stable; meadows may be kept up for any length of time; cost of growing hay, including ground-rent, $1 50 to $2 per ton; usual price of hay in stack, $2 50.

Neat Cattle.—Cost of rearing cattle till 3 years old put at from $15 to $18 per head; usual price at that age, from $20 to $25 per head. Good dairy cows vary from $18 to $25 per head, according to quality, always bringing the highest price in the fall, if promising well as winter cows. A given amount of food, it is generally conceded, will produce more meat in a Durham than in a native animal by one fifth; the Short horned Durhams having the preference.

Horses.—The growing of these animals is profitable at present prices. Cost of rearing a colt till three years old, $36 to $40; usual price at that age, $60 to $80. Mules cost from $25 to $30; usual price, $80.

Wool-growing is on the increase, and is found to be profitable. It is probable that the growing of fine wool is most profitable, as the small fine-woolled sheep are far more hardy than the larger coarse-woolled sheep, and can be kept in good order on such living as would in nowise support large ones. The cheapest method of wintering is to have good winter pasture, feeding only in severe weather—in times of snow; and then corn-fodder is best.

Hogs.—We can boast of being able to produce pork as cheap as can be done almost anywhere. The Grazer, from his disposition to fatten at any age, has the preference. The cheapest method of producing pork is to graze all hogs, six months old and upward, from May till July, on clover, without grain of any kind; then put them on rye six weeks or two months; after which they will require but little feeding till ready for maket. Spring pigs are frequently put into heavy market; but this needs closer attention and more grain, as it requires also a plentiful supply of rich swill all the time. Older hogs thrive better, and yield a better profit from fall feeding, if grazed in summer.

Root crops in general not cultivated as field crops; but are confined, as a general thing, to the garden, or cultivated for table use only. Potatoes are undoubtedly a good feed for hogs, but are considered too much trouble, as they are of little value without cooking. Best manure for potatoes, half rotted straw or leaves, applied at the time of planting.

Fruit is not cultivated beyond a necessary supply for home consumption, or rather for table use only; not relied on as feed for stock or exportation.

Manure.—Very little attention is paid to this article further than to remove the unavoidable accumulations in stables and barn-yards to the garden, or some poor spot in the field.

Thus I have glanced at the most prominent points in agriculture in this vicinity, deeply regretting that my effort is so feeble; but such as it is, I place it at your disposal.

Very respectfully,

H. CREAMER.

To the COMMISSIONER OF PATENTS.

ADRIAN, MICHIGAN, *December* 16, 1852.

SIR: To such of the questions contained in the Agricultural Circular from your Office, sent me, as I am able to reply to, I proceed to give you such answers as I believe to correspond with the experience of this part of the country.

Wheat.—Up to the present time the average product of wheat per acre in this State has not exceeded ten or eleven bushels; yet the average product where the land has been properly cultivated and manured has not been less than twenty bushels, and in isolated instances has reached from fifty to fifty-five. Like the other new States, Michigan was settled principally by persons of limited means, whose inability to procure the necessary aid for cultivating the soil well, and the necessity of relying almost entirely upon their own labor for clearing and tilling their lands, have led to the most negligent culture, and to such successive croppings of their limited improvements as have, in a great measure, exhausted the soil before they began to restore to it any of its original fertility. With them cheap cultivation and quick returns were a necessity. The average product per acre may now be said to be increasing, and will soon be double what it has ever been heretofore.

Farmers are using now a larger quantity of seed than formerly; not less now than a bushel and a half per acre, while formerly the average did not exceed a bushel. It is usually sown broadcast without any previous preparation, though some of our best farmers first coat it with plaster or lime, expecting thereby not merely to manure it, but also to prevent smut.

Summer fallowing is still general, though gradually, I think, falling into disuse, and once ploughing from 8 to 10 inches deep is being substituted. Opinions differ greatly as to the comparative merits of the two modes.

The average price of wheat at Adrian the present year has been 70 cents; at Toledo, 74.

Corn.—I think the average product of corn in this county about thirty bushels per acre, and the cost of production, harvest, and thrashing about 20 cents per bushel. The soil of the county will produce one hundred bushels per acre in favorable seasons, with good culture, and crops still larger have been produced here. The price of corn varies from 31 to 48 cents per bushel, and it is, therefore, a much more profitable crop than wheat. Corn is usually planted in hills of three or four stalks each, about three and a half feet apart each way. A much better mode, I think, is the planting of one kernel in a place in rows from three to four feet apart; the kernels to be dropped—say twelve inches apart in the rows. The advantages of this mode are obvious. The roots of the plants are more evenly diffused over the ground in search of the moisture and nutriment; the hoe meets with less difficulty in reaching the weeds about the stalks, and the plants shade each other less. The rows should be planted north and south, to give the sun access to the plants.

Corn is fast becoming the most important crop of the State. The quantity raised is now greater than that of wheat, and its higher comparative price is inducing every year a still more extended production.

Wool-growing is universally believed to be profitable, which is, perhaps, sufficient evidence that it is so. The crop is annually increasing, the amount exported from this county the present year being about

270,000 pounds, which was purchased from the farmers at an average price of 31¼ cents, and the most of it resold, before leaving the county, at an advance of from 2 to 3 cents. This amount, of course, includes no portion of that retained for manufacture in the various wool factories of the county, and in families. Grade sheep are, as yet, by far the most common, though the French and Spanish Merino, and Leicestershire, are being gradually introduced. There are also some flocks of Saxon, but they are not general favorites, and will be supplanted among the growers of fine wool by the larger and heavier-fleeced Merinos. Near the large villages and cities, where mutton is in good demand, the Leicestershire is undoubtedly the most profitable breed for the farmer, and is believed by many to be the most profitable everywhere.

Fruit culture is receiving increased attention every year, and large numbers of the choicest varieties of apple, pear, cherry, and peach trees are now being sold among our farmers by the nurserymen of this State, Ohio, and New York. Apples, however, are not as yet grown for food for stock to any considerable extent. The best varieties for winter use, and for exportation, are the Yellow Bellflower, Newtown Pippin, and Spitzenberg. Next to these are the Sweet, the Roxbury Russet, the Talman Sweeting, the Bellmont, the Vandevere, and the Greening; but the value of the last, for market, is diminished here by the circumstance of its not keeping so well as in New York and New England, where it is at its prime from January to March, while here it begins to ripen by the 1st of November. The Baldwin, the farmer's market-apple of New England, and the Northern Spy, equally famous in western New York, are as yet but little tried among us. The Yellow Harvest, early and late Strawberry, Fall Pippin, Hawley, and Rambo, are the best summer and fall market-apples; but the market is usually overstocked at those seasons, so that the cultivation of the best keepers among good varieties is much the most profitable, and, I think, more profitable than anything else in which a farmer here, with a small capital, can engage. Good winter fruit sells readily here at this time for 50 cents per bushel, though the crop has been an abundant one.

We are not as yet troubled to any great extent with the blight on apple or pear trees, nor with the yellows on peach trees. More difficulty is experienced with cherry trees than with any others. The tree is being often destroyed, or rendered unsightly and unhealthy, by the bursting of the bark on one side—usually the side exposed to the sun—leaving the wood at the opening to deaden and decay. The difficulty seems to consist in a too rapid growth of the wood for the growth of the outer bark, and the remedy needed is something to check that growth. Seeding down the cherry-orchard is one remedy. Perhaps root-pruning would be less likely to diminish the size and quality of the fruit. Pealing off the outer bark is recommended by some Western pomologist, and I have seen it tried, on a small scale, the present year, with apparently good success.

Grapes.—Our native grapes, the Isabella, Catawba, and Cluster, grow luxuriantly here, and produce abundantly, but are not cultivated for wine, except to a small extent for sacramental purposes.

Root crops are by far the most profitable of any of the crops raised by the farmers for feeding stock, and it is matter of great surprise that they are not cultivated to a greater extent than they now are. Rutabagas,

sugar beets, and mangel wurzels can be raised on the lands of this county at a cost varying from 4 to 7 cents per bushel, including the expense of harvesting and housing; and a clear profit of from 200 to 400 per cent. on the expense of raising them is thus realized. This fact is beginning to be understood, and, together with the fact that by feeding them so much more stock can be kept on the same number of acres than by raising any other crop for that purpose, are introducing them to general favor. A fair crop of either of the above roots is 500 bushels per acre, but with extra care and cultivation 1,200 bushels may be raised.

Carrots will not yield quite so much per acre, and, as they require the same care, they cannot be produced so cheaply. They are, however, believed to be more valuable than the rutabagas, and equally profitable to raise.

Tobacco is now being cultivated here to a small extent, and promises to be extremely profitable. I think its cultivation is destined to increase very much within the next two or three years.

Yours, very respectfully,

THOMAS M. COOLEY.

ROMEO, MACOMB COUNTY, MICHIGAN,
October 8, 1852.

SIR: The annual agricultural fair for this county has just closed at this place. There was a good display of all kinds of agricultural, mechanical, and ornamental products. This is but the third year since a fair was first held in this county. The principal products of the county are wheat, oats, corn, hay, and potatoes; of each of these there were fair specimens. Of horses, the display was fine, from the yearling to the full grown horse. The breeds of horses have very much improved within a few years. Of stock, there were Devons and Durhams, and crosses of both with natives. Of sheep, the assortment was large, from the full-blood Merino and Saxon to the Bakewell and Southdown. Of hogs, the number was not large nor anything extra. Butter and cheese were, probably, as good as are made in the State. The judges on butter were puzzled to decide: there were so many specimens, and all so good, and so much alike. Indeed, the large number and variety of articles and animals entered for premiums speak well for the enterprise of our farmers. This is one of the smallest counties in the State, but it is settled by emigrants from New England, New York, and New Jersey, with a sprinkling of Irish, Scotch, English, and French Canadians, who are all industrious, and improving in property and intelligence.

Fruit.—The variety was large, particularly of apples. One farmer had 54 varieties, others 40 and 20; some very fair and fine flavored. The best varieties are the Spitzenberg, Rhode Island Greening, Northern Spy, Seek-no-further, &c. The lateness of the season made the display of other fruits smaller than they would otherwise have been. Of articles in the domestic and needle-work department, the display would well compare with any of the State fairs; showing that our ladies are as enterprising and industrious as the lords of creation.

The crop of wheat this year has been about an average one; the straw was light and short, but the berry plump. Corn is a very poor crop; oats the same. Hay, light. Potatoes, about an average; but little complaint of rot. The summer has been a very dry one. Wool has been a good crop; the clip in this county will probably reach 150,000 pounds. Of this amount, over 80,000 were brought in this village; the price here averaged about 32 cents. Last year the amount purchased here was about 60,000, at an average of about 36 or 37 cents. There are in this county nine flouring mills, and all find enough to do nearly the year round. Besides, a large amount of wheat is yearly shipped east to Rochester, and sells in New York as Genesee flour.

Very truly, yours,

C. F. MALLORY.

ADRIAN, MICH., *December*, 1852.

SIR: Your Circular, among other things, asks for suggestions on the subject of forests. No branch of agricultural industry is of greater importance than the combined appliances of the forest; and accordingly I offer a few thoughts upon it. In most of our States, the question now is, not how the wood-lands shall be most speedily cleared of the trees, but by what management shall the necessary calls for wood, in its different uses, be most economically answered, with the smallest inroad upon the standing timber? Even in our new States a good "wood-lot" is often considered the most valuable on the farm.

Two questions are involved in the preservation of these forests—how may the uses of building material and fuel be economized? and how far may the products of the forest be increased and improved in quality by proper management?

With the greatly-improved modes of generating heat for domestic and manufacturing uses, not more than half the amount of fuel is required now that was consumed 10 years ago.

Iron and glass are displacing wood for the frames and finishings of buildings, water craft, carriages, furniture, and in many other branches of art. Iron and glass are fast gaining ground where strength is more needed than bulk, and where durability is an important consideration. I do not now wish to discuss the economies of wood after it has been taken from the forest. How much and how good the wood that we may get from woodland, consistent with the least deterioration of the permanent value of the forest, is a question that more immediately concerns the land owner. The oak is the most valuable of all our woods. It is the most generally diffused, and it is put to the greatest number of good uses. It is well known that the most valuable timber is that which has attained its growth with most light and air. The wagon-maker takes care to combine toughness and durability by selecting his wood from trees of second growth, or from trees of first growth that from infancy have stood alone or far apart. Acting on this hint, we could cull out such of the oaks as are unsound first, giving those that are left more light and air. It is a fact in vegetable physiology, that motion facilitates circulation, and that young trees confined to stakes do not form their bodies so rapidly as when left free to the moving influence of the breeze. The thinning should be carefully effected, too; for the sudden exposure of the body o a tree to the light after it has been shielded for centuries from the rays of the sun is frequently fatal to it. The growth of a tree which has

always been closely hemmed in and guarded by its fellows has a form so different from one of the same species that has sprung up and come to maturity in open ground, that the identity would scarcely be recognised. Thus the black walnut in a close forest is a tall, naked shaft, with often but a few short branches at its top; while in the open field it grows low, round, and spreading. I have often recommended the white wood for the avenue, or as a very fit tree for private grounds, and have almost as often been asked if that tall, naked tree, out of which so much lumber is made, could be beautiful.

How often does the woodman's axe itch for contact with the tall, naked column of the white ash, whose tempting softness is destined to be unfelt until he shall have disposed of some harder specimens. As a lawn tree, the white ash becomes short and round, close and symmetrical. The experiments of hundreds in attempts to develop the sylvan beauties of wild-wood have failed from sudden and indiscriminate thinning. I have seen the fruits of it on my own ground. A narrow belt of forest, composed of oak, linden, hickory, and elm, was left, a few years ago, on the front of a sloping field—noble old oaks some of them were while standing in the thick forest. I had hoped that exposure to the light would force them to throw out branches from their naked bodies, and that some of these days a pretty grove would be the result, as many more sound trees of a younger growth were left as body-guards to shield their stems. These younger have done their duty well; but the old ones struggle on from year to year, and refuse to be comforted by the youthful family around them. Some of them have thrown out a few weakly branches, but as many more look as if beginning to decay. I shall, after all, look to the second growth for my permanent and most beautiful shades. The difficulty in this case was, that the wood was too suddenly thinned. Two-thirds of the large trees had been cut out of the belt nearly at once, judging from the appearance of the stumps, and *all* the trees on either side. Owners of wood-lots do not attach sufficient importance to their nut-bearing trees. It will not be very many years before the hickory, black walnut, and chesnut will have become so scarce as to possess a value for the fruit which they might produce quite exceeding that of most orchard trees. But a small portion of the hickory trees in forests where this is the prevailing tree bear well, if at all. The good bearers should be saved and cherished. There is so much difference, too, in the quality of the nuts—nearly as much as in the fruit of a seedling apple orchard—that great care should be taken in selecting the trees to be spared the axe. Some claim to be able to judge of the character of the nuts by the number of leaflets in a leaf. I do not know how far this test may be relied on.

In forest labor there is quite too little attention paid to the fact that some trees are impatient of removal, and that such should be cherished on their natal soil. The hickory, for instance, is very difficult to transplant; indeed, I do not recollect ever to have seen one of the common size for transplanting live long after removal. We should act upon the hint, and encourage it to give us the greatest possible beauties in the place where it germinated. Few of our Western farmers realize that they have been guilty of a great barbarity when they have "cleared" their last field, without having left a hickory upon the farm. With this tree utility and beauty go so hand-in-hand that such wanton destruction is quite

inexcusable. In beauty and thrift, there are few round-headed trees equalling the hickory.

Thorough draining will much improve a forest, not only in the increased growth of the trees, but in the greater comfort of getting about in it. All, or nearly all, woods are closer and firmer on a dry than on a wet soil. Often the vegetable matter that forest ditches afford would pay very well for the trouble of cutting them; and, generally, it will be found that these drains will effect quite as favorable a change in the forest crop as in the field crop, though their influence would not be perceived so immediately.

It is becoming an object in the old States to *make* forests for timber. On sandy soils, and such as compose the Western prairies, the locust grows so rapidly that it soon arrives at a size profitable for many uses. On a moderately rich, sandy soil, the yellow or seed locust, if not sown too thick, is large enough at eight years old to make good fence posts, and would do very well for the rails of a "post-and-rail" fence. The sprouting propensity of this tree precludes all necessity of replanting. The character of the locust for durability is such that, if possible to get, it would very generally be used for railroad ties.

A prairie or New England farmer could hardly make a surer provision for his children than to make a locust plantation of a portion of the land he holds in reserve for them.

Respectfully, yours,

WM. H. SCOTT.

To the COMMISSIONER OF PATENTS.

YPSILANTI, WASHTENAW COUNTY, MICHIGAN,
December, 1852.

SIR: My remarks, in compliance with your Agricultural Circular, will apply chiefly to a light, sandy soil, with occasional tracts of more or less clay—what were oak-timbered openings and plains. Climate, somewhat milder than same latitude east of the lakes. It should be understood, also, that the standard of farming embraced in this information does not take in all that are engaged in this business. A portion of the farming community does not seem to regard with much care the necessity of doing things at the right time, and in the right manner; and the result is a less average product per acre.

No guano is used here.

Wheat.—The average product of wheat is 20 bushels per acre; time of seeding, between the 1st and 20th of September; harvest, between the 8th and 20th of July. There is not usually any preparation of seed, other than the selection of good clean seed. I have known of some who have rolled their seed in plaster, and it seemed to produce much better for it. The usual quantity of seed is 1½ bushel per acre. Formerly, the best farmers ploughed 3 times before seeding; now, more plough but twice, and many but once; afterwards cultivate. We plough about 7 inches deep. The yield per acre is increasing, owing, I think, to better farming. The rotation of crops is, to sow wheat—seeding to clover the next spring; then, 2 crops of clover; and after that, wheat again. If corn is planted, oats generally follow, at the same time seeding with clover. The best remedy for the Hessian fly is to sow

between the 15th and 20th of September, giving time for a frost before the wheat is up enough for the insect. If the insect should get in the wheat, the best method is to turn on sheep, and feed it short in the fall. We have not been injured by the weevil; it is said to be well to sow early to guard against it. The average price of wheat at our market, Ypsilanti, during this year, has been 75 cents per bushel; it now sells for 82 cents. If our soil has been once *well* ploughed and afterwards well pulverized, either by the plough and drag or by the cultivator, so that all grass, weeds, and foul stuff are wholly eradicated, and good clover seed is sown upon it early enough in the fall to get a good top, and no water is allowed to remain on or near the top of the ground, we are sure of a good crop of wheat; provided the ground is not exhausted, or made foul by previous bad farming.

Corn is a crop which is now receiving more attention than heretofore. Cost of production per bushel:

1st. With manure, one acre—

16 loads; value, $1 each; one-half the value in the crop, and one-half remaining in the land	$8 00
Interest on land	2 00
Once ploughing	1 00
Marking	25
Planting	75
Cultivating and tending	1 00
Husking and cribbing	3 00
Cutting and shucking	75
Thrashing and marketing	2 00
	18 75
Value of stalks for food and manure	4 75
Yield per acre, 50 bushels.	50)14 00
Cost of raising one bushel	28 cts.

2d. Without manure—

Interest on land	$2 00
Once ploughing	1 00
Marking	25
Planting	75
Cultivating and tending	1 00
Cutting and shocking	75
Husking and cribbing	2 00
Thrashing and marketing	1 25
	9 00
Value of stalks	3 00
Yield per acre, 30 bushels.	30)6 00
Cost of raising one bushel	20 cts.

But if to this we add the additional expense attending the use and cultivation of the additional land (which is two-thirds) required to raise the 50 bushels of corn, the cost, without manure, is 31 cents per bushel, which will be found by adding two-thirds to the items for interest on land, planting, ploughing, marking, cultivating, and tending.

The average yield is from 30 to 50 bushels per acre.

I have been thus particular from the great discrepancy which I have noticed in the reports made to your department on this matter, varying from five cents to sixty-five cents per bushel on the cost of raising corn. The best system of corn culture is to manure the tillable part of the farm which has lain longest to meadow or pasture, and then plough, once in the spring, as soon as vegetation, and before the cut-worm has well started, turning under the manure well; and, if the land is high and dry, furrow out the ground across the furrows, three feet nine inches apart, with a small corn plough, and then, between the 5th and 10th of May, plant some, five kernels in a hill, two inches deep, some distance apart the other way; and, as soon as the corn is up in plain rows, keep the weeds and grass down and the ground mellow with the cultivator and corn plough through the season. If the ground be low I should plant on the tops of the furrows. The corn should be cut with the stalks, and shocked, as soon as it is ripe or glazed, in small shocks, and both corn and stalks secured as soon as dry. I am inclined to think that the best method of feeding corn is whole in the ear. For cattle the ears should be soaked, or boiled soft, over night. I have found but little, if any, benefit from plastering corn on the hill. It produces a rapid growth of stalks, but does not help the *corn*. I have applied plaster as soon as the rows could be followed, and also just before the time of earing. The result, in each case, has been without profit. Yellow dent is the best variety.

Oats are not a very profitable crop; they exhaust land. The only way in which we can afford to raise oats is to sow them upon highly manured land, after corn, near the barn-yards; and then turn over the stubble—once ploughing—in the fall, and sow to wheat; seeding the ground to clover in the succeeding spring. I have found this method profitable, as, without the oats, the land would have been idle through the season. Clover is the principal hay raised on the upland; yield, about one and a half ton per acre. Plaster is the best fertilizer for clover meadows and pastures. Clover is used to seed upland and Timothy lowland. About six quarts of seed are sown to the acre. It costs about three dollars and fifty cents per ton to raise clover hay. If clover hay is cut when not too ripe, and cured without too much exposure to the sun, and put in the barn without being wet, it is not injurious to horses; but as it is generally secured, it is.

Cattle are beginning to be more of an object with farmers here now. It costs from $12 to $20 to raise cattle three years old, as they are usually kept; and that is about their usual price at that age. Good dairy cows are worth about $15 in the fall, and from $20 to $25 in the spring. But the breed and quality of cattle, and all stock, are rapidly improving here, and the prices of such improved stock would range considerably higher.

You ask, will a given amount of food yield more meat in a Durham, Devon, or Hereford, than in a native animal? In answering this inquiry

I would remark that there is a great difference in native cattle. I have known some native cattle equal to any other breed of cattle I ever saw for fattening. I am not acquainted with the Hereford breed; it is between the Durham and Devon; I think the latter more hardy than the Durham, and would keep in better condition on the same feed, provided the care and feed were not very good. In the winter season, without good shelter, I think the same feed would yield more meat in a Devon than in a Durham.

A great portion of native cattle are far inferior to imported stock. But if proper selections were made from native stock, and the same care and feed afforded in rearing such selections as are given to the Durhams, I think a stock of cattle might be produced that would compare favorably with blooded stock. The Durhams, however, are superior to all other cattle in size and symmetry.

The best method of breaking steers to the yoke is to drive them around a yard moderately for an hour twice a day, two or three days in succession, before putting a yoke upon them. Then, after they become tame and gentle, as they will with such treatment, yoke them up and drive them with other oxen, and singly, being careful never to overload them.

Fruit.—I shall avail myself of information obtained from Mr. E. D. Loy, who has an extensive nursery in this county, in replying to this branch of your inquiries—citing his own language:

"'1st. Is the culture of fruit receiving increased attention?'"

"It is, particularly the apple, pear, and peach. None but the choicest varieties of fruit are cultivated to any great extent in this vicinity, and these are pronounced by good judges as being of the first quality. Cherries and quinces are not extensively cultivated, but flourish well on most soils and situations. Plums and nectarines are much injured by the curculio, and a fair crop is seldom raised. But some have succeeded by fumigating the trees with sulphur for three or four days, when the fruit was setting, about the time the blossom leaves the fruit."

"'2d. Cannot apples enough be grown on an acre to render the crop a profitable one to the farmer?'"

"There is, in my opinion, no crop so profitable to the farmer as the raising of the apple, for market, family use, and feeding." (In this I do not wholly agree with Mr. Loy.)

"'3d. Comparative value of apples and potatoes for feeding hogs and cattle.'"

"I am of the opinion that the apple is worth as much for feeding as the potato, particularly sweet apples."

"'4th. What varieties of the apple are best to keep for winter, and for exportation?'"

"Green Newtown Pippin, Baldwin, Esopus, Spitzenberg, Rhode Island Greening, Bellflower, Northern Spy, Swaar, Look-no-further, Roxbury, and English Russets, for exportation. And the above varieties, together with the Rambo and Talman Sweeting, are the most profitable for winter use."

"'5th. Do you know of any preventive or remedy for the 'blight' on pear, apple, and quince trees, or the 'yellows' on the peach trees?'"

"I know of no preventive for the above diseases, and no remedy better than cutting off the diseased branches and burning them. The 'yellows' is a disease wholly unknown here; but the 'blight' we have in this vicinity to some extent.

"In transplanting trees, great care should be taken to make the soil rich, to plough the roots properly, and have the earth filled in about the roots well, and not leave any vacant places around and between the roots, and mulch them after planting with coarse manure. The best time for budding the apple, pear, cherry, and plum, is the 1st of August; the peach, apricot, and nectarine, the 20th of August.

"The best method of engrafting on small stocks, and in the root, is whip or tongue-grafting. For large stocks, and in the limb, cleft-grafting is preferable. In pruning trees, I consider the fore part of April and the middle of July preferable to any other time. In pruning, care should be used in not pruning too much at one time, as in pruning trees up, 5 feet is high enough to begin to form a head for a tree. An orchard should be cultivated with the plough and hoe, and manured often enough to keep the ground rich, and the manure should be applied over the whole surface of the ground."

There has been a very great improvement in farming in this county and State within the last five years, and there is now an increased and increasing attention given to the subject in all its branches. The importance of *ploughing well* is beginning to be appreciated. The importance of *keeping the soil clear from surface water* is obtaining a consideration. The importance of keeping *all grass and foul stuff from our growing grain crops* is more realized than formerly. The importance of keeping stock *sheltered in the winter by suitable sheds and yards* is being understood, and the profit of raising good stock is being felt. And I regret that the truth will not justify me in adding that the importance of *furnishing our youth with suitable agricultural instruction* is duly appreciated; but the future affords signs of promise in this regard.

This progress in the art of agriculture is owing, in part, to the influence of our agricultural societies, State and county, and in no small degree to the labors of your department of the government, in obtaining and disseminating useful knowledge on this subject. It would be well if a copy of your Patent Office Report could be furnished to each township and school district library in the Union.

Let us have remunerating prices for our produce—such as would be afforded if *our* products and raw material were more exclusively used by those who manufacture for us in our own, instead of in a foreign country; and the American farmer would furnish a stable and noble basis for the future prosperity and glory of our country.

Yours, respectfully,

GROVE SPENCER.

SOMERSET, HILLSDALE CO., MICH.,
December 7, 1852.

SIR: In answer to the *Circular* you favored me with, I deem it not out of place to offer a few preliminary remarks before proceeding to answer your inquiries pertaining to rural affairs.

The north line of this county is not far from 42° north, about equi

distant from Lakes Erie and Michigan. In 1833 the county began to be settled, mostly by emigrants from Western New York; we may, therefore, be considered in a new country. The average settlement of farms in this vicinity will not range higher than 12 years; some few are 3 or 4 years older.

Almost the entire population are engaged in agricultural pursuits. The spirit of emulation and improvement is awakened among us. Rotation in crops is favorably spoken of.

The *drill*, *horse-reaper*, and *mower* are not yet introduced; too many stumps in the way yet.

Wheat and corn are our great staples. Such crops as flax, hops, barley, rye, broom-corn, tobacco, and most kinds of root crops, are not cultivated to any extent. Experience has shown that they may all be grown advantageously.

An agricultural society was organized in this county nearly two years ago. Two fairs have been held. At the last annual fair, in October, over four hundred tickets of membership were sold, and over one thousand admission tickets were disposed of. Not less than three hundred dollars were distributed as premiums.

Governor McClelland, of this State, delivered an appropriate address on the occasion. The exhibition would do credit to a county twenty years older.

We have been visited by an unprecedented drought this season—from about the middle of May to the 20th of June, we were without rain; summer fallowing had to be suspended. After two, or at most three days' ploughing, our fallows had again to be abandoned till the 20th day of September, when we had a splendid rain; and from that date to the present we have had a good supply of rain.

A great many wheat-fields have received but one ploughing, in consequence of the drought; and yet our present wheat crop looks decidedly better than the crop sown a year ago.

Wheat came in last harvest a full medium crop, of an excellent quality; but our corn crop, as far as my observation has extended, (over seven or eight townships,) has been a failure. Wheatland, Moscow, and Pittsford have had some good crops this season. Many fields in my vicinage, mine included, will not turn out more than ten bushels of ears per acre.

A wail went up the length and breadth of the State last spring, "that the seed corn was bad." Many planted the third, and even the fourth time; some at the last planting put 12 to 20 seeds in a hill. When the corn came up, many hills were *blank*, and the balance showed but one or two stalks in a hill: occasionally a hill would be represented with four stalks; and the drought nearly completed the work of destruction by preventing the crop from earing. This is the first year I have witnessed a failure in a corn crop since my location here in the spring of 1839. Those that were fortunate enough to have *old* seed corn had no difficulty.

The pioneers in this section have had "a hard row to hoe"—*smut*, rust, and sometimes a partial *failure* in the wheat crop; they have had to haul wheat 30 to 50 miles, and then get but 40 to 42 cents per bushel; they have had to sell their pork for $1 50 per cwt., and have had the country deluged with a worthless paper currency. These difficulties and evils

have mostly vanished; our State credit is good at home and abroad; rail and plank roads have sprung into existence as if by magic; and our surplus products can be transported wherever there is a demand.

The railroad from Toledo to Cleveland has just been opened, which gives us a continuous rail-route from Chicago to the Atlantic cities. The route will soon be completed as far as the Mississippi river; and buyers are already here for our fat sheep to be sent East on the new thoroughfare. A brighter era dawns upon us. Our turkeys and chickens may figure on a Christmas table in Gotham; our choice fruits may take a front seat on some of their fruit stalls; we hear the result of a general election, two thousand miles from home, by the time we have canvassed our own votes. We *realize*, now, what would have been called *visionary*, a few years ago, to dream of.

And now, sir, I will endeavor to confine myself to answering a few questions put forth in your Circular, as far as my observation and experience will warrant.

Wheat is our principal crop. Cash we must have, and the only reliable thing we have to get it is, (or has been,) to sow the Cereal. Our farmers are beginning to discover that constantly cultivating wheat on the same old farm is an up-hill business, if *summer fallowed;* getting a crop only once in two years, uses up a team. The furnace and blacksmith's bills are no small items in his expenses. If a farmer hires the work done, the crop will rarely leave a dime for his wallet after footing the bills. Necessity compels him to try his luck once more; his old fields must be skimmed again. Thus he is kept on the tread-mill platform for a few years, till the old farm is "hard up;" and ten to one if the "yellow fever" does not take him off—as far as the Sierra Nevada, at least. Thank God! a revolution is taking place in our farming system. Pork, sheep, dairying, together with clovering, are doing up the work of reform as effectually as could be desired. Instead of ploughing six or seven inches deep, as we were wont to do while our farms were new, many are setting the plough ten inches deep, and, by bringing the latent properties of the subsoil into action, our crops are increased.

No guano is used, and but few wheat-fields are manured with compost or any kind of manure. Plaster has been tried on a few fields with favorable results. Average product per acre this year, fifteen to twenty bushels; time of seeding, 10th to 25th September. This year's wheat, sown as late as the 10th October, looks finely. Time of harvesting, 10th to 20th July; preparation of seed, none except cleaning; quantity of seed; one bushel was formerly considered sufficient for new grounds; at present we use one and a half to two bushels. Wheat thrashed by machinery is often injured by being cracked; consequently, more seed is required.

I stated last year that, "if all wheat-growers here (in this State) would adopt the plan of sowing none but clean seed, and of the choicest varieties, for two years, the result would be, at the end of that time, an advance of ten per cent. on Michigan flour in the New York market."

Rotation in crops, no regular system.

How many times do you plough? For summer fallowing, twice; once in June, again in August or September, immediately before seeding; the depth of furrow varies from 6 to 10 inches. The model farmer, on old grounds, will gauge his plough at 10 inches, and "nothing shorter."

Hessian fly: Best remedy, sow after 20th September.
Weevils: None that I am aware of.
Average price: Of wheat, from 65 to 79 cents.

"What kinds of grass-seeds do you sow with wheat?" I consider clover and Timothy the best for hay or pasturage; sow from four to five quarts of each kind on an acre, the latter part of March, or early in April, after the hard frosts of winter have *passed*. If a few inches of snow are on the ground, it will be in your favor; the seeds will, many of them, fall into the little fissures caused by the frosts of winter, and in an ordinary season will take root in a few days. It is not commonly practised to sow more than one third Timothy at the time of seeding; that will be sufficient to keep the clover from falling, and make better raking also. For a renovating crop, sow clover only.

Corn.—No guano is used. The average product per acre, for *good* lands, may be set down at 40 bushels. I prefer once ploughing, only, after the ground is *warm*—say from 15th to 20th May, and plant as soon as practicable. On old, smooth fields, the ground should be marked 3½ feet each way for the rows; on new grounds, with stumps, 4 feet will not give you any too much latitude. Plant 4 seeds in a hill.

Several varieties are in use here; I prefer the yellow dent and red cob. As soon as the corn is 4 inches high, start your shovel ploughs through it, two furrows in a row, each way; follow up with the hoe; no hilling will be necessary. In about 15 days, go through with the cultivator, same as with the plough, and the work is done.

I find by ploughing late, and planting from 20th to 25th May, that my corn will grow rapidly, and do as well with once hoeing as it will to plant in April and hoe twice. I have seen some fields of corn injured by ploughing when the crop was too large. Weeds ought to be subdued; but when you do it at the expense of your corn-crop, you "pay too dear for the whistle."

Oats are considered an exhausting crop; the average yield per acre may be put down at 33 bushels, although 40 bushels are not uncommon. This year the drought has left us but from 10 to 20 bushels per acre.

With but one fourth of a corn crop, and half an oat crop, our horses, cattle, and hogs will have a slender bill of fare this winter.

Hay.—The quantity cut per acre on our uplands (without plaster or manure) will not range higher than one or one and a quarter ton; on *low, moist* grounds, I have cut two tons per acre. This year, hay is scarce and dear; and although a great many cattle have been slaughtered, and a still greater number bought up by drovers, fodder will be in good demand.

Dairy Husbandry.—I am unable to say what amount of butter or cheese a cow will produce in a year. Cows in this section, from the first of May till September, pick their food on the range, and until the middle of July, they do as well, perhaps, as they would in a pasture; after that time the quantity of milk becomes less.

Butter at this time is worth 18 cents, and cheese 8 cents. The majority of farmers here keep from one to three cows. Dairying will eventually be a profitable branch of business when we get the *clover mania*.

Neat Cattle.—Cost of rearing till three years old, I think not far from $20. I sold good three-year-old steers this fall for about $17 per head. Good cows in the spring are worth from $16 to $18, and in the fall about $4 less. Working oxen command a high price—those of a good stamp, $100.

Horses.—The growing of horses is profitable; the California movement has made a heavy draught on the horses of this State. Probably not less than 6,000 horses have left here for the gold mines this year. A pair of good farm horses is worth from $200 to $225.

Sheep and Wool.—Wool-growing is not only profitable, but it brings the dimes into an empty wallet just in time for harvesting.

I think that wheat and sheep husbandry ought to walk hand-in-hand. Sheep enrich our fields by feeding on them, and at the same time they subdue briars and noxious weeds, and, in an ordinary winter, may be kept on straw two thirds of the time.

Sheep pelts at this time are worth (best quality) one dollar. Large sheep are best for mutton; buyers are governed by the size of the carcass. The proportion of lambs reared to the number of ewes is, I judge, not far from seventy-five per cent.

Potatoes.—Thank God! that scourge, the *rot*, has left our potato fields—at least, I have heard no complaint this year. The yield, owing to the drought, was light, but the crop was of an excellent quality. I harvested at the rate of one hundred and twelve bushels per acre; some premium crops ranged as high as one hundred and sixty, or upwards, at the county fair. My crop was planted on sandy loam, about the 20th May, in a corn-field; hills four feet apart, same as the corn; no manure; seed covered about three inches deep, making a broad hill, so as to retain the moisture; cultivated but once; hilled up about four inches, when I hoed them. I prefer but one hoeing for this crop. By hoeing often you are apt to create new sets every time you disturb the roots; if the ground is weedy cut or cover the weeds; but let once hilling suffice.

Varieties most in use here are the orange, or yellow, *Peach-blow*, *Pink-eye*, Merino, and *Meshannock*. The latter variety has been almost annihilated by the "rot." The Merino is a hardy root, and prolific; and from April till harvest it ranks the highest on our catalogue. It seems to be quite another thing from the New York Merino.

I think that large potatoes should be cut for planting. I prefer 6 or 7 bushels of seed for an acre in preference to twice that amount.

I recollect, when a boy of 12 years of age, a *lumberman*, in St. Lawrence county, New York, who economized in this way: Potatoes were scarce and dear; he wished to eat and plant out of his small stock; he took his knife and carefully cut each eye out, not much larger than a dime, and saved the residue for eating. In planting he found he had not seed enough to cover his ground; another resort was had to the knife; each eye was carefully divided into four parts; four pieces only were put in a hill. He harvested a good crop, as good from the latter as from the former cuttings.

Fruit.—Our soil and climate are capable of producing most of the varieties congenial to the northern temperate zone. Those who have taken the lead in orcharding are realizing handsome returns for their investments. A farmer near Jonesville, Mr. S. Gaige, told me, a short time ago, that he had sold nearly 1,000 bushels of apples for 37½ cents per bushel; the buyers picking the fruit. Mr. G. reserved the best orchard for himself. Beautiful specimens of fruit were exhibited at our county

fair this fall. We might almost challenge Pomona herself to beat them.

I have several varieties of choice plums in my garden. They are great bearers, being but five years from the bud. I measured one the other day; its circumference, 3 inches above the surface soil, was 12½ inches; (a Prince's Imperial Gage.)

The curculios have not disturbed any of my plums yet. I have some that have fruited 8 or 9 years. My practice is to mulch them every spring, and let the hens have free access to them during the season. Most kinds of fruit trees suffer by remaining on a sod, or meadow ground. The grass, if suffered, as is generally the case, to grow under the trees, will retard their growth materially. I find a valuable remedy by applying about three bushels of coal-dust (the bottom of a coal-pit, earth and coal mixed) around each tree. It operates like a charm wherever it is spread; it retains the moisture, smothers the grass, and makes the tree grow finely.

I tried last spring to propagate some choice fruit from cuttings; owing, as I believe, partially to the drought, I did not succeed very well. I intend to make another effort, and if successful I will report.

Preserving Fruit.—Take buckwheat chaff, and place alternately a layer of fruit and of chaff. The chaff is light. In case you wish to transport your fruit a great distance, it not only preserves from bruising, but is proof against frost, if used liberally.

Manures.—But little attention is paid to saving or applying manure; we are aware of its utility; we haul it to our fields if we find time; the low price of lands and the high price of labor will not warrant the operation in all cases. I will elucidate by stating a few facts relative to my own neighborhood, which will apply to many other portions of this State: Our school district embraces about three thousand acres of land; the majority of farms are eighty-acre lots; four lots, only, are unsettled; there are twenty-seven families in the district; three are mechanics, who follow their professions, and owning, together, ten acres of land; there are not more than six or eight boys in the district who are old enough to manage a team; five men have left the district for the gold diggings this season; four of them left farms to be managed as they best could be; the improvements on the farms will range from twenty-five to one hundred acres of arable land. There is but one man in the whole district who works at day's work, and he is accidentally here for a short time.

Marl is abundant if we had time to test its value. It is believed that the next generation will correct our errors.

If our farms were reduced to one half or one-third their present size, we should begin to imitate Congress by laying an ad valorem duty on our barn-yards, pig-sties, hen roosts, privies, marl-beds, and swamps. These are generally within the reach of all our farmers. Our excuse for not doing it now is, that we have not time.

Price Current for Hillsdale, December 2, 1852.

Wheat, per bushel, 75 cents.
Pork, per cwt., $5 50 to $6.
Corn, per bushel, 44 cents.
Oats, per bushel, 38 cents.

Potatoes, per bushel, 44 cents.
Hay, per ton, $8.
Butter, per pound, 18 cents.
Lard, per pound, 10 cents.
Cheese, per pound, 8 cents.
Salt, per barrel, $2.

I cannot close my remarks without making a feeble effort in behalf of the farming community. If I rightly appreciate the feelings of the agriculturists of this great Republic, they feel as though their interests were overlooked, if not forgotten, at the Capitol. They want an efficient Bureau of Agriculture at Washington to give its *undivided attention* to rural affairs—to establish an Agricultural College, where experimental farming, in all its phases and bearings, shall be taught—the study of soils, manures, management, dairy husbandry, pomology, &c; where theory and practice shall go hand-in-hand; to distribute seeds of choice grains and plants, as well as useful information pertaining to agricultural pursuits, to the different State societies, and they, through some proper channel, to the farmers and planters. We ask but a pittance from the national treasury. If the bureau could have at its disposal an amount equal to raising and supporting a single regiment of mounted men in Utah or California for one year, or for a single ship-of-the-line fitted out for the *Tongo Islands*, much good might be done.

I ought not to speak lightly of the navy; (I *almost* enlisted as a marine once.) The navy has been styled the "right arm of the nation." If you please, call the agriculturist the spinal column: cripple that column, and the right arm will be nerveless.

In the hour of need, on whom does our country rely to swell the ranks of war? Whenever the appeal has been made, has it been made in vain? Let the muster-rolls from Lexington to Chapultepec bear witness!

Millions of the United States revenue are expended in protecting our commerce. All right. The army and navy, and West Point to boot, are never overlooked, but come in for *all* the *glory* and full pay. All right, again. But how stands the case with the great mass?—five millions of farm laborers—who have caused civilization and science to tread close upon the retreating heel of the "red man"—who have made the wilderness to "bud and blossom as the rose"—have made the "solitary places become vocal"—who have performed the Herculean task of clearing up the vast expanse of forest from Maine to Texas, and from Florida to the great Northern lakes—who have covered this domain with fertile fields and thrifty hamlets—who have chequered it with roads and thoroughfares—have dotted its surface with school houses and churches—who have done more than all other classes united to make this "the land of the free and the home of the brave"—what has Congress done for them? Why, they have indirectly taxed them for more than two thirds of the revenue (am I correct?) and given them—what? The *Patent Office Report*—a work of real worth and utility, a treasure, indeed, to the farmer who is fortunate enough to *get* a copy. If the supply were equal to the demand, it would give greater satisfaction.

The halls of Congress are filled with legal and commercial men; but few farmers find a seat there: which, in some measure, accounts for their interests being overlooked.

As a class, however, we are willing to forget the past if we can but have the assurance that the prospects of the future shall not be dimmed by neglect.

We feel like swinging our caps and giving nine of our loudest cheers to the few choice spirits who assembled at Washington last summer and formed a National Agricultural Society. Their names are a guarantee that something will be done. It is to be hoped that they will carry the "war into Africa" with Congress, and press the subject home upon that body so strenuously that our interests will be duly considered.

The farmers and planters are unable to establish experimental schools that would have the desired effect. An institution of this kind should have an "odor of nationality about it."

It is argued by some that we have not suitable men to fill the various professorships. Shall we wait thirty years, as the empire State has, in the vain hope that something favorable will turn up? Will not the same fate await us?

In conclusion, I would suggest to the National Agricultural Society at Washington to sound the reveille in earnest, and the yeomanry of every State and Territory of this broad Republic will muster and stand ready to wheel into line at the tap of the drum. The farmers are ripe for action; all that is necessary is to "*go ahead.*"

Respectfully, yours,

CHESTER HUNT.

To the Commissioner of Patents.

Ann Arbor, Washtenaw County, Mich.,
January 10, 1853.

Sir: The past season has been rather a singular one throughout this county, and, indeed, the whole peninsula. It has been a very good one for wheat—about the usual amount being raised, averaging 20 bushels per acre, remarkably good, perfectly free from rust or smut, and not molested by insects; bringing, at harvest, 65 cents per bushel; now, 94 cents in our city.

Corn was almost an entire failure, owing, in some measure, to a cold, wet time after planting, preventing its spreading. In most instances the farmers, after planting the second time and again failing, prepared the ground for wheat in the fall. Price of corn, 62 cents.

Oats have also proved a poor crop; price, 50 cents.

Barley.—Little used.

Rye.—None sown.

Peas and beans have done pretty well, and bear a good price; beans, $2 per bushel.

Hay.—Not so much as usual, and, owing to scarcity of coarse grain, would have been insufficient for the stock but for the remarkably open winter, enabling sheep, colts, and young cattle to get their entire living from the pastures and meadows. Price of hay the 1st of December $10; now, $8 per ton.

Butter and cheese have been unusually scarce; many dairy-men have turned their attention more to wool and wheat-growing. Cheese, 9 cents; butter, 16 cents.

Raising *neat cattle* is rather less than heretofore, owing, perhaps, to the high price of hay and grain, and to more profit in growing wool; still there is a gradual improvement in the breed, and a good many cattle fattened, beef bearing a good price.

The breeds of *horses* are also improving, and raising them is a great source of profit.

Growing of *sheep* and *wool* is, next to wheat, the greatest source of profit of our farmers, and is continually on the increase, although the high price of pelts and tallow induces the slaughter of a large number; pelts now being one dollar each; tallow, ten cents per pound. Rutabagas have been raised this season somewhat extensively, and are used to profit in fattening beef.

Potatoes have done remarkably well, but were not so extensively planted as they would have been but for the rot that has heretofore prevailed, of which we have not been troubled this year; cost of producing, about 20 cents; average price, 40 cents.

The culture of fruit is receiving increased attention, and is a source of great profit, particularly choice apples; a great many have been shipped to Wisconsin this season; price here, about 40 cents per bushel. Dried apples, $1 25 for 22 pounds. A great many of our California emigrants have returned this season; most of them have come to the conclusion that our soil produces as much gold, in proportion to the labor and expense, with more certainty, and far less exposure of health, than the mines of California: so, although the emigration to that country has not ceased, it is far less than last year. This has been a very good year for our farmers; every article of produce has borne a great price in cash; the season has been a very healthy one, and the weather has been so very fine that they have been constantly able to labor—preparing for and putting in crops, and harvesting and improving their lands; not enough rainy or other broken weather to induce them to go fishing or to frequent the tavern or stores; consequently, they have all got out of debt, and most of them have money to let.

I am, very respectfully, yours,

WILLIAM J. MAYNARD.

Northville, Wayne County, Mich.,
December 31, 1852.

Sir: I have received your Circular requesting information on the various branches of agriculture, and send you the following reply to such questions as are applicable to this vicinity:

Wheat is our most important crop. In this and the adjoining towns all other branches of farming are made subservient to it. The varieties chiefly cultivated here are the Blue-stem, Soule, and White flint. The Blue-stem is our favorite variety; it ripens early, and is not liable to rust; it has a plump, white berry, giving a large yield of very superior flour. The average yield of our crop this year is about 15 bushels. Time of sowing, from the 5th to the 25th of September. Time of harvesting, from the 5th to the 15th of July. The amount of seed sown to the acre is generally about one and a half bushel. In preparing fallow ground for

wheat, our best farmers plough but once, and then from 9 to 12 inches deep, afterwards using the cultivator or harrow to keep down the weeds. Deep ploughing is beneficial, as it brings to the surface the subsoil, which in this section of the State contains all the materials necessary to promote the growth of the crop, and only needs exposing to the action of the atmosphere to fit it for that purpose. By this method of cultivation, the evil effects to the growing crop of excessive wet or dry weather may, to a great extent, be avoided. Our rotation in crops is—first, wheat on a clover lay; second, oats or corn; third, wheat; fourth, clover sown upon the wheat in the spring.

Corn.—Owing to the drought that prevailed here the past season, the average yield of our corn crop is at least 40 per cent. below that of last year. The most common varieties are the eight-rowed yellow and dent. The common method of feeding to hogs is in the ear; for cattle, it is generally ground with the cob. I am not able to state the cost of production per bushel, as that depends in a great measure on the yield. It costs but little more to cultivate an acre that will produce 40 bushels than one that will yield only 20.

Oats.—The crop this season is at least 50 per cent. below that of last year. It is an uncertain crop, and considered to be a great impoverisher of the soil. The quantity of seed sown to the acre is from two and a half to three bushels. *Barley* is raised to a limited extent; *rye* not at all.

Peas.—More are sown than formerly. They are less exhausting to the soil than any crop that we raise. Three bushels is the amount of seed sown to the acre. *Beans* are seldom cultivated as a field crop; enough is generally raised in the garden for family use.

The *Grasses.*—The quantity of hay cut from the acre the past season in this vicinity will not average over three-quarters of a ton. The grass seeds preferred in laying down meadows are, clover and Timothy on our upland; Timothy and red top for bottom lands. The quantity of seed sown should not be less than 8 or 10 quarts to the acre.

Root Crops.—Turnips, carrots, and beets are raised by most farmers to a limited extent, principally for family consumption.

But little attention is paid to *dairy husbandry* in this vicinity, further than to supply our immediate wants. There is no doubt but that, by proper management, it might be made a profitable branch of business. Price of butter from 18 to 20 cents; cheese 10 cents per pound.

Neat Cattle.—A very decided improvement has been effected in our neat cattle by the introduction of a number of fine Durham bulls into this part of the State. By crossing that improved breed with our native stock, we obtain a grade of cattle that is valuable for the yoke, the dairy, or for beef. They are well adapted to our changeable climate, and consume the coarse feed usually given to our neat cattle with greater avidity, and more marked benefit, than our native cattle or the imported stock.

The cost of raising cattle until three years old is not far from sixteen dollars; the price at that age varies, according to the quality of the animal, from fifteen to thirty dollars. Price of good dairy cows in the spring, thirty dollars; in the fall, twenty.

Horses and Mules.—An increased interest is manifested by farmers in raising horses for service. First-rate horses find a ready sale, and at remunerating prices. Cost of raising colts until three years old, about forty-five or fifty dollars; price at that age, from sixty to ninety dollars, according to quality. Mules are not raised.

Sheep and Wool.—Next to wheat, we consider wool-growing the most profitable business that farmers can engage in. The price that has been obtained for wool for the past two or three years, with the prospect of an increasing demand at remunerating prices, has induced farmers to engage more extensively in raising sheep. Some of our enterprising wool-growers have, within the last year, made importations from some of the most celebrated flocks in France. Such sheep are a valuable acquisition to our State, and will no doubt effect a decided improvement in our stock, which are already of a fine grade.

It is generally conceded that sheep with fine wool and long staple, as the French or Spanish Merino, are more profitable than the coarse-woolled variety. It costs no more to produce a pound of fine Merino than of coarse wool. The proportion of lambs annually raised to the number of ewes is about three to five.

Hogs are kept to a limited extent, for the purpose of consuming the slops and offal about the farm; but pork-raising for the market has not been considered profitable. The high price of pork may induce farmers to engage more extensively in that business. The best breeds are the Leicestershire, Byfield, and China, and their crosses. The cheapest method of producing pork is to keep the hogs in good clover pasture until fall, when they are put into small pens and fattened upon corn.

Potatoes have been less affected with the rot this season than any year since it made its appearance; fifty per cent. more raised this season than last. Price at the nearest market, fifty cents a bushel.

Fruit culture is receiving increased attention. Old orchards are being renovated and engrafted, and young ones of the best varieties—principally of winter fruit—set out in large numbers. An orchard bearing choice varieties of fall and winter fruit will pay a good interest on the investment; while poor fruit, like poor crops of any kind, seldom pay cost.

The apple-worm, which made its appearance in this part of the country two or three years since, has become very troublesome, and is justly exciting the alarm of fruit-growers. If it should increase its work of destruction in the ratio that it has since its first appearance here, our orchards in a few years will be entirely worthless. The Rhode Island Greening, Spitzenberg, and Red Canada are amongst our best varieties for winter use and exportation. Hogs thrive well on sweet apples, and for feeding horses they are considered an excellent substitute for grain.

Manures.—A great saving might be made in barn-yard manures by a judicious location of the buildings around which it is formed. Barns, as a general thing, are erected near some brook or pond, where cattle can have near access to water. The consequence is, the wash of the yard is carried directly into the water and lost. Such buildings should be so situated that the drainings of the yard may be carried as much as possible over lands that require manuring, and thus a great saving would be effected. Guano is not used to any extent; the high price at which it is held placing it beyond the reach of common farmers.

Plaster is used extensively on our meadow land and pastures, and is a top dressing for corn. Barn-yard manure is made use of in the production of our wheat and corn crops. It should be ploughed under as

soon as possible after being spread upon the land, to prevent waste by evaporation.

Swamp muck, which abounds in this State, is a most excellent fertilizer, especially when composted with other manures. I am satisfied, from actual experiments, that, when the fertilizing properties of this manure are generally understood, it will prove of great utility to our farming interests.

I have reason to believe that the Reports emanating from your Office are the means of conveying a vast amount of useful agricultural information to every part of our widely-extended country; and I shall feel highly gratified if the above is of any service to you in making out your Report.

Yours, respectfully,

J. D. YERKES.

KALAMAZOO, MICHIGAN, *January* 1, 1853.

SIR: In reply to your Circular of August, 1853, I would remark, that the drought of summer was severe, and materially affected the farming interest.

Wheat.—The berry was large, and the average weight was about sixty-five pounds per bushel; but the head was not more than two-thirds filled, making a small yield per acre; but the large quantity of land in wheat furnished a larger surplus than any previous year. The quantity of land seeded this past fall is not more than half as much as the previous year, owing to the severe drought—and this is applicable to the western part of this State; average price, 70 cents.

Corn.—The quantity planted was larger, but it came up badly—the seed not being sound—injured by frost of winter, as corn was gathered damp, being a wet season; which, with the summer drought, has caused quite a failure of the crops in this county—the yield not over one-quarter crop; and the price is higher than it has been for the past ten years, being 50 cents.

Oats were almost an entire failure, worth 40 cents.

Potatoes.—A very light yield, and worth 40 cents.

Hay.—Upland cut about one-half crop, and the wet land yielded heavy Upland hay is worth $10; marsh hay, $6.

Butter and Cheese.—The quantity made was a scanty supply; the price of the former 20 cents, and latter 10 cents—being higher than for many years

Hogs.—The number slaughtered was less than last year; price, from $5 to $6; the surplus has been sent to eastern markets; the quantity salted and held here is less than for a long time.

Wool.—The quantity was larger than before, fleeces heavier, and the price from 30 to 45 cents.

Sheep.—The number is on the increase, and worth from $1 to $3. A good deal of attention is being paid to improving the stock.

Cattle have been in great demand for Eastern markets, and a great many have changed hands, making the stock less than for many years. The scarcity of hay and grain caused farmers to be a free seller at low prices.

Apples.—The supply was light, caused by late frost in the spring, and the drought made the fruit small, but better flavored.

Peaches very poor and scarce; plums and berries, also.

Very great attention has been paid to all kinds of fruit, and the best varieties have been introduced; the trees are generally small, just come into bearing; and a few years will furnish a great surplus of all kinds of excellent varieties.

Yours, respectfully,

WM. L. BOOTH.

To the COMMISSIONER OF PATENTS.

NEW CASTLE, HENRY COUNTY, IA.
December 27, 1852.

SIR: One of your "Agricultural Circulars" has fallen into my hands; I will endeavor to answer such questions as come under my particular observation.

Wheat.—There is no guano used in this county, and but very little manure of any kind in the cultivation of wheat. About fifteen bushels are the average yield per acre. Seeding is generally done in September; harvest is about the first of July. We generally sow wheat on oat stubble, plough but once, about five inches deep; the average price this year (say) 52 cents. Clover is sown upon wheat some time in March.

Corn.—Average product, about forty bushels per acre; cost of production, 10 cents per bushel. If clover sod, break it up during the winter; about the first of May harrow well and plant in rows about four feet distant each way. If stubble ground, break it up as near planting time as possible; harrow thoroughly and plant immediately. Corn is so cheap that it does not pay for grinding or cooking to feed.

Clover and Grasses.—Quantity of hay cut per acre, about two tons, no manures used upon meadows or pastures. Timothy is generally preferred for meadows; cost of growing, about $1 per ton. Do not know that clover is injurious to horses; but think Timothy or blue-grass preferable.

Cattle.—Cost of raising till three years old, $15; usual price, $20. Value of good cows in spring $20, in fall $15. The same amount of food will yield more meat in a Durham than in a native animal.

Horses and Mules.—The raising of these animals at this time is very profitable; cost of raising a colt until three years old, $30; average price at that age, $60. Blood mares should be provided with good pasture in summer and worked but very little; in winter should be stabled, have plenty of hay and a small allowance of grain.

Sheep and *Wool.*—Wool-growing is profitable; cost of growing coarse wool (of the Bakewell) about $12\frac{1}{2}$ cents the pound; sells generally from 20 to 25 cents just as clipped from the sheep. A cross of the Bakewell and native will yield about four pounds to the head. Large sheep I think the most profitable for mutton or wool. I commonly raise as many lambs as I do ewes; but as a general thing, perhaps, three-fourths the number would be about right

Hogs.—The cheapest method of producing pork is feeding on corn. One hundred pounds of corn will yield about twelve pounds of meat. The best method of curing hams is "sugar-curing."

Yours, respectfully,

ELISHA CLIFT.

CONNERSVILLE, FAYETTE COUNTY, IA.,
December 14, 1852.

SIR: Your Agricultural Circular of last August has been put into my hands to be answered. To reply to the several inquiries in regular order is out of the question. I can only give you, in a summary manner, the soil, mode of cultivation, and products of this and the adjoining counties.

The county of Fayette is situated on the White Water river, which runs through the centre of the county from north to south. The soil varies from the rich alluvial along the river and numerous creeks, through the various grades of upland, though by far the largest portions of the uplands are rich, composed of yellow loam mixed with a portion of fine sand. The county abounds in limestone, forming in places the beds of creeks, and constituting the foundation for a bed of soil. All the springs are limestone water. In a state of nature the land was covered with a dense forest, consisting, on the uplands, of the beech, sugar maple, ash, walnut, poplar, and oak; while the rich bottom lands abounded with the buckeye and sycamore, in addition to most of the former. The settlement of the county commenced in 1812. The advances made were slow, owing to the heavy forests and the inland location of the county, being nearly sixty miles from Cincinnati, the only market. The very low price of grain forbade its being marketed, and the only produce was flour, pork, and whiskey. For a long time none of these paid, and in this condition things remained until within a few years. The completion of the White Water canal opened a direct trade with Cincinnati, giving life and activity to the twin sisters, Commerce and Agriculture. Connersville is the county seat and the chief market point on the canal within the county.

The natural richness of the soil, improved by the mode of clearing, *i. e.* by first deadening the trees, and then frequently allowing them to decay upon the ground, has sustained a succession of croppings without much diminution until within a few years; and even now the chief improvement required is dressing with clover.

Hogs have been, and are still found to be, the most productive source of wealth to our farmers. The fattening of hogs by turning them from the clover fields into the standing corn in September and October, is a source of improvement of the lands. This mode of farming is now undergoing a change in the cultivation of sheep, horses, and cattle, thus lessening the amount of the product of the hog. The rearing of these, together with the wheat crops, forms a considerable item of trade in the county. Flour, though it does not pay well, is beneficial to the farmer in the rest given to land and in rendering the division of labor more equal.

Of *hogs* we have several varieties: the Polish, Irish Grazer, and the Chinese; though of the latter there are but few remaining. Indeed, we have but few hogs of any one pure stock; they have been crossed and sub crossed until the stock is *sui generis* peculiar to our place, and we are now breeding from the best specimens of the several crosses. The same may be said of our horses as to breed; though not elegant, they are well-formed, serviceable animals, and in demand in the market from $100 to $150.

Cattle are attracting more attention; the Durham Shorthorn and the Devonshire constitute the principal varieties, and, like the hogs and horses, have been crossed until the original is nearly lost. Cattle for beef are in demand, bringing from $20 to $50 each, depending upon size and condition.

Sheep are of a mixed variety, being descended from nearly all the kinds imported; more attention is being given to this branch of husbandry, which must become profitable, as much of our upland is well adapted to sheep-raising.

Poultry is beginning to claim attention, and a well-arranged poultry-yard occasionally adorns the farm.

Mode of Cultivation.—The mode mostly pursued is to alternate the crops of corn, wheat, and grass, clover for pasture, and Timothy for meadow. (Some few are using the blue-grass for pasture.) Clover is sown among wheat in early fall or spring; it does equally well sown with oats in the spring. Timothy is sown in the same manner as clover, and frequently mixed with it, and succeeds well both for meadow or pasture, though clear Timothy is regarded the best hay, particularly for horses. About the third year after seeding with clover, the ground is broken up in early spring, and planted in corn one or two years, and then goes the round of wheat, oats, &c., and again seeded in grass.

Subsoiling has, as yet, been but little practised; but will claim more attention, as it is believed that the ground stands the drought much better, and the soil yields a much better crop.

Wheat is sown by breaking up the ground and putting in the crop broadcast with the harrow. This is done in the last of August, and during September and October. By this mode it yields about eighteen bushels per acre. It is thought that, by a better mode of culture, and putting in with a drill, twenty-five bushels, or more, could be produced.

The present plan of cultivating *corn* is by breaking up the ground in the spring, and sometimes harrowing it; then crossing it off with a plough in rows three or four feet apart. This is done from the middle of April or May. It is then ploughed three or four times during the last of May or June; and the average yield is about sixty bushels per acre. Wheat at the mills, for the last three years, will average in price about 60 cents per bushel; worth now 65 cents. Corn is mostly fed to hogs and cattle.

Oats are only raised for a portion of the horse-feed. *Rye* is little cultivated. *Hemp* and *tobacco* are very little grown, requiring too much labor. *Potatoes* are only cultivated for domestic use, being an uncertain crop. *Peas, beans,* and *root crops* are only cultivated for culinary use. *Barley* is a prolific crop, yielding about fifty bushels per acre, and bids fair to be more extensively grown.

Fruit.—Apples are of an excellent quality, and are produced in large quantities. The peach, cherry, and plum are but little cultivated, owing to their frequent failure. The peach is injured by the winter and grub-worm; the plum by the curculio.

As yet, the object of the farmer in this and the neighboring counties is to obtain the largest profit from the smallest outlay of money and labor. The establishment of agricultural societies this year will doubtless do much for the farmer, and result in an improved mode of cultivation, and more accurate calculations in regard to the profit to be obtained by the application of science to what has long been considered a very simple occupation, involving no great amount either of skill or learning. Judging from the exhibitions at our agricultural fair this year, and the great interest manifested by all classes of our citizens, a competition is awakened, and an interest being gotten up, that will stimulate our farmers to become as intelligent and practical as they now are industrious.

The foregoing will explain the reason for my not entering more into detail. Farm-book sand details are superseded by the go-ahead-itiveness of our people.

It is hoped that from what has been said, something may be gleaned that will be found useful.

Respectfully,

JOHN SPIVEY.

CENTREVILLE, WAYNE COUNTY, INDIANA,
December 25, 1852.

SIR: I view the Reports from the Patent Office as exceedingly well calculated to disseminate a knowledge of the diversified pursuits of the citizens of the United States, and also of the products and manufactures in the various sections of our Union.

These yearly Reports will be read with interest and advantage by the mechanic, the stock-grower, and the farmer; they will have a place in our history, so that posterity can determine the manner and mode of our ploughing, harrowing, and harvesting. With these remarks, I will respond to your queries, as far as I feel myself qualified.

Wheat is sown from the 1st of September to the middle of October. Early sown is uniformly the surest crop. No preparation of seed, except freeing it from chess or cockle, is practised. In August or September the ground is well ploughed 5 or 6 inches deep; from one and a quarter to one and a half bushel of seed is then sown to the acre, and well harrowed, and the seeding is done. The wheat drill was last fall introduced into this county, and the young crop has a decided advantage in appearance over wheat harrowed or ploughed in. McCormick's reaper has been used by some of our farmers during the last harvest, and, though it has failed to given entire satisfaction, yet it is believed to be a great labor-saving improvement, especially in the large prairies of the West. The yield of wheat increases in proportion to the labor in preparing the ground for its reception. From fifteen to twenty-five bushels per acre may be relied on. To avoid the ravages of the Hessian fly, some sow early, while others sow late: both to produce the same result. When the fly attacks the young wheat in the fall, they are sure to prove themselves by their works in the spring. Late-sown wheat is more liable to rust than early, and that kind of wheat that ripens earliest is the surest crop. The weevil is not known here as a pest. Timothy is sown with wheat in the fall, and clover in February or March following. There is no regular uniformity in relation to the rotation of crops, owing in part to the smallness of many farms. The usual practice in sward is to crop with corn two or three years, and alternately wheat, and then sow down with clover or Timothy, to be pastured or mown three or four years. Average price of wheat, 55 cents per 60 pounds.

Corn.—"This great stand-by of the farmers," when converted into pork, is almost the standard of value among us, and it has enabled many poor renters in a few years to become independent landlords. The Indian corn has been a powerful agent in the settlement of the Western wilderness, and the other crops may, and do occasionally fail. Corn has never, as a crop, failed.

The cheapness and simplicity of mills, with other methods of converting corn into meal, have done much in facilitating the rapid settlement of the new States.

The following anecdote from one of my neighbors, on his return from a hunting excursion, will fully show its valuable qualities in this respect: While out he sojourned with a pioneer, when they were edified by witnessing a novel mode of making corn-meal, which was simply performed by inserting a chisel through a fence-rail in the form of a plane-bit, and the operator with an ear of corn quickly passing it over the edge of the chisel. Although something like meal, and tolerable bread, was thus produced, and the host and myself partook of it without making any apology, yet their travelling friend had no exalted opinion of the invention.

In preparing our ground for corn, we plough as early as the land is sufficiently dry; if cloddy or sward, it is harrowed; it is then crossed with a light plough, three and a half or four feet both ways, and at every intersection from three to five grains are dropped, and the covering performed with a hoe. If the cut-worm is anticipated, the number of grains to a hill is increased. Four stalks to a hill are considered the most profitable in the yield of a corn crop.

The mode of culture is various. The old shovel-plough is mostly used, while some farmers use, during the tilling season, the cultivator. The two-horse harrow, in the form of the letter A, with the front tooth out, is much used when the corn is quite small. The three-shovel-plough is fast coming into use; and as the stumps and trees are becoming rotten and out of the way, they will be generally introduced.

The yield of corn per acre depends much on the quality of the soil; the average yield in this county per acre may be placed at thirty-five bushels, while from fifty to seventy-five bushels are frequently gathered. The cost of raising is estimated at 11 cents per bushel. It is fed whole to our stock.

Oats.—Two bushels of seed are sown to the acre; average yield per acre, from twenty-five to thirty-five bushels. This grain is considered a hard feeder on the soil. Here its cultivation is neglected by many farmers. In yield, barley and oats are alike, though the former is considered less hurtful to the soil. Rye is not sown with us, and peas and beans only for family use.

Clover and *Grasses.*—We cut from three-fourths to two tons of hay per acre, and the cost of making it is $2 60 per ton. Timothy hay is preferred, and finds the readiest market. Red clover hay, when well cured, is not considered injurious to horses, and a mixture in the meadow

of clover and Timothy makes the richest hay. The first crop of clover produces no salivation. From four to six quarts of seed are sown per acre.

Neat Cattle.—The cost of rearing until three years old is about $18, and the usual price at that age is from $18 to $22. Good milch cows are worth in the spring $20 and $22, and good fresh cows in the fall are worth $25 and $30. I know of no positive trial of the relative properties of the improved and native stock. In yielding good beef for a given amount of food, I feel confident that the Durhams are the most profitable breed for feeding. If in rearing cattle the same care was exercised to avoid in breeding and selecting a bull as is generally taken in selecting a stallion, effects would certainly follow calculated to please the eye and the pocket.

Horses and *Mules*.—The cost of keeping a colt until it is three years old is about $45, and the rearing of them is now a profitable business. But few mules are raised in this county or district; hence, further remarks will be unnecessary.

Sheep.—The rearing of sheep is not considered a money-making business; consequently, farmers keep a number sufficient for domestic uses. Large sheep are preferred, and the proportion of lambs annually reared to the number of ewes is over two-thirds.

Hogs.—The breed most esteemed is a cross of the Russia and China; and this stock crossed with the Grazer is preferred by many. In regard to the question—how many pounds of meat one hundred pounds of corn will make—it has been well tested that twenty-five bushels of corn will, with three months' pasture of clover, make two hundred and fifty pounds of pork. Taking fifty-six pounds as the standard of a bushel of corn, we have eighteen pounds of pork for one hundred pounds of corn. Others say (equally entitled to credit) that twenty-seven bushels of corn will, after pasture, make three hundred pounds of pork, or nineteen and three-fourths pounds per hundred pounds of corn. Root crops are only grown as family vegetables. Irish potatoes are better when grown on new land than on old, and are more liable to have the rot on manured land than otherwise. Increased attention is now paid to the cultivation of the sweet potato, with cheering practical results. Neither guano nor plaster has found its way to the district; nor has the use of lime thus far been successful, or met with encouragement.

Respectfully, &c.,

A. HOOVER.

To the Commissioner of Patents.

Williamsport, Warren County, Indiana,
December 1, 1852.

Sir: Two years since, I had the honor of submitting to the Commissioner of Patents a report of the condition of agriculture in this county. The chief changes wrought in the interval are, the reclamation of additional portions of prairie; the abandonment, by the prairie portions of the county, of the production of wheat; and the introduction into our meadows of grass-cutting machines. The immediate effect of the first

will be an extended production of pork and beef, as the newly-broken prairie is too remote from market to allow of marketing corn.

The relinquishment, by the prairie, of the culture of wheat, limits its production to the timbered portions of the county, which have a clay soil, and to the barrens or oak openings, which are mainly sand underlaid by clay. This, together with the better style of putting in wheat, where it continues to be grown, has had the effect of lifting the average acreable product to about fifteen bushels. Seeding for wheat continues from the 25th of August to the middle of October; the late seeding occurring chiefly among those who sow ground from which corn has been cut to shock. If clover sod or stubble is to be turned, one ploughing to the depth of four or six inches is followed by one or two harrowings, during which one and a quarter to two bushels of wheat are seeded in. If the crop be put in among corn, the whole operation is done at one ploughing with the shovel-plough. In March, clover, or clover and Timothy, are sown if the ground is intended to be brought into grass. From the 1st to the 15th of July the crop is harvested, and it brings, on an average, about 55 cents per bushel. Wheat is a poorly remunerating crop, owing to the high price of labor and the inability to use reapers in fields not yet clear of stumps.

Corn is the staple crop of this region, and much diversity of opinion prevails as to the most eligible mode of managing it; many supposing a system of culture good which the fertility of the soil has insured against failure. The most uniformity obtains in the manner of putting in a sod crop. Prairie sod is turned in the latter part of May or early part of June; because the grass, once started, is more easily killed, and the sun is then strong enough to do that office for it. The sod is aimed to be cut at the depth of two inches only, as a greater depth would make the grass liable to grow again. The furrow slice is from twenty to twenty-four inches, and is laid as smoothly as possible, to prevent the grass from peering up through the seams. A man then passes along every second seam, and with an axe, or similar instrument, makes a hole at intervals of three feet, into which he drops three or four grains of corn, covering them with a brush of the foot. No cultivation follows, and the crop yields according to season, from fifteen to forty five bushels; with a preference for the lower rate. Being put in late, it is oftener caught by the fall frosts; and the number of nubbins is greater than the ordinary crop. The next year the ground is as mellow as an ash-heap; and few weeds having established themselves, it is no great feat, during two succeeding years, for a hand to tend thirty acres of corn; raising in a favorable season twelve hundred bushels of corn. There is a mode of cultivating corn which is called *listing*, and is approved by some of our shrewdest farmers. It is applicable only to stubble-ground and that tended in corn the previous season. The most common way of executing this is by passing along with a plough and throwing up a furrow, and returning, so as to throw up another against it. The corn is then planted on the top of the ridge; the ridges are formed the distance apart that the corn rows are intended to grow. After planting, the intervening spaces are broken up. As will be perceived, there is a ridge of hard ground immediately under the corn rows; this is partially broken in the cross-ploughings given while tending the corn; but as a shovel plough is a poor instrument for breaking ground, it cannot be as effectually done as

if broken in grass previously to planting. Besides, it devolves upon one horse the work of two; and withal leaves a hard patch immediately below the hill.

Another mode of listing is to throw up a furrow and return in such a manner as to throw back the ground into its original position. The remaining treatment is as in the other case. This saves less in a point of time. The advantage of listing is that it enables a man to put in more ground than in the ordinary way; and as most men can tend more corn than they can put in, this is considered a gain. Hence, too, if delayed by sickness or unfavorable weather, a farmer may recover some time by listing his field, instead of breaking it up entirely before planting. Those who advocate the listing practice are generally energetic men, having new ground. In the hands of a slow man, the plan is likely to succeed poorly. The usual distance apart for corn rows is from three feet to three feet eight inches. Many who have a fresh, strong soil, prefer to plant considerably closer, putting fewer stalks in a hill. Certain it is, that, to have a large yield, there must be an abundance of stalks on the ground.

The quantity of grass cut per acre is one and a quarter ton, on the average. About $2 a ton may be set down as the cost of making hay. This will include the rent of land, and be subject to an abatement of 25 cents an acre for the value of fall pasture. A reduction of full one-half the actual outlay will be effected by the introduction of mowing machines. One of Ketchum's, in use here, cuts twelve acres per day, requiring one hand and two pair of horses, each being used half a day. Their earnings, at present rates of mowing, would be $9 per day. Meadows in this county are not manured.

It costs $12 to rear a *steer* till he is three years old, when he will be worth about $18. Good milch cows are worth $15 in the spring, and $12 in the fall.

In this county, where land and corn are cheap, and labor high, as cheap a mode of producing pork as could be pursued would be as follows: Have your pigs come in April, or as soon thereafter as possible. Let the sows have the range of the clover-field, and corn enough to keep them in condition while suckling. Feed the weaned pigs some corn to keep them growing; young pigs do not thrive well on clover alone; they must be wintered, too, on corn. The next season, if they have been kept thriving through the winter, they will continue to do so during spring on clover alone. Take them off before it goes to seed; else they will slobber. Have a field of ripe oats or rye for them to run on when called off the clover; it should keep them a month, by which time corn will be in roasting-ear; cut up and feed them what they will eat; they will eat the ear and much of the stalk, and the balance they will chew, so as to extract its juice. As much is realized from corn at this as at any subsequent time. When corn is hard in September, have a field to turn them on. In dry weather the waste will not pay for the gathering, and of this your stock hogs, turned in afterward, will save much In wet weather the plan cannot be followed; that which is trampled in the ground will spoil. The corn must, therefore, be gathered and fed while the ground remains soft. This, however, is not generally done; once turned on, they are suffered to remain. When the hogs have gathered the fields they should be penned near running

water, and fed what corn they will eat. They will come into an early market weighing 250 pounds and upwards. This plan is adapted to raising hogs in large lots where access to market is difficult; I know of no one who has pursued the plan throughout. It needs a large farm and the combination of soil which will raise clover, oats, and corn; but its several features are highly approved of and practised upon by some of our most judicious farmers. The oat-field, after being cropped by the hogs, has all the straw on it ready to turn under for wheat; and in a country where manuring is not practised, it is easy to perceive that the corn-field is left in a better condition for a future crop than if the corn had been gathered and fed.

Respectfully,

C. B. BOYER.

To the Commissioner of Patents.

Beech Grove, Rush County, Indiana,
December 6, 1852.

Sir: Your Circular of August, 1852, has just come to hand, and for fear that others more competent will neglect it, I will attempt, though perhaps but vaguely, to reply to some of the questions propounded. But before proceeding further, I desire to notice one thing in the Circular. You say that the United States Census will furnish reliable data as to the quantity of grain and other crops. It is true that the Census returns of 1850 show the quantity of wheat raised in Indiana in 1849; but that was a most disastrous year for the wheat-growers of this State; the wheat being universally struck with rust. Thousands of acres of wheat were not cut, and much that was never paid for harvesting and thrashing. Now, I am clearly of opinion that by taking the wheat crop of Indiana as shown by the Census returns and doubling it, you would have a close approximation to the average of the three crops raised since that year. This much I deemed it my duty to say, to place Indiana in her true position as a great wheat-producing State, while at the same time disclaiming anything like censure: so far from it, indeed, that I heartily approve the course adopted. Statistics never can be made reliable or useful until the States adopt a system for collecting them officially. Then their embodiment in one general report would lead to highly valuable and useful results, as *facts* for farmers will be better than *guesses* at their products.

Perhaps I could give you a better idea of our manner of farming by going back to primitive times in this country; and in so doing, I shall not confine myself strictly to your questions in their proper order.

The southeastern portion of Indiana was originally one vast, dense, heavily-timbered forest, and the plan pursued in clearing was to girdle the trees in the months of May, June, or August, and from four to six years after, in a dry time, to enter such a *deadening* with fire and burn the timber off. On such land, three, four, or even more crops of corn, are first raised, and then wheat sown with the corn—sometimes at the last ploughing in July; sometimes in August; but generally wheat is

sown in September. From February till April following, clover, or clover and grass seed, are sown on the wheat, and, if sown early, afford abundance of pasture after harvest—more than will pay for the seed and the labor of putting it on. The next year, hogs are turned where clover alone has been sown, and cattle and other stock where a mixture of seed has been used. Late in the fall, or during an open spell in the winter, or early in the spring, the clover sod is turned under from five to seven or eight inches, and when the time for planting arrives, the sod is well harrowed, crossed off both ways from three and a half to four feet, and three stalks allowed to each hill; when thinned, sometimes three and four, alternately, are allowed to the hill. The first thing used in the corn crop by many farmers is a two-horse harrow, with some of the middle teeth out, so as to pass over a row without injury. The implements chiefly used in the after-culture are the one-horse harrow, cultivator, shovel-plough, and hand hoe. Wheat and clover again follow corn; clover is frequently allowed to stand two years, and clover and grass three or four when the ground requires rest.

Where wheat is sown (as it sometimes is) on clover sod and oat stubble, one ploughing is almost the invariable rule. Wheat sown on clover sod generally makes a large yield if it does not fall before it fills; and if it falls afterwards, the expense of harvesting such a crop, with the present extravagant prices of harvest labor, makes a serious inroad on the farmer's profits.

We are too far in the interior to justify the hope that guano or plaster can soon be obtained here, at prices that would encourge their use, even on a small scale. The nearest lime kilns are twelve or fifteen miles from where I now write; price of lime at the kiln, 20 cents per bushel, and difficult to obtain in sufficient quantities for building purposes. Our soil abounds in lime, and, until it is more exhausted by cropping, it will not be likely to be used except by way of experiment.

Wheat is generally harvested here between the 25th of June and 5th of July; this year, from the 5th to the 15th of July. Having no means of ascertaining the average of wheat per acre in this county, I will just say that for ten years past my crops have averaged over twenty bushels. Few persons use any preparation for seed wheat. The quantity of seed used per acre is one to one and a half bushel.

A prosperous agricultural society, aided by Patent Office Reports, agricultural books and papers, more generally diffused among our farmers, is waking them to a spirit of improvement. We are getting better stock and better farming implements; and with better implements, we can till the ground better, and receive, as a reward, an increase of crops. I think we are safe in saying that all our leading crops are on the increase.

The best remedy for the Hessian flies is to sow wheat on land rich enough to produce a rapid luxuriant growth. There is then much less chance for them to eat it, so as to destroy the crop. Weevils are little known here.

Rushville is our nearest market for wheat; fifty cents the uniform price for eighteen months past.

I have repeatedly kept accurate accounts of the cost of wheat crops, and find that fifteen bushels per acre, at 50 cents per bushel, leave a very small margin for profit; whilst thirty bushels upon an acre will leave $6.

Let us state the account thus:

30 bushels wheat, at 50 cents per bushel	$15 00
Cost of production on *one* acre	9 00
Net profit	6 00
30 bushels wheat, at 50 cents per bushel	15 00
Cost of production on *two* acres	15 00
Profit	

Corn.—Taking a series of years, the average yield of corn per acre would not vary much from fifty bushels. Last year it probably run as high as seventy bushels; this year, owing to the severe and long-protracted drought when corn was earing, it scarcely reached forty bushels. With the present high prices of land and labor, corn cannot be produced much below 20 cents per bushel; the present price, however, is from 30 to 35 cents, owing to the shortness of the crop.

Best method of feeding: Until labor becomes cheaper and more easily attainable, and our facilities for grinding grain greater than at present, it appears to me impracticable to bring into general use any other method of feeding corn than our present one of feeding it whole. Thousands of acres of corn are annually *hogged down*, as we term it here; that is, the hogs are turned into the standing corn and allowed to gather for themselves. And here I must remark that a field of corn hogged down early, and then broken up and sown in wheat, almost invariably produces an extra crop.

Oats, Barley, Rye, &c.—Oats are a sure crop with us, and yield from forty to fifty bushels per acre. From one and a half to two bushels are sown per acre. They are usually sown where corn grew the preceding year, and, if not laid down to grass for pasture or meadow, are frequently hogged down, and followed with a wheat crop, and in that case are not very exhausting; but, when harvested and taken off the ground, they are. Rye is thought to be a less certain and less profitable crop than wheat, and when sown it is always done at the last ploughing of corn. Its greatest value is for the pasture it affords for calves and colts during the winter and spring. With the exception of what little is harvested for seed, it is always hogged down, and rather improves the soil than otherwise. It generally fills best when close pastured. Barley is beginning to be raised by our farmers, and, so far, appears to yield well and pay well.

Beans are raised by very few farmers as a field crop, but pay at present prices—from $1 to $1 25 per bushel.

Peas are not raised at all as a field crop.

Clover and *Grasses.*—The quantity of hay cut may be set down at from one and a half to two and a half tons per acre. No fertilizers used. Timothy is the favorite grass for meadows; clover is often mixed with Timothy, and increases the yield; and the only real objection to such mixture is the difference in their time of ripening. For pastures, blue

grass, Timothy, red top, orchard grass, and clover, are used; and white clover crowds itself into the list, whether sown or not.

I have not found *good* clover hay injurious to horses when fed out of a manger, but when fed out of racks there is some danger of its injuring their eyes. Clover sown in the spring affords good pasture for horses after harvest, and the next season until harvest; after that it is apt to salivate them, more especially if the weather be showery. Most farmers, however, prefer the other grasses named to clover for pasture for horses.

Dairy Husbandry.—There is but one dairy farm in our county where the business is carried on systematically to any extent, although we have an abundant supply of the richest pasture-lands, inviting others to engage in the same pursuit.

Neat Cattle.—The cost of rearing until three years old, I would estimate at from $12 to $15. This may seem low, but, when we take into consideration the fact that we keep our cattle mostly on that which otherwise would be entirely wasted, it is perhaps high enough; cattle are wintered here thus: All the corn not hogged down or cut up is husked on the stalk in the field, and the pasture of such fields keeps cattle in pretty good condition; and the fodder of corn cut at the right time is better than any hay for cattle. Our farmers all get out their wheat with machines, and at the time of thrashing rick up their straw in such a way as to afford comfortable shelter for their cattle as well as food; and by the use of salt, cattle can soon be taught to eat straw with avidity. Thus we manage to keep a good many cattle without the expense of making meadows and saving hay.

Steers at three years old are now worth from $18 to $25; cows from $12 to $20. Steers when stall-fed are generally fed on shock corn, and the droppings of fifty steers thus fed will keep from fifty to one hundred hogs, according to their size and age.

Horses and *Mules*.—Is the growing of these animals profitable? At prices obtained for three or four years past it is a good business. Horse colts are now worth at weaning time from $20 to $35. Mule colts at the same age sell for from $25 to $40. Good horses for the saddle or draught bring from $75 to $120. Mules are mostly sold and driven to the South before they are old enough to work.

Sheep Husbandry.—"Is wool-growing profitable?"

On cheap, hilly, broken land, adapted to grazing, and not to tillage, there are inducements to engage in sheep raising. But here, where land is worth from $25 to $35 per acre, and almost every foot of it susceptible of being brought into the highest state of cultivation; when hogs are worth from $3 50 to $4 per hundred gross, and cattle $2 50 per hundred gross; and horses and mules as already stated; it appears to me our farmers would not act wisely to abandon their present pursuits, and go exclusively into wool growing. Most farmers raise wool enough for their own use, and, where help is abundant, it is worked up in the family; if not, it is taken to the factories in the vicinity, and the owner pays for working it up, in wool or money, as best suits his convenience. Very little wool is exported, except what goes on the backs of the sheep to the Cincinnati market.

"How much more does it cost to raise a pound of fine Merino wool than of the ordinary kind?" I am unable to say; but am satisfied the difference in the cost of production is much less (if anything) than the difference in price. I have, in the course of my life, had some experience in raising both kinds on a small scale, and would prefer raising fine wool at less difference in price than is generally obtained.

I would like to see an experiment something like this tried: Let twenty good Merino sheep be taken, and their live weight ascertained; then take ten large coarse-woolled sheep whose weight shall be equal to that of the twenty Merinos. Let them be wintered separately, and the food consumed by each lot accurately ascertained; and I incline to the opinion that there would be but little difference. At shearing-time, let the clip off each lot be weighed; and again I think there would be but little difference; and if so, raising fine wool must be most profitable. Could not some one who has both kinds, and opportunity to do so, be induced to try some such experiment for the sake of the cause of agriculture? If I am wrong, I would like to know it; and thousands besides might be benefited by such an experiment.

Hogs.—"What the best breed?" We have Russian, Polish, Grazers, Big China, Berkshire, and other breeds; but I apprehend but few hogs of pure blood, of any breed, could be found in this county. All the different breeds are crossed to an almost unlimited extent, and I would not even hazard an opinion as to what breed or cross was most popular or most deserving of popularity.

Where labor is so scarce as often not to be had for love or money, the following is believed to be the cheapest method of making pork, and is generally adopted: Pigs that come through the season are fed through the winter on corn in the ear, and about the first of May are turned on clover. If rye and oats are raised for them they are turned into a rye field when the grain is in the dough state. From thence they go on oats, and, if the corn be ripe enough, they go into a corn-field when the oats are done; if not they are fed with old corn, or turned again on clover. Those who do not raise rye and oats allow their hogs to remain on the clover till new corn comes in, unless they have old corn to begin to feed with a few weeks earlier. If corn be gathered and fed to hogs, they should always be fed on a clover-field designed for corn the next year, and the manure and clover turned under soon after the hogs are taken off. Thus the crop of corn taken from one field may be made to reproduce itself the next year on another. This is believed to be the cheapest method of raising pork. It requires less labor, and is less exhausting to the soil; nothing being taken from it but the live weight of the hogs driven to market.

"How much pork will one hundred pounds of corn yield?" This question, or questions of similar import, have so often been answered in former Reports, and the answers are so generally below my estimates, that I shall not fly in the face of so much authority by venturing an opinion.

No pork or bacon is put up here except for domestic use. Our hogs all go on foot to the Cincinnati market. Pork is our great staple. From thirty thousand to fifty thousand hogs, averaging two hundred and fifty pounds gross, are anually driven to market, besides what are kept for home consumption; and all this we do with a population of less than seventeen thousand souls on a territory of four hundred square miles.

Next in value and importance in our list of exports is wheat; and next, horses, mules, cattle, and sheep; whilst oats, barley, flax-seed, beans, poultry, feathers, eggs, butter, &c., furnish no inconsiderable item.

Hemp and *Tobacco*.—Our soil and climate are well adapted to the culture of these crops; but, for reasons unknown to me, few of our farmers have ever engaged in the cultivation of either, though there is no doubt but they would be remunerating crops.

Root crops are not cultivated here as field-crops, and probably will not be soon. Our country is generally, but gently, undulating, and there are many locations where cellars would fill with water, or, at least, be too damp in winter to keep roots; and to bury them in heaps and have to dig them out of frozen ground, under the snow, would not suit the taste exactly of a go-a-head Hoosier. Yet no country would produce roots in greater perfection if the people could be made to believe there was more money in them than in anything else.

Potatoes, Irish.—"Best method of planting." When we were clearing land, as already described, there was no difficulty in raising any quantity of potatoes. If well put in they yielded abundantly, with very little after-culture. I have raised at the rate of four hundred bushels per acre with very little labor. New land is still used by those who can do it, and those that cannot plant on old sod-land, or on some lot where hogs or other stock have been fed. Any of our land will produce good potatoes by the application of a little long manure. The potato-bug is becoming an enemy scarcely less formidable to the potato than the rot. Since the appearance of the potato disease, although it has never been so bad here as elsewhere, I am inclined to think that, even when not attacked by the disease, the yield is less, and the quality of the potato inferior to what it formerly was.

Fruit Culture.—"Is the culture of fruit receiving increased attention?" Cannot say that it is. Much pains have been taken from the first settlement of the country to procure good fruit, and now few counties can show finer apples or a better selection of varieties. The *curculio* destroys the plums. The *yellows*, with the severity of the past winter, has nearly finished the peach trees, and the *blight* the pear trees: so we may well be proud of our fine apples, for they are almost the only fruit we have left to boast of, except some of the hardy varieties of the cherry. Apples enough can be grown on an acre to be profitable to the farmer if he makes no other use of them than to feed to stock. They are more nutritious, and less expensive, than root crops. The Newtown Pippin and Jenneting [?] are among our best varieties for long keeping, and, with proper care, may be kept sound until the earlier kinds begin to ripen. I know of no preventive or remedy for blight in pear trees or the yellows on peach trees, but would hail such a discovery as among the greatest in this age of wonders. Unless some preventive or remedy is soon found we may as well abandon the cultivation of the pear and peach in this region.

Transplanting, Budding, &c.—Having already extended this article beyond reasonable limits, I should have closed here but for the fact that some things have appeared in Patent Office Reports heretofore, as well as in horticultural works and agricultural papers, calculated to mislead the new beginner in the West. Manuring at the time of transplanting and ploughing, manuring and stimulating, and forcing the growth of trees afterwards, are all well enough in the strong hill-sides of New England, and on the sandy plains further south; but in the West the man that pursues such a course does it at the imminent danger of losing his orchard by winter-killing. I know this to be true, for I have tried it on one orchard and lost thirty out of one hundred as fine apple trees as I ever looked at, in one winter, by being winter killed; and thousands besides have tried like experiments with the same disastrous results. With us the question is not how shall we make our trees grow faster, but how shall we keep them in a healthy condition without letting them grow too fast. After an orchard is set out, crops that require cultivation may be grown on it with safety for four or five years; after that it should be kept in clover, and, if the clover dies out, it should be ploughed and harrowed in the fall after the trees are done growing, and clover again sown in February or March following. If it becomes indispensable to cultivate an orchard to extirpate foul weeds, it should always be done when the trees are well loaded with fruit; then all the energy of the tree is directed to the maturing of the fruit, and there is no danger of an inordinate fall growth or winter-killing. When an orchard is ploughed and the ground put in good order in the fall, it induces an early vigorous growth of the trees the next season; and if the trees make a large early growth, they make a small late one; and *vice versa*. If an orchard is ploughed in the spring and cultivated in some crop till harvest, the mutilation of the fibrous roots and spongioles retards the early growth of the trees, and induces an extraordinary late growth, placing the trees in the best possible condition to be killed; provided the fall and winter favor such a result. I often use the phrase "winter-killed;" yet I do not like it, because we never experience a degree of cold here that would affect trees injuriously if the growth of wood was completely matured before cold weather. Judging the future from the past, on the 27th of October, 1851, I wrote down a prediction that there would be a great destruction of fruit trees the ensuing winter, and never was evil prophecy more literally fulfilled. The early part of the season had been rather unpropitious to a rapid early growth; August was very dry, and retarded the commencement of the late growth; and September and October, being warm and showery, stimulated the trees to a very vigorous late growth. On the 26th of October a very rapid fall in the thermometer occurred, and with the leaves on the trees as green as at midsummer, a very heavy frost came on and completely destroyed their vitality; and the moment that happened, that wonderful chemical laboratory that had been converting sap into woody fibre, ceased its operations as suddenly as a steam engine when the boiler bursts. Every pore of the wood was filled to repletion with a watery fluid, that the tree was powerless either to throw off or assimilate. The sap became vitiated, and, on making an incision in the bark late in the fall, a colored, watery-fluid, sometimes slightly acid, exuded. It is a well known law of nature that all fluids expand by freezing; and in obedience to this law the trees surcharged with watery fluid expand until the bark bursts, and on the return of mild weather the water escapes at the cleft made in the bark, the tree again contracts to its natural size, the bark sometimes standing off the fourth of an inch from the wood, the winds of spring dry the bark in that position, and the trees perish. When trees are in such a condition I doubt whether any of our winters are so

mild as not to kill them. Our mildest winters freeze to their centres trees larger than any of our fruit trees. Now, I will not say that the causes alluded to bring on the real blight; but acid, diseased sap, induces an unhealthy condition of the tree, and brings on diseases that often pass under that name.

I have now an orchard of one hundred and forty apple trees set out fifteen years ago, and although I have occasionally had a tree slightly injured, I know of no orchard that has come off better, and thousands have fared far worse. And the loss sustained bears a very striking proportion to the stimulating treatment the trees have received.

I intend, at the next meeting of the State Board of Agriculture, to move the offering of a liberal premium for the best essay on the best method of guarding against the destruction of fruit trees from this cause. The loss through the West during the past winter is almost incalculable, and cannot be repaired in many years.

Manures.—In the first settlement of this county, many persons fell into the gross error of supposing the fertility of the soil inexhaustible, and as a consequence, manure of no value; but the sad experience of some who corned thin land too long, and the superior intelligence of others, have nearly dissipated that error; and if there are but few who make manure, there are many more that save and apply to thin corn-land what naturally accumulates about their barns and stables. I must not, however, disguise the fact that we still have a few farmers (not book farmers either) who look on a manure heap as a nuisance, that they would thank any of their neighbors to remove from their premises; and I have myself very much obliged some of them in this way.

With much respect, your obedient servant,

JESSE MORGAN.

To the Commissioner of Patents.

Brookville, Franklin County, Indiana,
December 19, 1852.

Sir: Having received a copy of the Agricultural Circular from your Office, I propose answering some of the questions there propounded, and also to speak of some other matters connected with the great subject of agriculture.

The White Water river runs through the central part of the county, dividing it into two very nearly equal portions. The eastern portion, including the White Water valley, is composed of very rich soil, generally level and dry, and well adapted to the raising of wheat, oats, rye, corn, clover, Timothy, &c.; the western part is mostly hilly, of an inferior quality of soil, and better adapted to raising vines and grazing, though large quantities of the grains before mentioned are also raised there.

Ditching.—In portions of this and adjoining counties there are some wet lands. They may generally be called "marshes," rather than "swamps" or "ponds." Over a portion of them water stands during the wet season of the year, or during a considerable part of some seasons. When the county was first settled by the present race of inhabitants, they were covered a great portion of the year with water, not deep, but extended all over them; the natural outlet to some of them being obstructed by logs and brush; to others by banks of earth, supposed to have been thrown up by beavers. The opening of these outlets, and clearing a part of the land, did much towards drying it; but still it was level, and the descent was not sufficient to drain it well. The soil was usually of the very best quality, and rarely failed, when the season suited, to produce large crops of anything adapted to the climate; but in wet seasons the seed and labor were often lost.

Within a few years under ground draining has been introduced, and is now pretty extensively used, producing most wonderful and valuable results. By making the outlets quite deep, sufficient fall can be obtained for the desired purpose. If the amount of water discharged by this be large, it should be a wide, open ditch; if the amount be small, the ditch may be narrow, and covered. Into these outlets lead several main branches, and the small ditches into these, connected with each other a river and its tributaries, or forming a system like the veins in the human body. The small ditches, running in every direction where desired, are usually cut from 2 to 4 feet deep, according to the position and character of the ground, and from 1 to 2 feet wide, according to the amount of water to be discharged. They are then finished in various manners. The most approved method, and the one more employed than all others, where stones are plentiful, is to build a narrow, dry wall from the bottom of the ditch, on each side, to the height of 10 or 15 inches; then cover the aperture with large stones; then fill in with earth over the whole to the level of the ground on either side. A little straw may be thrown in on the covering stones to prevent the loose earth from falling through; as soon as the earth becomes compact, it will retain its place, and not fall through into the open ditch. The common spade and shovel have usually been employed in ditching, though the plough is frequently used for filling them. For this purpose, the beam of the plough should stand at an angle with the share, or the common plough may be used with a long double tree, and one horse on each side of the ditch, though this is in some respects inconvenient. Ditching machines will soon be generally constructed and introduced, saving much labor and expense. Brick or timber may be substituted for stone. If brick are used, they should be well burned, though it does not matter so much where they are free from the effects of the atmosphere and freezing; if timber is used the most lasting kinds should be obtained, so that it may not soon need to be replaced. Another method of using stones is to cast them in loose, to the depth of a foot or more, and cover with the loose earth as before. That is said to make a very good and lasting kind of ditch. Another method, also, of using timber is to cut oak or some other lasting kind 18 inches or 2 feet in length; then split it into staves 2 or 3 inches in thickness, and the wider the better. Place one end of them at the bottom of the ditch on one side, and lean the other end against the opposite side, breaking the joints. Cover them as before. This will last most surprisingly. Another method still that has been suggested, and perhaps somewhat tested, is to use earthen tiles, made in an open half circle and jointed, spreading out 2 or 3 inches on each side, to form a surface to sit upon, so that the waste water may ooze into it. Water pipes are frequently

made of this material, but they would not answer this purpose, as they are made with a full circle, and have no provision for the admittance of the water which will be continually accumulating along them. It is thought that the half circle open at the bottom will answer well. Iron would probably answer equally well, but would most likely be more expensive.

Open ditches are used by many; but the under-drains are in every respect preferable, unless a large amount of water is to be discharged. The latter drain the ground better; they never fill up if properly made they consequently involve no expense or inconvenience in clearing them; they occupy no ground; they are in the way of nothing else; and they are cheaper in the *long run*. The ploughman must turn at an open ditch, leaving on each side of it one-quarter or one-half an acre, or often more, to turn upon; but he may drive over the covered drain without the slightest inconvenience; and, instead of giving up one or two acres of his richest soil to the production of weeds and bushes, as is often done, he raises upon it the best grain in his whole field. These reasons grow into additional importance where numerous ditches are required.

But one of the most strikingly beneficial effects resulting from the draining of wet land is, that the nature of the soil seems to be entirely changed. Instead of being cold and heavy, as before, it becomes warm, porous, and light. Previous to draining, the water falling and standing upon it at some seasons, runs the particles together, and gives it the nature of tough mortar. As it dries, it hardens; the plough turns up clods, instead of loose earth; the roots of the vegetables planted upon it, being scarcely able to penetrate it, derive very little nourishment therefrom, and consequently are sickly, and languish for something to sustain them. On the other hand, when it has been drained, the water never stands upon it to destroy its porosity; the winter frosts raise it up and leave it loose and capable of absorbing all the nutritious elements afforded by sun, wind, rain, or decaying vegetation; the wheat, the corn, the oats, the grasses, send down strong roots into that part of the soil never penetrated before, and bring up abundant nourishment to increase the luxuriance of the already vigorous crops. Each successive year continues to improve the soil, as the injuries hitherto sustained by it are more completely removed, and as new and increased sources of fertility are opened. Any farmer can see this exemplified in breaking up his ground for planting or sowing. Let him select a field all of the same quality of soil; then let him plough one half of it when it is wet, the other when it is reasonably dry. The former will be cloddy and hard during the whole season; the latter will turn up mellow, and can be easily kept so, and will moreover be more productive than the former. Similar causes produce like effects in the two cases.

But not only is this method of ditching of advantage to *wet* lands, but to *dry* lands also. In all dry lands are numerous little branches or ravines, each of them occupying some space, and very generally making it necessary for the ploughman to turn at each, thus involving a loss of time and of land. Besides, these uncultivated places are usually permitted to grow up with weeds and bushes, from which the whole farm is annually seeded in case any part has failed to produce its own seed. At the heads of these, and frequently alongside of them, the grain is frozen out

during winter, or is drowned by the fall or spring rains. Draining will prevent all this, or at least prevent it from being more liable to these mishaps than other lands. In each case, from a quarter to a half, or even one or two acres, of the best land are reserved from worse than non-productiveness. Fields, instead of being cut up into two or three angling parts, as many are now, almost doubling the labor of cultivation, are made square. The rich, alluvial soil, that was aforetime carried off, more or less, by every considerable rain, is now almost entirely preserved. Last, but not least, of these advantages which I enumerate, is the furnishing of stock water. The sources of these springs being opened, and provided with a steady outlet, an unfailing stream of water flows from most of them during the whole year, yielding an abundant supply of water for stock where before it could not be obtained at the time when most needed, because an outlet for it could not be opened or kept open. All that is needed is a trough or reservoir of some kind to receive it, so constructed and placed as to be accessible, but not easily destroyed. Every item of expense will often be repaid in a single year, and at the farthest in two or three years, in the numerous advantages derivable therefrom. Any farmer may have his whole farm ditched in the best style in a few years, and scarcely miss the time, by appropriating a few days to this business each year; but I think he would find it much more to his advantage in the end to have it all ditched as soon as possible.

Corn.—Indiana, Ohio, and Kentucky are celebrated as the great corn-raising States of the Union, and the White Water valley is among the most famous in them for this particular production. The crop this year is not equal to common crops, because of the drought of the past summer; indeed, it was thought for a while that we would not have half a crop. The rains came finally in time to save it in a great measure, though a great many fields are lighter than usual. I suppose it might be called three-quarters of a crop. The price was remarkably low during the early part of the season; but the drought caused it to rise in price in a few days from 20 to 33 cents per bushel. The new crop is coming into market, and is selling at from 32 to 35 cents. Large amounts are taken on the White Water canal to market from this place, and Metamora and Laurel, all in this county. Too much corn is raised in all this region of country; many farmers run their ground down by planting it continually in corn. Not more than two successive crops of corn should ever be raised, even on the best of land, unless it is well manured; and *they* should be well cultivated; for I am convinced that a large crop may be taken off with less injury to the soil, if well cultivated, than a small one, if but half cultivated. I admit that several successive crops have been raised on some rich lands without entirely exhausting them, but not without injuring them. Rotation in crops is of great importance, and is generally too little attended to. Some farmers who have given it proper attention, find that, by judicious rotation, they can raise a crop of grain every season, and improve their lands continually. Corn was the most profitable crop a few years ago, (that is, brought in the most money;) but now it is often less profitable in that sense even than wheat and other crops; and then it exhausts the soil, whilst they enrich it. I have not seen a test made that could be considered conclusive, but am of opinion that the best method of feed-

ing would be when the grain was cooked, or ground at least, especially if fed to cattle. It could not well be made palatable to horses, perhaps, when cooked, or be made to repay the trouble when fed to them in small quantities, even if it could. Of the mode of culture of corn, wheat, and other crops, I will perhaps speak more particularly at another time, if others do not.

Wheat.—Next to corn, wheat is more raised than any other grain in this county. For several years it has been fast gaining in amount, and will very soon surpass the corn, if not in the number of bushels, at least in value. Much attention has been given to the introduction of new varieties. Some of them have been fully tested; others, not. Upon some, the millers or buyers pay a premium; others, they will only buy at reduced prices. This is one of the most effectual methods of approving or condemning a variety. Machines are being introduced now for harvesting wheat, and some of them are designed to thrash, and partially clean it, also. They are truly labor-saving. The sickle has been laid aside, and the scythe and cradle will most probably soon give place to this machinery, worked by horse or steam power. Machines are already almost exclusively used for the thrashing. The last crop of wheat was a very good one. It was altogether free from rust, the fly, or the weevil, and was harvested in good order. Hands are always scarce in harvest, and demand high wages. In view of this, less wheat is often sown than would otherwise be. It all ripens within a few days of the same time, and must be cut or lost; hands must, therefore, be had, at whatever price. It is to be hoped that the introduction of the machinery above referred to will soon obviate this difficulty. The wheat crop, I think, will continue to increase. It is a profitable crop, renovating to land, always commands *cash* in market, and most of the labor which it requires can be done when other business is slack. Last year's wheat, during the spring and summer, sold for from 50 to 55 cents per bushel. This year's crop is selling at from 62 to 65 cents, and seems on the rise. (For the discussion of one point connected with wheat culture, see an article which I sent you a year or more ago.) Spring wheat is seldom sown here; it is more uncertain than the fall varieties.

Oats, Rye, Buckwheat, Flax, &c.—A large amount of oats is raised here, but chiefly consumed at home; small quantities only are taken to market. There has been an increase in the yield per acre, arising chiefly from the better mode of sowing them; but there has been very little improvement in any other respect. The same kind of seed is sown as hitherto. A general opinion prevails that oats are more exhausting to land than anything else; this, I am satisfied, is an erroneous opinion. Rye is very little raised now. Buckwheat is still raised in small quantities, generally where some other crop has been taken off the same season. Flax is raised to a considerable extent; not as formerly, for the lint, but for the seed, which sells at from $1 to $1 25 per bushel, or even higher The lint is sometimes used in the paper-mills—of which we have one; but the seed is the great object. Hemp is seldom raised here; tobacco, I am happy to say, never. Broom corn is raised some seasons to a considerable extent, and is generally a profitable crop. When the business of broom-making was first introduced in this State, a few years ago, it was very profitable; but, like all such profitable employments that are easily understood, it was soon overdone. It is

hard on the land, soon exhausting its fertility. One crop will perhaps reduce the soil more than two crops of Indian corn. Barley is raised occasionally, but not in large quantities. In the western part of the county, on the hilly, poor lands, hops are raised to a considerable extent. I am not acquainted with their culture; but judge that they may be profitably raised by those who have very small farms. They also seem to grow well upon rocky land, and in poor soil. They are chiefly cultivated by German immigrants.

Vineyards.—The same class of persons, in the same part of the county, have planted, and are planting, vineyards. Some have planted half an acre, and are making additions from year to year; some have planted one or two or more acres. Many of the vines are already bearing well. They are usually planted on hill-sides facing the south. Various kinds have been planted. The proprietors who are experienced in the business say that these vines give promise of productiveness, and are remarkably healthy. This, again, is a business in which a small, very small, piece of land will support a man and family. The grape vine is considerably cultivated in yards and gardens for its luscious fruit. It is a great producer, and will amply repay all the labor bestowed upon it.

Renovating Crops, Grasses, &c.—Grasses are the principal renovating crops, and they are raised with a double or treble purpose, as, besides renovating the soil, they are designed to furnish hay and pasture. Hay is made in quantities sufficient for domestic use, as its great bulk *seems* to forbid the sending it abroad to hunt a market, though I think it probably would pay well. Grazing is altogether too much neglected in this State and in the western part of Ohio. Especially are wood-lands neglected. By removing the logs and brush—the scrubby saplings, that will never become valuable, and the decayed trees—and then cutting off the lower limbs from the trees and saplings remaining, the thickest forests may be completely set with grass, and be almost equal for grazing to cleared lands. This is seldom done with us; and thus very nearly one-half the entire surface of the earth is lost for all agricultural purposes, except to furnish timber, which it would still do equally well. As renovators, then, they are chiefly sown, but with an eye, in most cases, to one or both the other objects. Considered as a renovator alone, red clover is preferred to all the other grasses for dry land; it has large, strong roots, which perforate the earth, and thereby loosen it to a greater depth than any of the other grasses, and probably furnish more enriching matter in their decay. Besides this consideration, the soil receives more from the above-ground crop, leaves, &c., than is received from any of the others. When it is designed for pasture—for I cannot keep entirely separate the distinct heads without taking up too much space—for pasture, then, some Timothy is sown with the clover. It is thought that cattle relish it better, and that they are less liable to be injured by it when first put on it in the spring; though clover alone will produce more pasture. Timothy is very generally preferred for hay, though clover is perhaps most profitable, from the fact that it furnishes a crop of seed after the hay has been taken off, besides a large amount of refuse straw for manure. In wet lands Timothy is generally preferred to clover. One cause of this preference is, that it is less liable to be frozen out in those lands; but that reason will no longer exist when the draining of them is completed, which it is to be hoped will soon be done. Red-top

is also raised to some extent in wet lands, and seems well adapted to them; but it is regarded as an inferior grass. It does not possess the strength and nutriment for cattle and other animals that Timothy and clover and blue grass do, and I suppose the same is true as to furnishing nutriment for the earth. I have called clover a grass, and do not think it any great misnomer. Peas have never been raised here as a renovating crop.

Manures.—Well-rotted manures are the best of all renovators. These, I am truly sorry to say, are greatly neglected in this part of the country; but I am equally rejoiced to add that a great improvement is manifest in this respect. The best reason that I have seen given for this is the following: The early settlers, finding the land so rich, thought its fertility could never be exhausted; they, therefore, deemed it unnecessary labor to save or apply manures. Experience is only now driving this notion out of the heads of their sons and successors. Barnyard manures are now beginning to receive from many pretty careful attention, and other kinds that are easily obtained, especially where it is necessary to remove them out of the way. With a few exceptions, sufficient care is not taken to apply all that might be collected. Lime and plaster are seldom used; guano, so far as I am informed, has never been used at all. Every year is working a change in regard to these land restoratives.

Potatoes.—Sweet potatoes are not so much raised as Irish potatoes. They require a dry, warm soil, but a sandy soil is generally preferred. They are seldom marketed, but are designed for table use. Their culture would be vastly increased if a kind could be obtained that would remain sound during the greater part or all the year, as Irish potatoes do; but the kinds now in use cannot be kept, without much inconvenience, even for winter use.

Irish potatoes are raised in large quantities, being much used in most families as an article of food. They are also taken to market in considerable quantities at Cincinnati, which is the great market for almost all the spare products of the farm. They are sometimes fed to hogs, which do well on them. The potato is a very productive plant. More bushels of potatoes will probably grow upon an acre of ground than of any other kind of crop that we raise; but they also require a great deal of labor. Very many different varieties are cultivated. The potato *rot* has never visited us to any extent; indeed, I doubt whether the real disease has ever visited us at all. It has not been found necessary to seek a remedy, as the amount of injury has generally been so limited.

Other Root Crops.—Turnips, beets, and some other bulbous roots, are raised in gardens for table use, but are seldom made a field-crop for the feeding of stock.

Tomatoes.—But a few years have elapsed since the general introduction of the tomato plant; yet few, if any, garden vegetables are in so great favor. Tomatoes are easily produced in all kinds of soil, and the plants bear most abundantly. They grow best on light, alluvial soils, but, as I said, can be raised in abundance anywhere. There are a great many varieties of them, differing in size from the fraction of an ounce to two or three pounds in weight. The middle-sized varieties are usually the most esteemed for ordinary cooking purposes. In their common green state they cannot be preserved during the winter, but they are now extensively preserved in tin cans for winter and spring use. They

are cooked, as for the table, with salt, pepper, &c. Tin cans of various sizes, from one quart to two gallons, are made. Small openings are made in the tops of them, through which they are filled whilst they are yet warm, so that the air may be mostly expelled from them. These openings are then covered with small pieces of tin, and they are soldered, so as to make them air-tight. If they are kept where they will not freeze and thaw, they will remain good any length of time. I ate some in July or August that were put up in this manner the previous October, and so fresh and well did they taste that they could not have been distinguished from those just plucked from the vines. They should soon be used when opened, for they will quickly spoil when exposed to the air. It is therefore advisable that the size of the cans be made proportionate to the size of the family, so that, when one is opened, it can be used before it will spoil. Peaches, pears, cherries, and fruit, or berries of any kind, may be preserved in the same manner.

I find that subjects accumulate on my hands; but I have already occupied too much space. I should like to speak of the various kinds of stock—such as horses, cattle, hogs, sheep, &c. I should also like to write some account of the several fruits—such as apples, pears, peaches, cherries, &c. I should in like manner be pleased to write an essay on hedging, and say something of some other matters, also; but I must close. Should this be acceptable, and Providence favor, I may write on them hereafter.

Yours, most respectfully,

JOS. BRADY.

Swain's Mills, Rush County, Indiana,
January 3, 1853.

Sir: According to your request, I hereby attempt to answer such of your inquiries as I feel competent to answer correctly.

We put no guano on ground in this county; but we use common stable manure, increasing the crop of wheat or corn twenty-five per cent. by a light covering of the ground. The average crop of wheat is from fifteen to twenty bushels; seeding, from 20th of August to the last of September; quantity of seed, from one to one and a half bushel per acre; plough twice, or plough a furrow six inches deep first time; four the second; the yield is increasing; rotation not regular; few Hessian flies; no weevils; price 50 cents. Clover, or clover and Timothy, sowed in February or March.

Corn.—Average crop, forty bushels; cost, 10 cents, including rent. Culture: plough sward in fall, or early in spring; other ground, later; plant four feet wide in hills, three stalks in a hill; plough often while the corn is small; stop before the tassel appears; keep every noxious thing from the hill.

Oats.—Average crop thirty bushels; one and a half to two bushels seed per acre.

Clover and *Grass.*—Quantity per acre, one and a half to two tons. Clover is considered the best fertilizer; though Timothy mixed does well either for meadow or pasture; quantity of seed, three quarts per acre; cost of growing per acre, $3, clear of rent. Red clover is very good for

horses the fore part of the season, and by frequent salting they do well afterwards; but need grain when used any time.

Neat cattle cost (say) $4 per year; will bring $15 at three years old; good dairy cows, $18 to $20, spring or fall; one hundred pounds of corn will make (say) fifteen pounds of beef. The Durham, &c., are preferred, generally, by good farmers. I have never tried the experiment of weighing and feeding. The best plan for breaking steers is to yoke them while small, and work them frequently, and not beat them too much.

Horses are grown at a profit, and so are mules; rearing to three years old cost (say) $50. To rear good and serviceable colts, I should work the mother moderately, and feed her well, and let her have grass while suckling; but if you wish a mare to prove with foal, keep her from clover during the time of trial. The plan I prefer to break young horses is, to hitch them, when two years old, with an old, steady animal, and load them no more than the old horse can pull, together with the colt, until he inclines to pull well; taking good care not to let him get scared in gear; and if he should, never let him run away, for he seldom can be trusted afterwards.

Wool-growing is not very profitable here; the cost of production equal to the price—say 25 to 30 cents; the cost of coarse wool nearly equal to fine. The lambs are more hardy and easier reared; the proportion of lambs to ewes varies from one-half to three-fourths, or seven-eighths, according to the severity of the winter, (as they generally come in the winter,) and other circumstances; large sheep are most profitable either for mutton or wool.

The Berkshire hog has been reared here; but farmers do not like him so well as the improved common stock.

The Shakers of Ohio keep the best stock I know of. Farmers differ as to the best mode of rearing them: some say give them all they will eat; while my opinion is, half that quantity will make more pork, with the same grain; or, in other words, giving two hogs what one will eat, I think, will make more pork; for nature does much for growing animals. When I commence the process of fattening, I give them all they will eat. There is a great saving in grinding grain, particularly for young hogs; and either cook or sour it for rearing; but give it in dough for fattening.

Potatoes.—Average crop, four hundred bushels per acre, Irish, and two hundred, sweet. The best Irish are Meshanock and Pink-eye; the best sweet are the Spanish; but they are not so good to yield as the native yellow; the cost per bushel—say 30 cents for sweet, and 15 for Irish. Best mode of culture: drill for sweet, and hills for Irish, and ploughing and hoeing for both varieties; manure not necessary for sweet; where hogs have been fattened is the best for Irish.

Fruit is receiving increased attention; but peach trees do not flourish. Apples are a profitable crop. I view potatoes better for food than apples for any kind of stock. The best variety for keeping and exportation is the Geneting or Never-fail; though many other varieties keep well—such as Wine sap, Canon, Pearman, Newtown Pippin, Vandevere Pippin, &c. We manure and improve our soil by clover more than any other way; though we use the manure from the livery or horse stable next to clover when easily procured, and think it more congenial for a cold, wet soil, or

rather better adapted to that kind of soil than any other manure or any other soil. No guano is used in this county.

Yours, respectfully, &c.,

JETHRO S. HOLGER.

JACKSONBURG, WAYNE COUNTY, INDIANA,
November 16, 1852.

SIR: Dr. Bunnel, to whom the Circular before me was addressed, has deceased. Before his death he requested me to answer this Circular, and in compliance with which I make the effort.

The staple products of this county are corn, wheat, and hogs. Until recently corn and hogs were the main reliance of the farmer, owing to two facts: first, the soil was new and very productive of corn; secondly, corn could be fed to hogs, which could be driven to Cincinnati, 65 miles, our nearest market; too far to haul wheat over bad roads. Since we have a canal and better roads to market, more wheat is raised than formerly; besides, the farmer begins to discover that our soil, that for the first 15 years of cultivation yielded from 50 to 70 bushels of corn per acre, without manure or extra cultivation, now requires manure and rotation in crops to maintain it in a state of productiveness.

But little attention, however, is paid to the saving and application of manure most economically; all that is done in that line is to gather up once a year, in the farm-yard, all the manure that has accumulated, and apply it to the poorest field, or the poorest spots in a field, before planting corn, or sowing wheat.

Corn is planted from the 20th of April to the 15th of May, according to the season.

If clover sod is to be planted, late fall or winter breaking is considered the best, on account of the sod becoming more rotten and the ground mellow. Fall ploughing, however, makes the ground obnoxious to the cut-worm, as most of the vegetation is thereby destroyed, so that the worm must depend on the young corn plants for sustenance.

When corn is to be planted in ground that was in corn or wheat the previous season, it is ploughed just before planting and harrowed. It is not generally ploughed more than six inches deep; but I am satisfied that deeper ploughing would well pay for the extra labor, from some experiments which have been made in the vicinity.

After harrowing, the ground is marked out both ways about three and a half feet apart, with a common shovel-plough; the corn is dropped by hand, and covered with a hoe; three stalks are designed to be left in a hill. This season there was a remarkable failure in corn coming up, owing, as it was supposed, to the severe cold of last winter, when much of the seed corn was yet in the field ungathered.

When the corn has been up about two weeks, it is gone over twice in a row with a cultivator or harrow; after which it is ploughed three or four times with a shovel-plough and hoed once. The average yield of corn per acre is about 50 bushels, though 100 is not uncommon; in such cases the corn is drilled. The cost to the farmer who owns the land is about 7 cents per bushel, or 14 cents to the renter. The average price at the nearest market is 30 cents.

Wheat is seeded from the 1st of September to the last of October; ground is ploughed but once. As much wheat is sown in corn as by any other plan; the yield however is not near so great as when sown on fallow or clover sod. Clover ground is generally ploughed just before sowing; the wheat is sown, then harrowed, which is all the labor applied generally.

Those who pay any attention to rotation in crops adopt the following plan with much advantage: first, one crop of wheat, then two of clover, then one of corn; the clover is sown in March or April, on the wheat.

One and a half bushel of wheat are sown per acre; harvest generally commences by the 27th or 28th of June. When sown among corn, 12 bushels are an average crop; on sod, 20 bushels. The yield is increasing; 30 bushels per acre is not uncommon without extra labor; price 52 cents per bushel.

Hessian flies and weevil seldom injure wheat in this region, though this fall the young wheat appears to be badly injured by the "fly;" I know of no remedy. The greatest enemy to wheat in this country is the "rust." The best remedy is to sow early varieties of wheat, and sow it early, so as to be ready to harvest early. The rust appears to "strike" all wheat at one time; after which, the grain does not increase in weight; hence it is obvious that early wheat will be the best.

Hogs are still the principal crop; they are generally sent to market at about 15 months old; average weight, 200 pounds net. The first 12 months of their lives they are fed merely enough to keep them in "growing order." Then commences, about the first of September, the "fattening," which consists in feeding them as much dry corn as they will eat until the first of December; during this time, each hog consumes about 14 bushels of corn and increases about 100 pounds net pork; it is worth $5 per hundred.

From a variety of experiments, I am satisfied that two points in the above plan are wrong: the first is letting a hog remain poor 12 months of its life, when it could be made as large in 9 months as it generally is in 15; the second error is feeding corn without grinding.

S. S. BOYD.

QUEENSVILLE, JENNINGS COUNTY, INDIANA,
December 2, 1852.

SIR: As rocks make the mountains, so items make a history; and if every man could give his fellow his experience, there is no doubt every man would see something to improve on, if not to imitate. Your valuable Report, so far as I am a judge, is the very medium calculated for that business; and it is, I think, a work that every practical and thinking farmer should have, if possible, in his family; it is so well adapted in its compositions to the wants, the intellect, and feelings of the farming community; and, although there are an abundance of agricultural journals, and good ones, which have been, and at this time are, working great changes in the farming class, for the better, still I consider your Report as a great boon to the community; and I hope that, as such, it will be upheld and encouraged to the fullest extent, not only by good contributors, but by the government as well.

The county I live in is fast emerging from a slovenly and unsystematic manner of farming, and what with the improvements of railroads and steam-power, scientific publications, the introduction of improved stock, of good and improved ploughs, farming mills, and other tools and implements for the saving of labor, we are continually progressing, so that we hope ere long to be able to rank with the first farmers in the State.

Our crops of wheat generally this season have been good—considerably over an average crop, but from 10 to 14 days later in harvesting, and the weather prior to that time very cool, indeed, for the season. We have had a remarkably dry and favorable time for wheat, oats, and hay, not having any rain worth mentioning till all was, or might have been, housed or stacked away, although our corn crops had like to have suffered in consequence; but, fortunately, before it was too late, we had copious supplies of rain, which did just save our crops, and that was all. Had the rain kept off one week later, a vast amount of corn in this section would inevitably have been lost; but as it is, I think the drought we suffered will not cut us (generally speaking) far out of an average crop. The worst part of the season, take it altogether, was in the spring, and the greatest inconvenience and detriment we suffered was in getting our corn to come up and stand the attacks of birds, and but more especially the mole. It is very common for moles to attack and eat the grain after planting (more or less) in this country in sandy or loose soils; but never do I recollect of their ravages being so early, so extensive, and general as this season; and it is a pity there cannot be found some certain remedy, some effective drug, in which corn might be steeped to prevent its destruction, both from birds and small animals of this kind. There is one thing, however, I have proved to my satisfaction—and that is, that the hardiness of white seed-corn in sprouting in a cold season far exceeds the yellow. The yellow, if it is sound, may come well in a good season, on a wet, heavy soil; but it will not do in a cold and wet spring; it will rot in the ground when the white will come tolerably thrifty.

Our fall here has been particularly seasonable for turnips, potatoes, and other fall roots and vegetables; but I hear many complaints of the rotting of the potato; nor do I believe the best at this time raised are as good in their eating qualities as they were some years ago.

Our wheat sown this fall looks well, having had so far the most favorable time for it I remember to have seen.

Very respectfully, your obedient servant,

STEPHEN CADBY.

BEDFORD COUNTY, TENNESSEE,
September 28, 1852.

SIR: I received your Circular some time since, and now attempt to answer the interrogatories therein contained, so far as I am prepared to do so. I regret that I am not able to give a more full and satisfactory statement.

Wheat.—No guano is used here in the production of this crop. The average product per acre has been about ten bushels. Time of seeding, from the middle of September to the middle of November; harvesting,

about the first and second weeks in June. Seed prepared differently, viz: sometimes soaked in brine, sometimes in water tinctured with blue-stone, sometimes simply poured into water, and all that will swim skimmed off, and sometimes sifted with a wire sieve; but, oftener than any other way, it is sown without any preparation at all. Generally one bushel of seed per acre; generally sown amongst corn, and ploughed or scratched once; sometimes sown on stubble or fallow ground, and ploughed twice—perhaps three inches deep. Yield for the last three years generally less than formerly, owing to the seasons. Average price, 75 cents per bushel.

Corn.—No guano is used in the production of corn. Average product per acre, eight barrels. All I can say as to the best system of culture is to plough deep and close, and stir the ground often whilst the crop is young. The only method of feeding here (or nearly so) is whole; but we suppose it would be better for horses and cattle, chopped, and for hogs, cooked. We prepare our ground for planting by ploughing twice, (in general;) then lay off rows about four feet distant each way, two stalks, and sometimes three, in a hill.

Peas and *beans* only raised in small quantities for table use. *Barley* not raised here. Average yield of oats per acre, twenty five or thirty bushels; quantity of seed sown, one and a half bushel per acre. Average yield of rye, ten bushels per acre; quantity of seed sown, one-half bushel per acre. Rye is considered renovating to land.

Clover and *Grasses.*—Quantity of hay cut per acre, about two tons. No fertilizers for meadows and pastures used. Timothy and herdsgrass are preferred for meadows; about one gallon pure, clean seed sown per acre. I do not know that red clover is injurious to horses.

Dairy husbandry is not atended to here, any of consequence, more than for family use. However, I think the average price of butter and cheese is about 12½ cents.

Neat Cattle.—Cost of raising until three years old, about $12 or $15; which is fully as much as they will sell for when fat at that age. Value of good dairy cows, either in spring or fall, from $10 to $20. It is thought that a given amount of food will yield more meat in a Durham than in the native breed. We generally break steers by yoking a wild one with a trained one.

Horses and *Mules.*—The growing of these animals is profitable. The expense of rearing a mule until three years old is about $45. Brood mares and colts should be treated tenderly, with plenty of wholesome food, and a shelter or stable in cold, rainy weather. The colts should not be weaned under four months old; and, when taken from their dams, should not be permitted to hear their neigh.

Sheep and *Wool.*—Wool-growing is not considered profitable here; therefore, we are not prepared to give the cost per pound, &c., &c. The number of lambs annually reared will, perhaps, not vary much from the number of ewes, though it frequently happens that the lambs die, very considerably, at six or eight months old.

Hogs.—The best breed is, in general, those which have been best raised and kept; though I have no doubt but that our breed of hogs has been improved not only by increased care and attention, but also by a cross with the Berkshire and other foreign blood. We have generally such an abundance of corn here, that we have not tried much to

ascertain the cheapest method of obtaining pork and bacon; but we find it profitable, in raising pork, to have red clover for hogs in spring and summer; and if our corn should be a little scarce, we find it cheaper to turn hogs on a field of oats, when the clover fails after harvest, than to buy corn to feed them. And after having eaten the oats, then turn them on a rye-field, which (if plenty of it) will keep them till new corn may be fed to them. Hogs can be fattened early in the season cheaper than late. Here, in order to save labor, and in that sense to fatten our hogs cheaply, we usually turn our fattening hogs into a corn-field about the middle of September, and deliver them to the drivers about the 8th and so on to the 15th November. I know of no new or superior method of putting up pork and curing bacon. The common old method is in use here.

Rice.—This crop can be successfully cultivated on upland.

Cotton.—This crop is not raised in my neighborhood, except for family use.

Tobacco.—This crop is not raised in this vicinity, except in very small quantities, for family use.

Hemp.—The culture of hemp here is on the decrease, I think; average yield per acre, five hundred pounds.

Potatoes are only raised here for home consumption; yield per acre not taken account of; it is, however, tolerably good.

Fruit culture is not receiving great attention here. I have found that apples, as well as peaches, are worth something for hogs, &c.

Manures.—Our lands are, in general, rich, and we have paid but little attention to making or preserving manures. No lime nor plaster is used as a fertilizer; neither is guano.

Most respectfully, yours, &c.,

WM. BOONE.

Remarks.—Our correspondent says that "lands there are generally rich." If so, how does it happen that farmers in Bedford county fail to raise more than eight bushels of corn per acre? He says that the average product of wheat has been about ten bushels per acre; and concludes by informing his readers that "but little attention is paid to the making and preserving of manures." Our object in this note is simply to give a hint in favor of paying more attention to the manure heap, and not forget to try both lime and plaster.

D. L.

NEAR PINE GROVE, CLARKE COUNTY, KY., 1852.

SIR: The Circular from your Office for August, 1852, was duly received.

As far as my knowledge extends, no guano has ever been used in this region of Kentucky; nor has lime or plaster been used as a fertilizer. Our soil has plenty of lime in it.

Ground is generally prepared for planting corn by breaking up in the spring, as soon as the ground will do to work, with two horses or oxen, as deep as the plough can be made to enter. If sod-ground, it is frequently double-ploughed; that is done by running a plough which cuts

the sod two or three inches thick, and turns it into a deep furrow. The second plough follows in the same track, and is made to cut as deep as possible. The next round the foremost plough throws the sod into this deep furrow, and the other covers it. The ground is then laid off in checks or drills, and then planted. The corn is mostly dropped by hand and covered with a small plough called a bull-tongue. Of late years the planting has been much closer than formerly. Three feet six inches is now the most common distance, though many persons are planting only three feet apart. The number of stalks left in the hill is from two to four. The average product is greater than formerly.

The product of rye has gradually lessened until its culture is almost abandoned. It was cultivated extensively to be fed down with hogs. Oats have now, in a great measure, taken the place of rye. The product of the oat crop has been greatly increased. Into those fields intended for hogs, as soon as ripe enough, they are turned and permitted to stay until they have finished the harvest. Some years, red clover will salivate a horse in a few hours after eating it. I once saw a crop of hay made of red clover that would have this effect upon horses. The white clover has generally been considered much worse in this particular than the red. They are both much worse when closely pastured. This effect from the clovers has been much less of late years than formerly. I have frequently seen hogs salivated in the same way. Cattle sometimes eat so much red clover as to swell and die. The best remedy, if seen in time, is to run them until they will purge it off. If not able to run, a knife may be stuck just behind the most projecting part of the paunch, which will let out the wind, and thus save life.

Yearling steers are now selling at $25. I have just sold my three-year-old Durhams for $50 each. Native cattle would not have brought more than half those prices.

The growing and fattening of mules is now considered the most profitable business of the farmer in Kentucky. So many persons are engaged in it that it has increased the demand for young mules so much that large numbers have been brought from Indiana, Illinois, and Missouri, to be prepared for market in this region of Kentucky. They are generally sold again at two or three years old, and the price is from $75 to $150, according to quality. Some very inferior ones are sold lower, and superior ones higher. A feeder of mules told me to-day that the cost of feeding was about $3 a month the second year, and about $2 a month the first year from the time of weaning, which is generally at five or six months old.

Yours, respectfully,

SAM'L D. MARTIN.

To the COMMISSIONER OF PATENTS.

SOUTH UNION, KENTUCKY,
December 23, 1852.

RESPECTED FRIEND: I received your Circular in due season, and attempt a reply.

Wheat.—This is not regarded as a good wheat-growing country, but I think it is more owing to the poor and slovenly manner of culture than either to soil or climate. However, there is enough grown for home consumption, with some for other markets. There are several varieties sown, but the red may be, and is generally, preferred, being less liable to be injured by rust—and that is dreaded more than all other blights or disasters that happen to the crop. The average per acre of the crop of 1852 would not fall short of 15 bushels; but that is more than an average, taking the seasons together. Time of seeding, in the months of October and November; harvesting, from the 10th to the 30th June; usually sow 5 pecks seed to the acre, without preparation, only to have it clean; sod land, with ploughing from 6 to 8 inches deep, generally insures a good crop; subsoiling can be done to profit, and is practised by our best farmers. The average price at our nearest markets, from 50 to 60 cents per 60 pounds.

Corn largely cultivated; average yield per acre from 30 to 60 bushels. The kinds mostly cultivated are the large, late varieties, white and yellow. Some of the best farmers cultivate the small variety called Baden, which gives the largest yield, but is more tedious to harvest. There is nothing peculiar in the manner of culture; it is done almost entirely with the plough, cultivator, and harrow. It will cost 12 cents per bushel to produce corn, and it generally sells for about 20 cents.

Oats largely cultivated; average yield per acre from 30 to 40 bushels; two bushels seed sown to the acre, and sells for from 15 to 25 cents per bushel.

Clover and *Grasses.*—Clover is cultivated largely, mostly for grazing, and as a fertilizer; Timothy preferred for meadows, with a mixture of red clover for cattle; average of hay on our best meadows, from one to two tons, and costs from six to eight dollars per ton to produce it.

Neat Cattle.—The native, with crosses of the Durhams, are the breeds mostly kept in this neighborhood. It is not considered profitable to raise cattle except for family purposes; but it is generally believed that pure-blooded Durhams will pay better for the food they eat, either in the dairy or for meat, than any other stock known. In our society, we keep about 90 cows, mostly of the Durham stock; in one of our dairies, we keep 34 cows, and the last year they averaged, per cow, 100 pounds of butter and 15 of cheese, besides furnishing a family of 90 persons milk to drink three times a day, with cream for warm drink, and quantities of cream and milk used in pastry cookery, and raising 24 calves. Three other dairies not so large would give about the same result. Our cows graze on clover pastures six months of the year without any other food; the other months they are fed on hay, wheat, and oat-straw, cut up finely with Eastman's horse-power cutting machines. About one bushel of such cut hay and straw and 6 quarts of corn meal well wet and mixed together, is about the amount of food each cow consumes per day, with an occasional feed of turnips. The average price of Durham cows, from $30 to $50; other breeds, about $12.

Irish and *Sweet Potatoes.*—The Irish has not yielded, or been of so good quality as formerly; several varieties are cultivated, but the Meshanock is generally preferred, and brings the best price in market; very early or very late planting succeeds best—say in March or first of July. We planted a lot this season the first of July, that yielded at the rate of 240 bushels per acre of excellent quality; whereas we planted other lots in May and June, that did but little good. The soil should be a rich,

light loam, well prepared, laid off three feet each way, and from two to three potatoes put in each hill without cutting. There is more attention paid to sweet potatoes since the rot in the Irish. They can be produced in great abundance in this section by giving them that attention they deserve. We usually put out seed in hot-beds early in March, and have slips by the time it is safe to escape the frost, early in May. We usually select a light, sandy, rich soil, and prepare it well, make up in hills 3 feet apart each way, open the hills on the top with a hoe, put in the plants by pressing the earth to the roots with the hand; cultivate well, by keeping them clear of weeds and grass, and they seldom fail of producing from 150 to 200 bushels per acre; average price about 50 cents per bushel.

Manures are not receiving that attention that their value and importance demand; none used only from the barn-yards and the droppings from the animals, and no means used to increase it by litter. I am of the opinion that lime could be used to profit on our lands in the production of wheat, as that ingredient seems to be lacking in our soils; it would cost from 8 to 10 cents per bushel in this neighborhood. Still having fresh lands to clear up, our attention seems to be devoted to other branches of industry; but the time is not far distant when we shall be compelled to give more attention to that branch, or our country will cease to be regarded as a fertile one. I have thus endeavored, in my humble way, and in as brief a manner as I could, to answer some of the interrogatories in your Circular.

Respectfully, your friend,

URBAN E. JOHNS.

City of Independence, Missouri,
November, 1, 1852.

Sir: In this county, (Jackson,) which is the upper county on the south side of the river Missouri, and bounded on the west by Nebraska Territory, is, perhaps, as much good land for cultivation as any in the State; it is well watered with good water privileges, and has a good deal of fine prairie; yet farming is not flourishing: it is in that state in which it cannot remain. The great Pacific railroad which is projected meets with so much conflict from a variety of interests that its completion cannot be calculated with any certainty until a greater uniformity of opinion prevails. Were this matter settled, an impulse would be given to every kind of industry; while it remains unsettled, business will languish, capital will be diverted into other channels, and with it enterprise.

As to the cultivation of wheat, it is not sufficient to supply the county. The land is rich; but the manner of cultivating wheat is very bad; its cultivation is almost abandoned. I have, in some instances, remonstrated with farmers about the manner in which they prepare their land for a wheat crop. It is usually put in amongst corn, either before it is cut up (when it is ploughed in, being covered very shallow) or after the corn is cut up and set up in shocks; the ground is then ploughed about two inches deep and sown, and then harrowed with a light harrow; this is done in October.

In one field I observed the wheat was in some places too thick, in other places too thin; but the great fault is its liability to winter-kill. All this they acknowledged was true. Wheat-growers do not improve in the cultivation of it, because they cannot have it converted into flour for want of mills; and because they have to pay, when ground, 15 cents per bushel, cash, or about one-fourth, to the miller. Men of capital will not build good mills, because the farmers do not cultivate wheat.

Farmers never think of manuring, as a general thing, either for corn or wheat. Corn is the great crop cultivated in this State; this year, when it has been well cultivated, it has been above an ordinary crop. Within a few miles of this city, a farmer, who is one of the best, cultivated a field of between twenty and thirty acres, from which he gathered one hundred and thirty-three bushels from each acre. I have been credibly informed by a number of farmers that the average crop this season will be forty bushels per acre; the uniform price of corn from this time until Christmas is 20 cents per bushel; forty bushels, at 20 cents per bushel, is $8; total cost of labor, $4; profit per acre, $4. Thus, one hundred and thirty-three bushels, at 20 cents, is $26 60 clear per acre.

The simple preparation is, to plough the ground well and deep, then cross-furrow it four feet apart, plant the same in the furrows; as soon as the corn appears above ground commence ploughing, which is continued until harvest. Even from their corn but little profit arises to the farmer. Why? If he sells to the merchant at 20 cents, he receives his pay in merchandize; if he ships it to St. Louis he risks sinking money, freights being very high; even there it commands a very low price; if he puts it in store, it is a losing business.

Hemp.—This crop, a gentleman informs me, is on the decrease in this county. He also says there is no new way of preparation for market; and that the average price per cwt. is $3; at the river bank, 600 pounds is the amount per acre; this, at $3 per cwt., is $18. This produce is a loss to the planter; he cannot estimate his labor at less, per acre, than $15. In the counties of Platte, Clay, Ray, and Carroll, on the north side of the river, opposite Jackson, the corn and hemp crops are very fine this season; the average of hemp will be about nine cwt. to the acre. The cost of cultivating an acre of hemp, from the planting in the spring until it is delivered at the wharf at St. Louis, is about $20. If it sell for $4 per cwt., each acre of 900 pounds will pay $36 20—$16 per acre. In the last-named counties the corn, per acre, will average forty-five bushels; this, at one-fourth of a dollar per bushel, equals $11 25; cost of cultivation, $6—net, $5 25. Now if we multiply $5 25 by 3 we have $15 75; so that three acres of corn equal one of hemp.

In Carroll county a farmer, with whom I resided a considerable time, cultivated about sixty-five acres of hemp; it ranged from six to ten feet in height, and very thick; he estimated one thousand pounds to the acre. A part of his ground was in hemp for the eleventh year, and improved every year; this year he intended another improvement, namely, ploughing it (the same ground) over in the fall; indeed, he commenced as soon as his hemp was cut and set up in stacks. This I suggest for the benefit of hemp-growers. There is another thing I will suggest: Hemp stubble, ploughed deep and early, sown in wheat, would unquestionably produce a good crop.

Neat Cattle.—The usual price of neat cattle at three years old is about $8. The average price of milch cows may be estimated at $12; fine cows sometimes at $20. Oxen are in great demand, especially at some seasons of the year; they vary from $50 to $80 per yoke; they are much in the Santa Fé trade; they are in great demand by the emigrants in the spring of the year, sometimes rising to $100 per yoke:

Horses and *Mules.*—The growing of these animals is very profitable; they are almost the only source from which farmers obtain cash; tolerably likely horses, from four years old and upwards, will sell for $75 to $100 cash; whilst prime mules are easily raised; sometimes mares fail in breeding them; they are much used, and greatly in demand, and sell very high; a fine young mule of three years old will sell as high as $75, sometimes more; the average for good mules is from $70 to $100 in cash.

Sheep.—But very few are raised, unless the farmers manufacture the wool themselves, which is expensive; as they have to pay for carding, 8 cents per pound; and if they sell the wool, they only get 15 cents per pound.

Hogs.—The best breed of hogs is the Irish Grazer crossed with home stock. Farmers find it unprofitable business either to make pork or bacon; the home market is not only uncertain, but they cannot turn it into cash; the merchants are the purchasers, who will not buy unless they can pay in merchandize, and purchase low—say at from 6 to 8 cents per pound; and all merchants' sales, except in this way, are for cash. Farmers have no stimulus to industry as matters are now in Missouri.

Root Crops.—Beets and carrots are cultivated, as yet, only in gardens; they grow well, and are juicy and sweet; no experiments of field culture have been made as far as my knowledge goes.

Potatoes.—Both sweet and Irish are cultivated to so great an extent as to show that as soon as there is a market, there can be any amount made; the Irish sell at 25 cents per bushel; the sweet potato at 50 cents. *Turnips* are cultivated to a considerable extent, both for the table and for stock; they sell at 25 cents per bushel.

Fruit.—Farmers are beginning to turn their attention to this part of husbandry, in promoting the culture of all varieties of fruit, small and large, and also the grape, to a considerable extent. Apples sell at 50 cents per bushel. The fruit crop here, as elsewhere, is a short one. I add no more.

As a matter of course, the foregoing, necessarily, is desultory; I collected my materials from every source that presented itself—from gentlemen of intelligence, from observation, and from facts coming under my eye.

Yours, &c.,

JOHN C. REID.

To the COMMISSIONER OF PATENTS.

P. S.—The cutting of hemp is exceedingly hard work; he who contrives or invents a machine to facilitate the cutting of hemp, will inevitably make a fortune; to cut half an acre in a day is a hard day's work.

HAZEL RIDGE, GLASGOW, HOWARD COUNTY, MO.,
October 11, 1852.

SIR: Herewith please to receive answers (as far as is in my power to give them) to the interrogatories propounded upon *"rural affairs"* in your

Circular of August last, received through my esteemed friend, Hon. John G. Miller, member of Congress from this district.

Wheat.—Guano is not used as a fertilizer or a manure for agricultural purposes in this State. Average crop, ten and eleven bushels per acre. Time of seeding, August or September. Little, if any, spring wheat is grown in this State. Wheat is sown among the corn and ploughed in shallowly, with the stalks standing; or the corn is first cut up and shocked, and then it is sown and ploughed in; or it is sown upon fallow ground, after it has been turned over and harrowed in, or ploughed in with a shovel or share-plough. Quantity of seed per acre, one and a half and two bushels. I think that the average product has varied little since 1825. Our rotation system of cropping is corn, wheat, and clover, alternating in the order named yearly. Average price at Glasgow Straw Mills, 60 and 65 cents per bushel. Clover seed is the only grass sown upon wheat ground early in the spring; and I consider this mode as good as any other for putting in this grass as a fertilizer, although there are many good farmers who sow clover seed with oats in the spring.

Corn.—Average product per acre, fifty and sixty bushels. The best mode of growing this crop is considered to be by breaking up the soil eight and ten inches deep, early in the spring, (1st to 20th of April,) with a share plough, planting three feet apart each way, so as to keep the ground clear, with two furrows in a balk each way, and leave two or three stalks in a hill, as the soil will bear. I doubt not that ground or boiled corn is best for cattle or for feeding hogs, although, owing to the little labor that is here required to grow this grain, no preparation of food is cared for.

Oats.—Seed sown per acre, one and a half to two bushels. Average crop, thirty and thirty-five bushels.

Barley, rye, peas, and *beans* have little or no attention paid to them.

Clover and *Grasses.*—This is a fine country for grasses of all kinds. Timothy is the growth for hay; three tons per acre the average crop, without any manure or attention, except to keep off stock from it after the 1st of April. Herdsgrass is grown by many farmers. Horses or mules will grow poorer daily if kept upon red or white clover after 1st of August, from the excitement of the salivary glands, which it produces when eaten.

Dairy Husbandry.—Little attention is paid to this business, except butter-making for domestic use.

Neat Cattle.—I have no experience in fattening cattle. Breaking steers is easily done by yoking together a couple that match evenly (as to size and strength) and placing them between the tongue and lead oxen in a wagon or cart.

Horses and *Mules.*—I never heard of a person who engaged in this business of raising horses or mules failing to make money. If well kept, $10 per head will cover their yearly expenses. Brood mares and colts must have what grain and hay they want during cold weather, and plenty of good pasture in summer, to thrive and be profitable to owners. Kindness I have generally found to succeed far better than the "knocking down and dragging out" plan of breaking horses and mules.

Sheep and *Wool.*—No sheep of consequence grown in this part of the country, except for mutton and clothing.

Hogs.—I consider the cross of Woburn and Berkshire as the best breed for pork. In the frontier counties of the State, the cheapest and

best method for producing fat hogs is to grow them upon the mast (nuts and acorns) alone. These hogs would run, in fright, from an ear of corn thrown at them. But in the densely-populated counties, the most economical method of growing pork is to keep no more hogs than can be kept in good order within the enclosures of the farm. Corn is so plentiful and low here (generally 20 cents per bushel) that I have never experimented in feeding those animals enough to say how much pork a given quantity of corn will make. I generally put up my hogs for fattening in a pen, through which runs a stream of water, about the 1st of October, and keep them upon what corn they will eat from the ears until the weather will permit the killing of them for my own family use, or for market. They eat during that time twelve or fifteen bushels each. On the day after killing I salt down with L. B. salt, having first rubbed upon the hams pulverized saltpetre. The salt having done its part, I hang up in the smoke-house—hams highest—upon hooks in the rafters, shoulders next below, and sides lowest. Smoke well with green hickory wood; and, when finished, put all down in dry ashes. I never see a skipper.

Cotton.—Although in 1820 and 1825 there were several fields planted and produced good cotton in this and the neighboring counties, the culture of this plant is now discontinued.

Tobacco.—Average yield per acre, one thousand pounds. Cost of production, $1 50 and $2 50 per hundred pounds, according to quality and the soil upon which it is grown.

Hemp.—This is my principal crop; and I presume that in this county (Lafayette, Jackson, Saline, Clay, and Platte) the principal part of the Missouri hemp crop is grown. Average yield per acre, eight hundred pounds. Cost of production, three cents per pound. The crop this year in Missouri is about two-thirds of an average product.

Potatoes (Irish.)—Average yield, two hundred bushels per acre. No rot hereabouts. Meshannock, Vermont, and Blue are the best varieties. Cost of production, 10 cents per bushel. Few potatoes are exported from this part of the State, and few farmers grow any more than enough for their own tables.

Turnips, carrots, and *beets* are grown only as kitchen-garden vegetables.

Fruit Culture.—The culture of fruit is receiving increased attention. An apple orchard may be made the most profitable enclosure upon a farm. From my orchard of one hundred and thirty trees of winter apples, I average twenty bushels per tree in a favorable season. I permit the stock (hogs only) to run in the orchard and eat the fallen fruit. The Cannon, Geniting, New York Pippin, Father Abraham, and Newtown Pippin, I rank among the best varieties. These will keep till spring, if carefully barrelled. A three-quarter-inch auger hole should be bored in each head of every barrel previous to storing in such a place as will preserve them from frost.

Manures.—With these I have no experience; all made are put upon my garden. Our lands are kept fresh by the rotation of crops heretofore mentioned.

All which is respectfully submitted by your obedient servant,

J. T. CLEVELAND.

To the COMMISSIONER OF PATENTS.

POST OFFICE, WARREN COUNTY, MISSOURI,
November 15, 1852.

SIR: In replying to the inquiries propounded in your Circular, I shall confine myself to those subjects with which I am most familiar.

Mules.—To the raising of mules more attention is latterly paid in this section of the State; young mules, five months old, readily sell at $30.

Potatoes.—I had prepared a piece of land, not very rich, for grape-vines by trenching it about 18 inches deep. The young vines not occupying the whole ground, I put in some potatoes by making holes with a stick about 4 inches deep, into which the seed potatoes were thrust down, one in every hole, and three feet apart. They came up very well, grew to an enormous size, and yielded about four times as much as when planted in the ordinary manner. The new potatoes were all found near the surface; no working of the ground was done during the summer time. Cabbage, crisped cabbage, turnips, and other greens grow also astonishingly well on ground thus prepared without any manure.

Fruit culture is receiving increased attention. The Germans of this vicinity use to great advantage small and simply-constructed drying-houses (the stoves made of bricks, like a baker's oven) to dry their apples and peaches. The price of dried fruit latterly has nearly doubled.

Pear Trees.—I never have had as yet a single one of my pear trees destroyed by the *blight.* Our climate is rather too warm for the pear tree, which is consequently to be sheltered in some manner against the ruinous effect of our hot sun. I prefer to plant mine close to the north side of a fence running east and west, keeping thus, and by some low branches which I suffer to grow, the trunk of the trees, as well as the ground near it, completely shaded all summer. Do not stir the ground around the trees during the warm season. A heavy soil, of middling richness, not swampy, but not too dry either, with a subsoil well penetrable for the roots and moisture, suits the pear tree best. Before planting, make a hole at least three feet deep. It will do to graft the pear-tree scions on apple roots, (in want of pear-tree roots;) only transplant them a little deeper, to cause them to make roots of their own. Do not expect fruit from your pear trees before they have grown to a considerable size; never raise young fruit trees on too rich ground. Do not overlook what is called the Virginia crab apple; for making cider it greatly excels all other varieties. What the Germans call *coputiren* (to marry or join) is in most instances far superior to the common mode of grafting or budding, and may at convenience be done from November to the end of April. Transplant either in November or December, or late in the spring when the buds begin to swell; do it with all possible care, for the trouble saved in transplanting you will have to pay dearly afterwards. Prune little, but regularly and systematically. Sweet apples are excellent food for hogs; in transplanting peach trees, cut them down to three or four inches; prune them carefully in the first years, in February and August. The common sorts of peaches grow well from *cuttings;* manage them just as grape-vine cuttings; they make better fruit than seedlings. We know nothing of the *yellows* on peach trees; but, to prevent their being destroyed by the frosts, are bound to choose very elevated situations. Plum trees grow well here, and bear little; I raised more and better plums, in a rough part of Germany, with very little trouble, than I can do here with the greatest care. I have not succeeded with the European walnut; I would

like to make trials with the black mulberry, the German hazelnut, and others, but my imported seed did not grow. For cherries, too, this land is less adapted than most of the European countries.

Wine.—In a former report I communicated my experience on the culture of the grape-vine and the manufacture of wine. Last spring our grape harvest was mostly destroyed by heavy mildews at the blossoming time; I saw some vineyards that had escaped more or less—it is difficult to tell for what reason. It seemed to me that their situation was rather less open and airy than is generally deemed advantageous, and that they were in some manner sheltered by opposite heights from the injurious effects of winds from the southwest. It is still my opinion that the Catawba, though doubtless highly recommendable in every other respect, is a little too delicate for our climate in the Far West, and that repeated experiments should be made with the cultivation of the native vines of this and the neighboring States. My own experience on such trials I shall be able to communicate in a few years. Catawba wine will, under proper management, improve in the course of some years so considerably as to surpass nearly any similar beverage imported from foreign countries. But the *taste* of the majority of our people has first to undergo a change for the better before wine-raising will find due encouragement in this country. A moderate use of genuine native wine (besides beer) ought to take the place of whiskey and brandy.

I have commenced making *hedges* of the Osage orange, and hope to succeed.

Hops.—Latterly the attention of the Germans in this vicinity has been directed to raising hops; they follow the manner adopted in Europe, and have thus far succeeded beyond expectation. In St. Louis, where several thousand dollars are annually expended for that article, no imported hops bring a higher price than those raised in our own State. The demand is increasing steadily. It is highly desirable that competent persons in the Northeast should give public information about the rules for raising this valuable product in this country.

I was raised in a hilly country of the Old World, but I never saw there hill-side fields, though they had been perhaps for a thousand years in cultivation, so badly washed as they are here done in one single year. Some of our hill places are already ruined beyond redemption—and this is a *new* country. Farming in the old style will do no longer; we are bound to restrain the culture of *grain*—to put more of our ground in clover and grass, and to try to make something from fruit, wine, hops, and the like.

Yours, very respectfully,

FREDERICK MUNCH.

MENDON, ADAMS COUNTY, ILLINOIS,
December 10, 1852.

SIR: Your Agricultural Circular came to hand in due time, for which please to accept my sincere and hearty thanks; not so much for the act of courtesy as for the evidence it affords of the interest the general government is beginning to feel toward the agricultural interests of the country generally, and to the great valley of the West in particular. I think I speak the sentiments of nine-tenths of the laboring people of the land when I say that no public documents issued from any department are read with so much satisfaction as your annual Reports, both mechanical and agricultural; and the reason is a very plain one: they are wholly divested of every germ of political or sectional character, and treat of subjects that interest the great mass of our laboring population.

I am fully aware of the fact that manual labor, either of a mechanical or agricultural character, when followed as a necessary means of obtaining a livelihood, is considered by some as a degrading employment throughout our land. With amateur farmers, who cultivate large tracts of land by servitude, voluntary or involuntary, I have nothing to say; they do not come within my range; I speak of those who toil early and late, through sunshine and storm—who wear out their lives with the cast-iron drudgery of hard labor to feed a nation which otherwise would starve—who are classified by polite circles as the connecting link between the brute creation and themselves—who wear out a life of sorrow and toil, and sink into the grave, to be forgotten like the beasts that perish.

It is the name and character which our nation has given to a life of labor and toil that are driving every young man who can sport a black coat and a yellow glittering watch-chain into the counting room of the merchant, the laboratory of the village apothecary, or the office of a fifth-rate practising attorney; from whence, after the usual twelve weeks' apprenticeship, a swarm is sent forth to fill those polite circles with merchants who have paid 10 cents on the dollar, physicians who have filled our church yards with the victims of their quackery, and brawling lawyers who have sported their shingle in some obscure village corner; but have never seen a brief in their brief lifetime.

To the charge of belonging to that despised race of hard-working men I plead guilty; I submit to my fate without a murmur or a sigh. But as your limits, and my time, forbid a prosy essay, I will reply, briefly, to some of the queries set forth in your Circular.

Wheat.—There is something radically wrong in the management of the wheat crops of Illinois; of this I am fully satisfied. We employ no manure, of course, on our prairie lands, for none is wanted in the production of a wheat crop; on the contrary, I believe most of our land is too rich for wheat. In proof of this fact, our best wheat crops, and the most sure, are produced from the first cropping of the land, before the long, tough roots of the native grass are fully decomposed. The prices of wheat ranged in 1852 from 60 to 75 cents per bushel; average product per acre, ten to fifteen bushels. As an offset to this, we must purchase or hire a reaper; if we purchase one of McCormick's, the price is $130, cost and freight; if we hire, the price is from 50 to 75 cents per acre, which is about half the cost of harvesting. In thrashing we must do the same way—purchase or hire, which will cost 5 cents per bushel for wheat, and 3 for oats; other expenses about as much more.

To show the cost and profit, I will present you the following, in tabular form, for 1852, on wheat, corn, oats, and apples—one acre each—with the yield in bushels, and the price of each per bushel, fifteen miles from Quincy, our market.

WHEAT.

Land rent	$2 00
Ploughing twice	1 50
Seed, one and a half bushel	1 00
Harrowing and sowing	75
Harvesting and stacking	1 50
Thrashing machine	62½
Taking to market	62½
Hired help and board	62½
Total cost per acre	8 62½

Yield in bushels, per acre, 12½; total market value, $8 25; loss, 37½ cents.

OATS.

Rent	$2 00
Ploughing once	75
Seed, two bushels	50
Seeding	50
Harvesting	1 00
Thrashing	1 20
Marketing	1 20
Hired help	1 00
Total	8 15

Bushels per acre, 40; total market value, $10; profit, $1 85.

CORN.

Rent	$2 00
Ploughing in fall	75
Seed, say	10
Harrowing and planting	50
Ploughing four times	4 00
Gathering	1 00
Total cost	8 35

Bushels per acre, 50; total market value, $12 50; profit, $4 15.

APPLES.

Rent eight years	$16 00
Cost of trees	5 00
Interest for eight years, at ten per cent.	4 00
Care of trees eight years	8 00
Total cost for eight years	17 00

Cost of 40 trees 8 years old, $17.

The next two years will pay rent, and for the trees. Good winter Genitens, at ten years old, will yield ten bushels per tree; worth 75 cents per bushel. Forty trees—ten bushels per tree—will produce 400 bushels; worth, at 75 cents per bushel, $300. Deduct cost for eight years, ($17,) and you will have a clear profit of $283.

Remarks on the above Table.—An acquaintance of mine last spring purchased eighty acres of land, for which he paid $1,200. On this tract were two acres of orchard and about eighty trees sixteen years old. While on a visit to him in the fall, I observed some ten or twelve trees of the winter Geniten hanging very full. He asked me how I thought they would yield to each tree. I replied, about seven bushels. He then told me he had gathered some of them, and that they measured ten bushels to each tree, and would bring 75 cents per bushel at his door; and that they had borne equally well for the last five years. I had no reason to doubt his word; and on his report I have founded mine; and let it go for what it is worth.

In travelling through the Genesee valley, in the State of New York, during the past summer, the greatest wheat-growing section in our country, I made inquiries of intelligent farmers if their land, from a long course of cultivation, did not depreciate in fertility like the old Eastern States? Their reply was: We make use of all the manure we make on our lands; but our principal remedy is clover. Every spring we go over our wheat and scatter on clover seed; the next spring we usually mow the first crop; and then if we wish to put in wheat in the fall, we turn under the second crop when in full blossom, and in this way we keep up our lands so that they produce as well as they did when first brought under cultivation thirty and forty years ago; and we feel pretty sure of getting 25 to 30 bushels of wheat to the acre.

Such is the response which the farmers of the Genesee valley gave to my inquiries on wheat-growing; but, so far as my knowledge extends, clover has not come into use in the wheat culture in this section; but there is little doubt, in my mind, that its introduction here would start our wheat crops up to the figure quoted from the valley of the Genesee, or nearly that point. Our usual depth of ploughing for wheat is from 4 to 6 inches; with this uniform depth of ploughing our soil depreciates, in my estimation, about six or eight per cent. annually, but with several counteracting causes: first, from a rotation with corn and oats; second, deeper ploughing, which improves the soil very much; and third, ploughing under stubble, corn stalks, and the like, *versus* burning them off.

Our staples are corn and pork; as corn, in the way we cultivate it, is more natural to our system than wheat. In the tabular estimate which

I send you, corn is put at 25 cents per bushel; this is its relative value, which is far from being correct when compared with its value fed into pork. According to the best estimate made by old corn-growers on the comparative value of corn fed into pork, it increases in a ratio of 10 per cent. in a manner as follows:

If pork is worth	$2 50	per 100 lbs.,	corn	is worth	25	cts.	per bushel.
"	3 00	"	"	"	30	"	"
"	4 00	"	"	"	40	"	"
"	5 00	"	"	"	50	"	"
"	5 50	"	"	"	55	"	"

Pork is bringing, at this date, in Quincy, $5 50 per hundred pounds; so that the comparative value of corn is 55 cents per bushel, while its relative or real value is 25 cents cash.

This fictitious valuation (if I may so call it) arises from the estimation that ten bushels of good corn will fatten a full-grown hog; and that it will take another ten bushels to make a full-grown hog out of a decent pig.

Another estimate has, by unanimous consent, been agreed upon between farmers—that half of the quantity, ground into meal and cooked, will make an equal quantity of pork.

The best method of cultivating our corn crops where we do not use the hoe, especially if corn follows the wheat crop, is to begin with fall ploughing to a good depth—say eight inches; the frosts of winter will pulverize the soil and make it as mellow as an ash heap. In the spring, from the 15th of April to the 15th of May, we first cross-harrow; and then, with a light plough and one horse, lay it off in rows, four feet each way, and plant in the crossings; three plants in each hill is a sufficient number of our largest kinds of corn, after the birds, mice, and squirrels have taken all they can get. When the young plants are up so that we can see the rows, we plough the corn, turning the soil from the hill the first two ploughings; our last two ploughings, we turn the soil *to* the hill, and plough three furrows between the rows. This is after the old Kentucky pattern of corn-growing, and with a good horse, a man faithful to his work will cultivate twenty acres, and have it laid by at harvest time. I have known as high as eighty-five bushels of shelled corn grown to the acre without a hoe going into the field; but this is not an average estimate; from thirty-five to fifty-five bushels to the acre is high enough.

Corn lands have been in cultivation from twenty to forty years, and produce good crops yet; but this remark applies more particularly to our river bottoms than to our upland prairies. Corn lands can be renovated very much by ploughing under the stalks, instead of raking them and burning them off, as is practised by some; as it keeps the land light and loose; whereas raking and burning must, in time, run down the soil.

Oats cannot be a profitable crop to raise for market at this distance; consequently none are raised, except for the home market and for feed. There are two very serious objections against an oat crop which every farmer feels decidedly: first, it is a crop nearly as expensive as a wheat crop; second, it impoverishes the land in a ratio of from eight to twelve per cent. on every crop; which is altogether too high a deduction from the productive qualities of the land to follow up for any given length of time.

I have already spun my communication out to such a length that I shall be compelled to be very brief on the other points inquired after in your Circular, and many of them must pass over unnoticed.

Root culture is not receiving that attention which I know it richly merits as a field crop. Our prairie soil is well adapted to it, being a rich vegetable mould, light, loose, and deep; the main difficulty is the want of cellars to keep the roots from the frosts, and the hot, dry weather, which makes it extremely doubtful about getting the seed up, and the young plants a good root hold. When these difficulties can be obviated, give us our dry prairie land against the world on root crops.

The figures which I send you in tabular form, on fruit culture, are correct in the main, founded on personal knowledge, on the results of this year's observations, enormous as they are, and from observations extending back 10 and 12 years. The culture of fruit, I may safely say, has been increasing from 25 to 50 per cent. during that whole time; the demand is just as firm, and prices rule as high as at first. The most inveterate enemy that man has to contend with in fruit culture is the borer. I have dug and slain every *one* I could find in the spring, and searched closely at that; by midsummer I have gone the rounds again, and found just as many old fellows boring away at my trees, determined to kill them all. I have washed my trees in soft soap, strong lye, milk of lime, and everything I ever heard of, and some things I never heard of and nobody else ever heard of, and I find "it aint no use." I have got to give up, my trees are dying, and I must either plant out more trees, buy apples if I have any, or go without.

The best remedy which I ever tried to keep peach trees alive and healthy is, when the tree is three or four inches in diameter, to drive two eightpenny nails into it, close to the ground, so that they may cross each other at right-angles and divide the tree into nearly four equal parts; the tree will soon grow and cover up the nails; or mix sulphur and soft soap, and rub down the trees in spring and midsummer, and cultivate the ground around the trees. It is a mistaken idea to suppose that peach trees can thrive and do well, without cultivation, any more than cabbages; I never had half the difficulty with the peach that I have with the apple in cultivation.

TIMOTHY DUDLEY.

MONTELLO, MARQUETTE COUNTY, WISCONSIN,
December, 1852.

SIR: This is comparatively a new country; it is only some six years ago that the first settlement was made here, and even now not one acre in twenty of the tillable land of the county has been touched by the plough. But it is fast filling up with a good, enterprising population, and soon *we*, too, shall help to glut the already-overstocked markets of the East. The soil and climate of this portion of Wisconsin are well adapted to the growth of wheat, corn, oats, potatoes, barley, rye, root crops, and fruit. Our winters are too open to render winter wheat a sure crop; and, consequently, we raise but little, although its culture is not altogether abandoned. If we could secure it from winter-killing it would be a profitable crop, and would take the place of spring wheat,

which is now extensively raised. Corn, however, is what our land likes, and its culture is on the increase. Our chief fault in raising this crop is, that we do not plough *deep* enough, four inches being about an average. The average yield of corn per acre is about forty bushels, although in many instances it is far more than that. It is the common custom to feed corn to hogs and cattle in the ear, there being no cash market for it; pork and beef will always bring money at some price. At home, beef is worth three dollars and pork four dollars per hundred at the present time. The disadvantage of being at a great distance from the consumer is keenly felt by the farmers in this part. The extra price we have to pay for all kinds of manufactured articles, and the low prices which we receive for our products, tend to keep the spirits, as well as the purses, of our agricultural population rather low. Our land is rich enough, and our disposition to work good enough, and seems to warrant us a better support. Although we need to improve much in many branches of farming, yet we need a home market for our products still more.

Sheep and *Wool*.—These might be made to pay well, but the absence of the stock to begin with proves a "damper." We are all too poor to go five hundred miles away to get flocks of sheep, and bring them home, and so engage in that pursuit which comes most handy for us to do, viz: raise corn, wheat, oats, and potatoes, without regard to profit.

Fruit Culture.—We cannot say that this is receiving *increased* attention, for it has heretofore received no attention at all. We have crab apples, wild plums, wild cherries, currants, gooseberries, raspberries, strawberries, cranberries, whortleberries, wild grapes, &c., all spontaneous productions of the country, which go to show plainly what might be done at fruit-raising. Very many of our settlers are becoming convinced of the importance of trying to raise fruit trees, and there is no doubt that in a few years we shall see large numbers of trees planted, both in orchard and nursery.

Meteorology.—By a comparison of the range of thermometer here with the same in Western New York, we find that the average temperature for the last six months has been a trifle higher here than at the latter place—a fact worth considering by those who desire to emigrate and think that Northern Wisconsin is too cold a climate, since it is certainly the most healthy region in the Western country.

Yours, respectfully,

H. B. EVEREST.

Hon. S. H. Hodges.

Berlin, Marquette County, Wis.,
January 5, 1853.

Sir: I have the honor to acknowledge the receipt of your Circular; and, in reply, submit a few observations on the culture and management of flax.

The large sums which we remit annually to Europe, especially to Ireland, for linen, form a considerable item in the out-going capital of this country: whereas a concentrated and well-directed exertion on the part of a few capitalists would not only establish a home manufacture of linen, and thereby retain the money at home, but also encourage the production of a crop which, in Ireland, generally pays better than any other.

The chief obstacle in the way of the cultivation of flax in this country is the want of manufactories. Some cultivate the plant for the seed alone, leaving the fibre to waste, or to go to the paper-maker for a trifle. When the fibre is properly managed, it should be worth at least three times as much as the seed.

To prepare the ground for flax, it is necessary to plough it in the fall, and harrow as soon as it is sufficiently dry in the spring. Sow the seed and harrow lightly, and, if the land is flat, run the plough from head to foot of the field at every twelve feet or so; water-furrow, to draw off the superabundant moisture. Some prefer to water furrow before sowing and finishing.

As soon as the flax is four or five inches high, all weeds should be carefully pulled up. This is all that is necessary till the crop is ripe. It should then be pulled and tied up in bundles, and set up to dry preparatory to stacking. The steeping, and all after-management of the crop to prepare it for linen, would be uninteresting, as we have few factories, and therefore little inducement to attend to it.

Last spring I sowed a small plot of new ground with flax, as an experiment. I had taken rutabagas off the plot the previous fall. I did not plough the ground, it being very clean and mellow. I merely dragged it well and raked off all roots and weeds, and though the seed was very inferior, and the ground unploughed, I had a very fair sample of flax. This spring I intend to sow all the seed I have raised, which is very good, and have no doubt of a good crop.

I have the honor to be, sir, sincerely,

ALEX'R ORR McGOWAN.

Johnstown, Rock County, Wis.,
January 17, 1853.

Sir: At your request, received a short time since, I forward my experience in cheese and butter making on the prairies of the West. I find the prairie-grass well adapted to making them both for a small portion of the year—say the summer months—and the flavor and richness of each are not excelled even by the best of tame grasses. The only difficulty is in the shortness of time that the prairie-grass is available. It starts late in the spring. There is not, generally, a full bite until near the 1st of June; then it grows very rapid. By the 1st of September it becomes tough and unpalatable, and, after one or two slight frosts, worthless.

I milked the past season thirty-five cows. Have been in the dairy business for the last seven years on the same farm. My cows have not been allowed to run at large, as many are in this section; but have been kept in a pasture that is one-half seeded with Timothy and clover; the remainder is native grass; though I have increased my tame pasture of late, and find my butter and cheese increasing something in proportion. Not that I can make a larger cheese from the same cows in the month of June or July; but that my cows will give a larger quantity before the month of June, and a *much* larger quantity after the month of

August, for reasons given above. It is a mistaken idea of the people of the Eastern and Middle States that the prairie soil is not adapted to the tame grasses. I have seen no country yield heavier burdens of Timothy and clover hay (the large New York clover) than rock prairie. I have mown one piece of this variety for five seasons in succession. It has cut over two tons of hay to the acre, and I doubt not but that some years it has cut three; and no kind of fertilizers have been used on it. Average yearly produce of cheese per cow, made from pasture above described, without grain or slop, three hundred and fifty pounds.

Treatment of the Milk.—Strained at night into a tin vat, surrounded with water and ice, by placing the vat inside of a larger wooden vat, and stirring until the temperature sinks to fifty degrees. In the morning skim the cream from the milk; add to it an equal quantity of milk from the cow, and raise the temperature to one hundred degrees by adding hot water. Stir until the cream is perfectly limpid; then mix it well with the milk in the vat immediately before adding the rennet. Warm the night's milk by passing steam into the water in the wooden vat. When at the temperature of ninety degrees, add rennet sufficient to curdle it in forty minutes. The morning's milk, when taken from the cow, is strained with the evening's, and one cheese is made from the two milkings. I copy from my memorandum table of 1851. Milked twenty-five cows that season.

Time made.	Number of gallons of milk.	Heat of milk at setting.	Time of curding, in minutes.	Time of breaking, in minutes.	Time of heating, in minutes.	Scalding heat.	Time scalded, in minutes.	Number of tea-cups of salt.	Quality of curd.	Quality of cheese at sixty days old.	Pressed weight of cheese, green.	Weight of cheese at sixty days old.
1851.		*Deg.*				*Deg.*					*Lbs.*	*Lbs.*
June 25	76	86	75	30	35	102	50	5	Sweet and fine.	Mild and soft.	62	58
June 26	66	86	70	35	30	104	40	6	Sweet and fine.	Mild and little dry.	60	57
July 1	65	90	60	30	35	103	55	6	Extra fine.....	Good	66	61
July 5	63	88	50	50	30	104	40	6	Extra sweet & fine.	Mild and good	69	62

Average price of cheese, 7 cents at sixty days old. For further information in reference to the appearance and quality of cheese, I refer you to the Wisconsin State Agricultural Society.

Very respectfully, yours,

F. S. ELDRED.

PLATTEVILLE, GRANT COUNTY, WISCONSIN,
December 4, 1852.

SIR: Some time last year I received a Circular from your Office making certain inquiries, which at the time I thought but little of, being myself but a small farmer, and deeming others more capable of giving the information desired; but in reading the Report of the Commissioner

of Patents, I find you had not received a response from this county, (the Upper Mississippi lead mines,) and feel it to be a duty, however incompetent, to answer your Circular.

Wheat.—For some years fall wheat has been winter-killed so often as to discourage our farmers from attempting to raise it to any considerable extent; when it lives through the winter, the crop is generally good, yielding sometimes as high as forty bushels to the acre; but this is much above an average—perhaps one-half; the price is about 65 cents. The varieties mostly in use are the Red-chaff bearded and White bald; the latter has so far stood the winter best. Our main dependence is, and has been for some time, spring wheat; the varieties most popular are the Italian and Red River; the Black Sea makes the best crop; but our millers have not thus far been able to make a good article of flour from it; the price of the first two is about 50 cents, the latter something less. Our best crop is made by sowing on new prairie sod and harrowing it over several times; spring wheat produces from ten to thirty-five bushels to the acre.

Oats are one of our best crops, yielding, with but little labor, from 40 to 60 bushels to the acre; the best plan is to plough the land in the fall, and sow the oats (about three bushels to the acre) in the spring, and harrow the ground sufficient to cover the seed; they are hardly worth raising, as they usually sell for about 15 cents a bushel, with no great demand at that price.

Barley is a first-rate crop with us if we had a market for it; it is raised as easily as oats, the crop about thirty bushels; but the price this season has been from 20 to 25 cents; it is not so good a crop as oats.

Corn is with us one of the principal crops; we raise usually about forty bushels per acre, though I have seen whole crops go as high as sixty or more; the price is now 25 cents.

Flax-seed will in a short time be a large crop; from three crops made this season, (and it is an unusually dry one,) I believe it can be raised to better advantage than perhaps anything else; the three crops, taken together, averaged about thirteen bushels to the acre, worth about 90 cents, with an expense far less than either wheat or corn; and when the flax itself is worth anything, which is not the case now, the crop will be worth that much more.

Potatoes had till lately almost ceased to be a crop, though one of our best crops till the rot commenced. It is now disappearing to some extent, though it has left us without the Meshannock, (our best variety,) and the principal one till the rot commenced.

Hay.—Till lately we depended on the native grass for our supply of this article; but our farmers have commenced the cultivation of Timothy and clover, both of which do well, yielding from one to three tons per acre.

Manures.—You are aware that this is a new country, and, though nominally settled some twenty-odd years, it was first overrun with miners, who, instead of cultivating the land, rendered it so far as they did anything, unfit for cultivation by digging it up; the cultivation commenced about twelve years ago, and our soil, being of the best quality, has heretofore needed but little manure. The English farmers—and we have many of them here—haul out all their barn-yard manure every fall and throw it in heaps on their ground, scatter it in the spring, and plough it

under, they raise the best crops of any in the country, to my knowledge; no other manure has been used in this county.

We have one of the finest countries in the world; and were it cultivated as it might, and as I hope it soon will be, and were manufactories established on many of our thousand water-powers, as good as the sun shines on, making a market for the immense surplus we are capable of producing, ours would certainly be one of the most desirable locations in the world.

I will conclude by subscribing myself yours, &c.,

JAMES DURLEY.

To the COMMISSIONER OF PATENTS.

KOSSUTH, KENOSHA COUNTY, WISCONSIN,
December 16, 1852.

SIR: Your Agricultural Circular came duly to hand.

Wheat.—Wheat culture has been a very precarious business, either in winter or spring, for a number of years past. The most careful preparation by summer fallow is often so much labor lost. It was formerly our staple crop, when large crops of the best winter wheat were raised with a small outlay of skill or labor. As winter wheat began to fail, recourse was had to spring wheat, which yielded good crops, and of an excellent quality, at first; in a few years it deteriorated in quality and quantity so much that Wisconsin wheat rated the lowest wherever it found a market. Continual cropping is one great cause of this result—a result which has driven the agriculturist, in this section, to commence a different system of farming. White-flint, Canada flint, and the Mediteranean, are the favorite kinds cultivated here, though to a limited extent. The Mediteranean is considered the least hazardous, and most exempt from the insect and blight; twenty bushels per acre are considered a fair yield.

Corn is becoming a favorite crop, converted into pork, and yields a profitable return. The favorite kind is the Yellow Dent, which matures, in ordinary seasons, to the greatest perfection. A very productive method is, to take a piece of stubble-ground, as soon after harvest as convenient, put on a good coat of barn-yard manure, plough it under, (the earlier the better,) let it lie till spring, and harrow it thoroughly just before planting. Four feet each way is the distance for Dent corn, with but three stalks in a hill.

Tobacco has been cultivated in this county with good success, in small patches; yield from ten to twenty hundred weight per acre. Connecticut seed-leaf and Cuba principally cultivated; price, in Kenosha, from five to fifteen cents per pound.

Potatoes yield well, and of an excellent quality; owing, perhaps, to an extreme dry season; not a symptom of the disease observable; yield from one hundred to one hundred and fifty bushels per acre. Ground that has produced but one crop after the first breaking is the best for potatoes without any manure, as manure is considered a promoter of the disease, with the exception of lime or ashes, which operate as preventives.

Fruit culture is receiving increased attention. Fruit trees, generally, do not come into early bearing, especially those in cultivation; they make a rapid and great growth of wood. Some apple-orchards have, within a year or two, been attacked with the bark-louse, to the great detriment of the trees. I think there is a remedy for it. I have about two hundred apple trees, to which I give a thorough washing, spring and fall, of the following mixture: four quarts of soft soap, one pound of sulphur, two quarts of common ashes, and six quarts of water, with a broom; wash the body and limbs as high as convenient. I also put in the spring about two quarts of unleached or one peck of leached ashes around the roots of the trees. No insect will live in alkali. My trees are exempt from this insect.

Some attention is being paid to the culture of flax, but, as yet, to a limited extent; and should there become a reliable market for the fibre, the culture would be greatly extended, but not otherwise.

Respectfully, yours,

PHILANDER JUDSON.

Hon. SILAS H. HODGES,
Commissioner of Patents.

CERESCO, FOND DU LAC COUNTY, WISCONSIN,
November 18, 1852.

SIR: Your Circular came to hand some weeks since, and in reply I forward my gleanings of agricultural knowledge from our district of country bordering the Upper Fox river, better known to travellers as the Green Lake country. The counties of Columbia, Dodge, Marquette, and the south half of Winnebago and west half of Fond du Lac, comprise my range of observations; this district is about equally divided between prairie and openings; the latter of burr, yellow and white oak, with occasional groves of timber bordering our lakes, streams, and springs, which abundantly water our district. Our soil rests upon the cliff limestone, which is occasionally broken by the out-cropping Potsdam sandstone. The soil is both silicious and argillacious, some places abounding in one, and more in the other, and is as well adapted to the production of the cereals as any portion of the Northern States. Our agricultural settlement commenced about 1840, and hence most of our soil is still unbroken, and all contains much of its virgin vigor. Our leading efforts have been the production of wheat. Two or three favorable winters, followed by abundant harvests of winter wheat, led to extensive fall sowing of this grain, without much regard to time of sowing or peculiarity of kind of seed; this was followed by successive failures—total on the prairies, and partially in the openings, owing to our cold, dry winters, almost without snow, as a majority have been for ten years past. If we had a variety of winter wheat, that would live through our winters, we could produce it in abundance, and with as little labor as any other wheat district of our country. Perhaps the Mediterranean would succeed. It has not been tried to my knowledge. These failures have changed our leading crops to spring wheat and maize; spring wheat yields abundantly of the several varieties. The Hedge Row was most common, but has died out with a disease which our farmers call a rot in the berry, and is succeeded by Black Sea, Canada Club, Red River, and Dent; of which the first yields best, second and third make best flour, and fourth is least known and least esteemed. Our prices this fall range, at our markets, for winter wheat, from 50 to 60 cents; for good spring wheat, from 40 to

50 cents. No kinds of manures are yet used for wheat crops. The fly and weevil have not yet troubled us. On new soil our farmers usually raise two or three crops of wheat in succession; then alternate with oats or maize, or fallow with weeds; spring wheat yields to average about twenty-five bushels per acre; plough but once, and about six inches deep. But little skill or science has yet been applied to our agriculture; like the early settlers of most districts of our country our farmers are deficient in that science and economy which will be much more needed by our successors, but which could be used to great advantage now. In the production of corn our farmers began very moderately, fearing the seasons would not allow of its ripening; we were disappointed; it has never failed to yield a good harvest, and its culture has steadily increased, until the last season has carried it in advance of any other crop; and many believe it is to be the leading grain of our district. Barn-yard manure is usually bestowed on the corn ground, and improves the crop very much, although few farmers would take the trouble to remove it were it not in their way; no other manures are used. Our farmers estimate the cost of production at from 10 to 15 cents per bushel; it brings on the ear from 25 to 35 cents per bushel. There is scarcely a field of unmixed variety to be found in our district; the Dent, or a mixture nearly approaching it, prevails; some, however, keep nearer the white and yellow eight-rowed varieties. We plant from the 10th of May to the 10th of June; plough out once, and slightly hoe; forty bushels per acre are called an average crop; it is principally fed raw and on the ear, or ground with oats and carried to our neighboring pineries on the Wolf and Wisconsin rivers, and fed to oxen during the logging seasons. Oats, as a crop, rank third in our district; they yield abundantly; cost of production from 5 to 10 cents per bushel, and sell from 15 to 25 cents; they are considered more exhausting to the soil than any other crop. Our farmers have heretofore confined their efforts mostly to these three great staples. The winter wheat failures have, however, turned the attention of many to other products, of which wool, horses, and cattle are most important. Barley yields well, but is little raised. Beans yield abundantly, and the crop is yearly increasing; they sell for $1 per bushel; cost about 25 cents. Peas yield well, but are less raised than any of the foregoing, and rye less still; the latter is used more for grazing sheep, but little as a crop. Of grasses, clover and Timothy do well on our lowlands, but on our prairies and uplands kill badly, during our cold, dry winters. We have not yet succeeded in finding the kinds properly adapted to our district; we depend on the native wild hay, which is yet abundant, and can be furnished in the hay season for from $2 to $4 per ton in the stack. Our dairy husbandry is very limited, but steadily increasing; many cows during the grazing season, on our wild grass and no other feed, yield one hundred pounds of butter each, which usually sells at from 10 to 16 cents per pound. Cheese sells at 8 and 10 cents; and the home demand is, as yet, barely supplied. Our district is well adapted to dairy business and stock-raising. Our climate is well adapted to packing and keeping both of butter and cheese; good dairy cows are worth $25; three-year old cattle, $15. We have not yet raised a supply for our increasing immigration; and we are supplied from the southern part of our State and Illinois. Little attention has yet been paid to breeds. Horses are easily raised; but prices are high, and the demand greater than the supply.

Considerable attention has been turned to the raising of flax for two years past; the crop yields well, but no use is yet made of the straw. Sheep and wool-growing are becoming of much importance in our district; thus far the experiments indicate that it will be our most important branch of husbandry; I am, however, not able to give accurate results of experiments.

Hogs are profitable, but not abundant; they live in summer without feed; are shut up in fall and fed; eight bushels of corn, cost $2 40 (if bought) make one hundred pounds pork, which sells at $5 per cwt. There is little trouble in keeping bacon and hams in our climate.

No *tobacco* or *hemp* is raised here. The root crops yield abundantly, but are but little raised, except potatoes, which have rotted for several years until this season, when the rot has entirely disappeared, and the crop, although small, has come in of excellent quality and abundant, in proportion to the number of acres planted. But little care or skill is devoted to raising this or any other root crop.

Of *fruit* we can only say that our thermometer showed each winter occasional days when the mercury went down to 0°; and once in ten years to 36° below zero; and hence our peach trees kill in winter. Apple, pear, cherry, and plum trees grow thriftily; and many young orchards are to be seen, but few are yet at the age of bearing.

Lime abounds in our soil and in our rock; no gypsum is used as a manure.

Respectfully, yours,

WARREN CHASE.

To the COMMISSIONER OF PATENTS.

NEAR FORT MADISON, IOWA,
December 27, 1852.

SIR: I received your Circular some time since, but, owing to a press of business in consequence of the winter setting in earlier than usual, and endeavoring to collect information from the farmers in this neighborhood, so as to make out a correct statement of the highest and lowest yield per acre, I have been unable to answer it until now.

The following statements I have collected from brother farmers, and we have agreed upon the facts therein stated, with a few exceptions, where I have given my own opinion:

Wheat.—No guano used here. The average product this year is eleven bushels per acre. Time of seeding, from 1st to the last of September; time of harvesting, from the 6th to the 18th of July. Preparation of seed: This is not much attended to. I prepare by steeping in a strong brine, then rolling in lime, with good results. We sow from one bushel to one and a half per acre. We use wheat stubble, oat stubble, fallows, and corn-ground. Stubble is best ploughed twice—the last ploughing the deepest; then harrow well in. There is no rotation of crops that is particularly in use here, Late sowing, pasturing close, and rolling in the fall, or the above mode of preparing the seed, are the only remedies we know of for the Hessian fly. The yield is diminishing; price, from 50 to 60 cents per bushel. There is not often grass seed sown with wheat; but when there is, Timothy is used, with a mixture of red clover.

Corn.—Average product per acre, forty bushels; cost of production per bushel, about 14 cents. Our best system of culture is to plough the ground in the fall, plant early, harrow with a two-horse harrow, run the harrow over the rows when the corn is small, then plough three times; but other farmers have different modes. For feed it is best to grind corn and cob together, and no doubt if cooked it would be still better; but it is not done here—it is nearly all fed without grinding. Plant rows about four feet distant, crossed the same distance; not more than three to five stalks in the hill.

Oats.—Average yield per acre, about thirty-three bushels. *Barley*, spring, from ten to thirty-three bushels per acre; two bushels of oats and about the same of spring barley are sown per acre. Fall barley not much cultivated. Barley is the least exhausting crop, and a good crop to precede wheat. *Rye, peas*, and *beans* not much cultivated here.

Clover and *Grasses.*—Quantity of hay per acre, about two tons. Best fertilizer, barn-yard manure, and the only fertilizer used here for meadows and pastures. Timothy and red-clover are the only seeds used in laying down meadows; quantity sown, ten quarts per acre. Cost of growing hay, $2 50 per ton. We have never known red clover to injure horses.

Dairy Husbandry.—Average yearly produce per cow, one hundred pounds of butter, or two hundred of cheese; comparative cost per pound, butter probably one third more than cheese. As to the treatment of milk and cream, there are different modes in use; and I cannot particularize any one, as each has its advocates. The mode of churning is the old-fashioned churn, generally. Butter is put down in stone jars for market as the best method. Price of butter, from 8 to 20 cents per pound; cheese, 7 cents per pound.

Neat Cattle.—Cost of rearing until three years old, $7; usual price at that age, from $10 to $15. Cows sell in the spring from $16 to $20; in the fall, from $14 to $18. As to the pounds of beef one hundred pounds of corn will produce, I think from about eight to ten pounds would be near the amount. A given amount of food will, I am convinced, yield more meat in an improved breed; but as there are few of such breeds here, the experiment has not been tried. Steers I have seen broken with more ease to the yoke by gentle treatment than by a contrary method; and, in my opinion, the same rule will hold good with horses.

Rearing *horses* and *mules* is profitable; particularly the latter. The expense of rearing a horse is, I think, one-third more than a mule; the horse at three years old would, perhaps, cost $24 or $25; the mule $15 or $16. The horse, at that age, would be worth $50 on an average, and a good mule from $60 to $80; this difference, I think, is occasioned in whole or in part by the demand created for them by the emigration to California. Brood mares, if worked at all, should be moderately used; they should run in pasture and be fed, in winter corn, and in summer, oats, in addition to their grass and hay. Colts: Our practice here is to feed sparingly until two years old. It is the opinion of many intelligent farmers that the big head and stiff complaints so prevalent among horses here are caused by feeding so much on corn without any change, summer or winter. Gentle treatment, in my opinion, is the best way to break either horse or mule.

Sheep and *Wool.*—Sheep are but little raised in this neighborhood, each family keeping only enough for home use. Some, that five or six years ago had flocks of sheep, found that it was not profitable, and have sold out. There is a sheep farm in the northwest corner of this county, but I am unable to give any definite answer to your inquiries.

Hogs.—The best breed is a mixture of the China with the Byfield, Irish Grazer, or some other large breed. The Berkshire is out of repute here. Our only method of producing pork is by feeding corn in the ear. No doubt that corn ground, or ground and cooked, would be much more economical; but the experiment has not been made. It is the opinion of a number of farmers that I have consulted, that one hundred pounds of corn, fed in the usual manner, will yield from sixteen to twenty pounds of pork.

Our merchants salt the middlings in bulk—that is, piled up on the floor of the warehouse. There are various modes of curing bacon. I can only say that I have made good bacon by salting in a hogshead; the hams and shoulders undermost, so as to be covered with pickle. After two or three days, draw the meat, boil and skim the pickle, and salt down again in the same manner. After remaining until properly salted—say six weeks—take up, hang, smoke with green hickory wood, and canvas.

Tobacco but little raised—and that used only by smokers. *Hemp* only raised for home use. *Turnips* grow very large on our upland prairies, but are not much raised. *Carrots, beets*, &c., only raised in gardens for family use.

Potatoes.—On upland prairies potatoes were badly used up by the rot this year. There was a bug that destroyed the vines in June or July, and the destruction of the potato followed; for which we have discovered no remedy. Meshanock is the best potato we have. Sweet potatoes do well here, and are raised in considerable quantities for home consumption.

Fruit culture is receiving increased attention; and I believe that apples will be, and are, a profitable crop. At present our orchards are just commencing to bear, so that I cannot answer you more fully. There is no remedy that I know of for the blight or yellows. The borer is the worst enemy our apple trees have; for which I know of no remedy, only to examine the trees closely often during the summer, and cut them out.

Manure.—The stable manure is all that has been tried here, and its effects are surprising on grass and other crops on our new prairies.

I have now endeavored to answer your inquiries as briefly as possible; but, as we have an agricultural society in the southern part of our county, and an agricultural periodical printed there, also in Keokuk, I hope they will give you more information than I can.

I am, sir, respectfully, yours, &c.,

DANIEL McCREADY.

Abstract of Meteorological Observations made near Fort Madison, Lee county, Iowa, for the year 1852.

Date.	Monthly mean.	Highest temperature.	Time of the highest temperature.	Lowest temperature.	Time of the lowest temperature.	Range.	Quantity of rain.	Quantity of snow.	Prevailing course of wind.	Days on which rain or snow fell.
	°	°	Noon.	°	Sunrise.	°	Inches.	Inches.		
January.....	22.96	56	28th......	22	19th....	78	1.45	4.70	NW. & SW.....	4, 6, 7, 8, 9, 10, 14, 15, 16, 17, 20, 21, 25, 30, and 31.
February....	33.05	54	3d & 4th.	8	29th....	46	.15	....	NW. & SW.....	5, 21, and 29. (Roads dry and dusty this month.)
March......	41.08	80	25th	4	19th....	76	8.05	1.00	NW.,SW.,& SE.	1, 3, 4, 8, 11, 13, 16, 20, 25, 28, 29, and 31.
April......	46.48	79	30th......	21	2d.......	28	2.85	4.75	NW. & SW.....	2, 3, 4, 5, 6, 7, 9, 10, 16, 17, 20, 23, and 24.
May........	62.32	88	29th......	30	20th....	56	6.85	....	NW. & SE.....	2, 7, 6, 5, 10, 11, 12, 13, 18, 21, 22, and 25.
June.......	69.13	94	30th......	42	5th.....	52	4.97	....	NW...........	2, 3, 7, 16, 17, 23, 27, and 30.
July.......	74.93	99	18th&29th	48	2d.......	51	2.60	....	NW.,SW.,& SE.	7, 5, 8, 10, and 23.
August.....	72.96	97	24th......	48	11 & 28	49	3.10	....	SE. & NW.....	14, 19, and 22.
September...	65.07	94	1st	38	26th....	56	6.55	....	....	1, 10, 13, 17, 19, 20, 23, 24, 25, and 30.
October....	57.50	83	7th.......	30	12th....	53	6.40	....	SE. & NW.....	1, 2, 3, 5, 8, 9, 11, 13, 25, 26, 27, and 28.
November...	33.54	54	1st.......	9	19th....	45	6.40	21.25	NW. & SE.....	1, 3, 4, 5, 10, 11, 13, 15, 20, 21, and 25.
December...	27.70	53	2d........	0	13th....	53	1.80	6.00	NW. & SE.....	2, 3, 8, 11, 20, 22, 23, 25, 26, and 30.
Yearly mean.	50.56	Total rain and snow..........					51.17	37.70		

N. B. If rain fell in the night, it is given as the day before.

Respectfully,

DANIEL McCREADY

To the Commissioner of Patents.

Le Claire, Scott County, Iowa,
November 16, 1852.

Sir: By the kind remembrance of Hon. A. C. Dodge, senator in Congress from this State, I have been furnished your Circular of August last, asking information with regard to the agricultural products of this section of the country. Notwithstanding my knowledge of agriculture is somewhat limited, I have concluded to send in my *mite* from this newly-settled, but productive and rapidly-improving portion of the Great West.

I have read all the Reports from your Office from 1847 down to the present time with great care and attention, and I rejoice in the means afforded by them of disseminating such valuable information over our widely-extended Republic.

Owing to the fertility of our prairie soil, manures of any kind have not been used by any of our farmers in this section of Iowa. The crops mostly raised here are wheat, corn, oats, barley, potatoes, and onions.

Wheat.—Owing to the cold, dry, windy weather in the winter, fall wheat is not raised to any extent, but very fine spring wheat, of the Red River and Italian varieties, and what is called Hedge Row, is extensively raised. It is sown in April and harvested in July. Before sowing, the ground is ploughed about four inches deep and then harrowed well, when one and a half bushel of seed per acre is sown, and again harrowed; the yield is from fifteen to twenty bushels an acre. The Hessian flies and weevils are unknown to the wheat raised here; nothing troubles wheat in this country but *smut*, which may be prevented by washing the seed in vitriol water before sowing. The price of wheat this year is from fifty to sixty-five cents per bushel.

Corn.—Several varieties of Indian corn are raised in Scott, Clinton, and the adjoining counties of Iowa; the most common, however, is the Yellow Dent. One man with a team will cultivate about thirty acres; it is planted in May and ploughed three or four times, and ought to be hoed once or twice; common yield from fifty to seventy-five bushels per acre. The ground is well ploughed up before planting, and the rows from three and a half to four feet apart, and four stalks left in a hill.

Oats, barley, rye, peas, and *beans* are successful crops here; the yield, however, depends upon the season.

Clover and *Timothy* grow well wherever tried, but, in consequence of the abundance of prairie hay, little attention has yet been paid to their cultivation.

Butter and *cheese* made in abundance, and quite profitable. I am, however, but little acquainted with the dairy business.

Horses are raised, with but little trouble and expense, and at three years old will sell for from seventy-five to one hundred dollars.

Sheep and *wool-growing* will undoubtedly be the most profitable business in Iowa, as they seem to do remarkably well, and can be raised with very little expense. I am sorry to say that but few sheep have yet been introduced into the country.

Hogs are raised here extensively, and pork sells at from four to five dollars per hundred weight.

Potatoes.—Irish potatoes of the best quality are raised here in great abundance; they produce from two hundred and fifty to three hundred

bushels per acre, and are selling this season at twenty-five cents per bushel. *Sweet potatoes* grow well here, but are not much raised.

Fruit Culture.—Apples, pears, cherries, plums, and grapes do well; the peach is uncertain.

I regret that I have been unable to answer your questions more fully, and also to give you some other information, as I intended.

Very respectfully,

LAUREL SUMMERS.

To the Commissioner of Patents.

Kanesville, (Council Bluff) Iowa,
October 23, 1852.

Sir: Pursuant to request by your Circular of interrogatories, I hasten to reply, and will briefly state, in answer, so far as my knowledge and experience extend, in regard to the subjects of which you wish information.

Wheat is produced through this section of country without the aid of any kind of manures. Much of the crops are put in with but once ploughing of 4 to 6 inches deep, and the wheat covered by dragging the ground. The better crops are produced by sowing in September amongst the standing corn; the stalks being left standing through the winter are cut down and raked off in the spring. A number of crops are frequently produced successively from one piece of ground, without any perceptible diminution in the succeeding crops.

There is no insect that disturbs the crop here.

The best crops are produced where the northwesterly winds are broken from the fields. As the snows are light and lay on the ground but a short time, a great advantage may be derived in this Western country by sowing early with oats where the land is open. These will protect the wheat through the winter from wind, and also from destruction by frost and heat.

The general average of winter wheat in this county is about 25 bushels per acre, and brings, at this time, 75 cents per bushel. August and September are the time for seeding, and July the harvest month.

Corn is abundantly produced without the assistance of manures. Sixty bushels per acre is considered an average yield; and 10 cents per bushel is near the cost of raising. Average price in our place is 20 cents per bushel.

Oats are a good crop here, and yield well—say 50 to 55 bushels per acre. *Peas* and *barley* are not raised to any extent. *Beans* are easily produced, and will average per acre—say 20 bushels; bringing in our market from $2 to $3 per bushel. *Oats* average 30 cents per bushel.

Clover and *grasses* are not as yet cultivated, the country being but lately settled.

Stock-growing.—There is no county within my knowledge better adapted to grazing than this. Upon all the streams large beds of rushes are found, where stock will fatten all winter, only requiring herding. Then in the summer our broad prairies produce an abundance of fine rich grass, which will fatten stock much quicker than the tame grasses.

The cost, therefore, of rearing is comparatively nothing. The average price at 3 years old will be $12 per head.

Wool-growing at present is very limited, but would be exceedingly profitable, as the increase of the stock would pay the yearly expense of the flock.

Hogs are raised with very little trouble, and the climate is particularly adapted to their increase; nuts and roots abounding in the forests and on the prairies, to sustain them. Very little corn is fed them until they come to fattening.

Root Crops.—Turnips, carrots, beets, parsnips, &c., are not at present cultivated as field crops, but grow in boundless and unlimited profusion provided the ground is furnished with seed. Melons, pumpkins, and cabbage also grow abundantly, and to perfection; the two former only requiring to be planted on sod ground, with or without corn, and many wagon-loads per acre may be grown without further trouble. Molasses produced from the watermelon is considered equal to honey.

Potatoes.—Both Irish and sweet are produced in abundance. The former will produce, if well attended, 300 bushels per acre, at a cost, before harvesting, of about 5 cents per bushel, or less; average market price 30 cents per bushel. The Pink-eye, large Red Meshanock, the Irish Gray, Blue Kidney, and large Orange, are considered the best varieties.

Fruit.—As yet, few or no orchards exist in this county, or immediately in this vicinity, except a few small orchards and nurseries. This is doubtless an excellent fruit country. A few very fine peaches have been produced from the seed since settling here. Fruit would be an exceedingly profitable crop, as apples bring from $1 50 to $2 per bushel; and this county will ere long become one of the finest fruit counties in the West.

Your most obedient servant,

J. E. JOHNSON.

To the Commissioner.

Jefferson County, Iowa,
November 12, 1852.

Sir: I acknowledge the receipt of your Circular of inquiries relating to the farming interests. Particularly confining myself to this vicinity, I proceed to answer such of your queries as have fallen under my observation and experience.

Wheat.—Varieties in use, Red-chaff bearded, Golden-chaff, and Red-chaff smooth, and Early May. The Mediterranean does not stand the winter so well as the other kinds; the first mentioned most in use. We are somewhat troubled with the Hessian fly and the rust, and often injured by the severity of the winter. There is little or no snow, and occasional thaws, and then on a sudden the thermometer sinks from eighteen to twenty and twenty-two degrees below zero, which kills more or less root and top. Time and method: some sown on sod broken up in June or July; it is also sown on oat-stubble, and mostly among corn; time, from the last week in August till the middle of September; average yield, from eight to twelve bushels per acre; price, fifty cents per bushel.

Spring wheat is considerably sown; yet it is somewhat uncertain, in

consequence of an insect known by the name of the chintz fly. It attacks the lower extremity of the stalk, taking all the sap from the head, or not leaving enough to mature the berry perfect and plump, it being more or less shrunk; this is invariably the case if late sown. The best preventive that I have found is, break up the ground in the fall, then take from fifty to eighty bushels of air-slacked lime and a light coat of stable-manure, spread them evenly over the surface; this is done before the frost; and then let it lie until February or March, as the going out of the frost will admit of a loose soil to operate with a drill or harrow—the former preferable. Put two bushels of seed to the acre and you generally have a plump berry, free from the insects, and from ten to thirty bushels per acre. Several kinds in use; but the Italian is the best adapted to our soil and clime, in consequence of its early maturity.

Rye is not largely cultivated; it is generally sown in September; yet some sow in August for the purpose of pasture. It is a sure crop; yield, from fifteen to twenty bushels per acre; price, from fifty to seventy-five cents per bushel.

Oats are largely cultivated; common time of sowing, March, April, and May; one and a half to two bushels and a half per acre; yield from thirty to fifty bushels per acre; price, fifteen to twenty-five cents per bushel.

Corn.—This great staple is of the first importance with us; it affords a cheap and wholesome bread, and supports our stock of all kinds, which are our only source of making anything in the surplus-money line. We have two kinds in common use—the yellow and white gourd-seed; the yellow being the hardiest and earliest, and considered the most heating and strong; the white possessing more of the saccharine, and when distilled will not produce so much liquor to the bushel as the yellow. I prefer the white to feed to horses; the yellow, for all other kinds of stock. The method of putting in: plough in the fall, harrow in the spring, list or furrow out in the usual way, four feet apart; put from three to four grains in a hill. Time of planting, from the last of April to the 1st of June—the best time from the 1st of May to the 15th. Yield in bushels, from forty to seventy-five per acre; price, from ten to fifty cents per bushel.

Yours, respectfully,

ENOS ELLMAKER.

To the Commissioner of Patents.

Knoxville, Marion County, Iowa,
October 26, 1852.

Sir: Agreeably to your request, coming though an Agricultural Circular of August, 1852, we have the pleasure of answering you, so far as we are able, in relation to some of your interrogatories; but as we reside in a new State, and in a county that has not been organized more than six years, we must be pardoned and it must be excused should it fall behind older ones.

Wheat.—In relation to guano, we must say that even stable-manure is not used, as there appears to be enough of richness or productiveness in the soil to satisfy the agriculturist without resorting to the use of manure of any kind whatever. In relation to the productiveness of wheat, we think that twenty bushels may be reckoned an average crop; though we think more might be raised, as the soil is new, and there is not proper care and labor bestowed by the husbandman in the cultivation of wheat, so as to produce as much as the richness of the soil will admit. The usual time of seeding is from the 15th of August until the 20th of September. The amount of seed is from three pecks to one and a half bushel. Those who sow early use the smaller quantity, and those who sow later the greater quantity. Time of harvesting, about the first week in July. Plough but once. As we before stated, the husbandmen here are not yet sufficiently enterprising to cultivate the soil by more than one ploughing. The yield is increasing, and we think will increase as the country grows older. Price, about fifty cents per bushel. There have never been any flies or weevils here. Timothy is the only grass sown here with wheat.

No manure used for corn. Corn is the principal crop raised here. Average product per acre, about sixty bushels; cost of production, about three dollars per acre. We have no hesitation in saying that, by having the corn ground, it will gain twenty-five per cent. over corn fed raw. The ground is prepared by ploughing, in the month of April or May, and then listing the ground out, having the rows about three and a half feet apart, and cross-listing or furrowing out and planting the hill where the furrows cross, so as to permit the corn to be cultivated by ploughing the rows both ways.

Oats.—Oats are very productive here; and the most inconvenience in relation to this crop is, that, owing to the newness and richness of the soil, they are very subject to fall down or lodge. Quantity of seed used, from two to three bushels.

Rye, peas, beans, and *barley* not cultivated to any extent.

Clover and *Grasses.*—Clover very little cultivated here. Timothy does extremely well, owing to the richness of the soil, and grows as coarse or large in the stalk as rye; and we have measured the heads of Timothy that measured 8½ inches in length. The yield per acre is about three tons. Cost of growing Timothy, about $1 50 per ton.

Cheese.—There has been a considerable amount of cheese made in this county by a colony of Hollanders, who have done well in the business. Average price, 6¼ cents per pound. The cost is comparatively small, as cows graze upon the prairies free from the first of April until the latter part of November, the whole of the cheese-making season.

Neat Cattle.—"Cost of rearing until 3 years old:" The cost will be about $6; usual price at 3 years old, heifers, $12; steers, $20. "Value of good dairy cows in spring and fall:" spring, $16 to $20; fall, from $12 to $15.

"How do you break steers to the yoke?"—By putting the yoke upon their necks and hitching them behind an old and steady yoke of well broken oxen, and sometimes by yoking them up and tying their tails together.

Horses and *Mules.*—We think them highly profitable, from the small cost here in raising them, and the high price they command at present. The expense of rearing will be about $30.

Wool-growing is quite profitable here, as the pasture costs nothing.

The cost per pound will be about 10 cents. Large sheep are the most profitable here.

Hogs.—"What is the best breed?" A cross of the Berkshire with the largest breed.

Turnips.—Turnips do uncommonly well, better here than in any of the other States, owing to the depth and general looseness of the soil; we have weighed turnips that weighed 8 pounds.

Potatoes.—Average yield per acre, from 400 to 500 bushels; free from rot this season. Cost of production per bushel, about 5 cents. The most prolific are the Merinos or Long-red. The best varieties for family use are the Meshanocks and Pink-eyes.

The best system of planting and tillage is to plough deep, then drill out the ground about 3 feet wide, then drop your potatoes in the drilled rows and cover them with coarse manure, and then cover with earth.

We are, most respectfully, your obedient servants,

ADMIRAL B. MILLER.
JOSEPH BROBST.

RAMSEY COUNTY, MINNESOTA TERRITORY,
December 8, 1852.

SIR: Agriculture in this Territory is in its infancy. Only 3 crops have been raised. It was not until last season that the attention of more than a few individuals had been directed to the subject. My report, therefore, must be limited.

The soil of the Territory generally is a light sandy loam, underlaid with a subsoil of clay of various depths, and the whole country is interspersed with small lakes of pure water. The general fertility of the soil, like that of the West generally, is such as to induce a total neglect of manuring as yet. What manures have been applied are common stable manures, and their application has been chiefly confined to garden spots. It may be said, perhaps without exception, that the Cereals all do well. Winter wheat, however, has not yet received a fair trial. Root crops all prove very profitable. Clover, Timothy, and Blue-grass have been introduced, and promise very fair, but sufficient time has not elapsed to prove the adaptation of our soil to their culture. Wild grass is luxuriant and exceedingly nutritious.

A single instance of the culture of flax, within my knowledge, induces the conviction that our soil will produce that crop abundantly. The existence of the crab apple, plum, cherry, &c., in the wild state, warrants the belief that this will be a good fruit-growing country. Many are turning their attention to the subject, and young orchards already grace many farms.

I give below a table showing the average yield, &c., of the principal products yet tried in our soil.

Kinds of products.	Time of sowing.	Amount of seed to the acre.	Average product to the acre.	Average cost per bushel.	Average price in market.	Remarks.
Spring wheat..	April 10	1 bushel...	30 bushels	$0 35	$0 75	
Corn	May 10	5 quarts....	50 "	25	45	12-rowed white flint best adapted to this climate.
Oats*	April 10	2½ bushels..	50 "	20	35	
Barley	April 10	....	50 "	20	35	Little raised yet.
Beans	May 15	....	....	60	2 00	
Sweet potatoes.	May 15	....	....	50	1 75	Little raised yet.
Irish potatoes..	May 1	12 bushels..	300 bushels	20	50	
Rutabagas.....	July 1	....	500 "	8	20	Drilled yield most.
Butter	....	....	....	10	20	

It should be observed, the above table is the result of culture *without manuring*, and is the lowest average of such products. Many individuals produce much more to the acre.

The production of pork is necessarily much limited; scarcely any has been fatted with grain. Hogs, except the past season, have become very fat on mast.

The attention of our citizens has not been sufficiently turned to any other branch of agriculture to demand special notice.

Very respectfully, yours, &c.,

B. F. HOYT.

To the COMMISSIONER OF PATENTS.

SANTA FÉ, NEW MEXICO,
December 23, 1852.

SIR: At the request of his excellency Governor Lane, I have the honor to send you the following communication, by way of reply to your Agricultural Circular of the present year:

Indian corn is one of the chief agricultural products of New Mexico, but without irrigation there is no certainty of success in its cultivation. When the season bids fair to be unusually propitious, by the fall of frequent showers before the commencement of the regular rainy season, the farmer occasionally ventures to plant a small quantity of ground beyond the reach of his irrigating canals, with the expectation that, should his corn fail to mature itself, he will be at least repaid for his labor by a moderate harvest of fodder. As no one has heretofore felt sufficient interest in agricultural pursuits to test with accuracy the capability of the soil, it is not possible to say what has been, or what may be, the

* Minnesota oats per bushel are two pounds heavier than Illinois oats.

maximum yield per acre. It is, however, certain that, under favorable circumstances, the yield could be made as great as the average product of the most favored region in the States. I have seen in the southern part of the Territory, at Doña Ana, fully as fine corn as the State of Ohio is capable of producing. Doña Ana, however, is a new settlement, and what is said of it cannot apply to the other settled portions of the Territory, the greater part of which has been much exhausted by very many years of unremitting cultivation, without rotation of crops, without rest, and without manuring, or any other means of preserving the natural fertility of the soil. The actual yield of lands thus carelessly cultivated is a matter of astonishment to the farmer from the States.

Whether it be owing to the natural fertility of the soil, or to the well-known invigorating influence of artificial irrigation, certain it is, the lands of this portion of our country appear to be inexhaustible. The crops of corn produced this year in the immediate vicinity of Santa Fé have been such as amply to repay the labor of the farmer, although produced upon lands which have been cultivated certainly for a period of not less than 200 years—and that, too, in all probability, without the intermission of a single season.

The most impoverished lands, where water is attainable, will well repay the labor of cultivation, and their average yield per acre, it is presumed, will not fall short of 25 bushels. The best lands, under similar favorable circumstances, will produce from 50 to 60 bushels. Judicious cultivation could scarcely fail to increase these quantities very materially. The variety of corn here cultivated bears a strong resemblance to that which is most common in the New England States. The average height of the stalk is not more than six feet, and the ear is generally within one foot of the ground. The cob is large, but, by way of compensation, is unusually long. The grain is roundish, instead of long and flat, and the germ or heart is in larger relative proportion to the rest of the grain than is generally the case with the varieties produced in the States. Hence the corn of New Mexico is more nutritious than that of the States.

The colors are numerous—blue, yellow, white, red, and even jet black. Blue seems to be the predominant color, and is esteemed by the natives as the richest of all, being almost universally used by them in making the *tortilla*, or their corn cake. This is the only shape in which they prepare corn bread for the table.

The time of planting in this portion of the Territory is from the last week of April to the last week of May, inclusive; whilst in the latitude of El Paso it is some three or four weeks earlier.

The grounds destined for this crop receive but little previous preparation. A thorough irrigation is the first step taken, and this is done with the double object of mellowing the earth, to facilitate the use of the plough, and to furnish sufficient moisture to cause the grain to sprout and rise above the ground. The next step is to run those furrows alone which are meant to receive the seed. The plough is used in covering the corn, which is never planted in checks, but always in rows about three feet apart. From three to six stalks are suffered to grow in a single hill, and the hills are very much crowded, the intervening space being barely sufficient to admit the use of the hoe. Between the period of planting and that of maturity, the crop receives, as a general rule, but

one ploughing and one hoeing. During the same period it receives from two to four irrigations, according to the nature of the weather and the supply of water in the canals.

Where there are large settlements on small streams, each cultivator must await his turn in the use of the water, and the farmer is thus often restricted to a single irrigation during the summer. In truth, instances are not unknown in which certain water courses, by reason of long protracted drought, have not furnished water sufficient for one irrigation. Fortunately, however, for New Mexico, this is not common, and two or three irrigations, especially when assisted by a chance shower, are amply sufficient to produce a remunerative crop. The productiveness of the soil is, of course, enhanced in proportion to the accessibility and use of water, within proper limits.

Speaking in an agricultural sense, land in this country is nothing, and water is *everything*. Lands in the States without running water have value; lands in New Mexico without water are without value to the agriculturist. There is not a single crop of the husbandman that can be produced in this country with any degree of certainty without irrigation. At long intervals, propitious seasons do occur, it is true, but, without prescience, no advantage can be taken of them.

In this connexion I will mention a fact, so singular, indeed, that I would not venture to relate it unless I had previously obtained such evidence of its truth as places it beyond all doubt. The Navajos, a powerful and partially civilized tribe of Indians, who occupy the western portion of New Mexico, do *not* irrigate their lands, and yet produce plentiful crops of corn. Their method of planting is as follows: Holes are made in the ground to the depth of 12 or 18 inches, by driving down stakes made of firm wood and hardened in the fire. Each hole receives one or more grains of corn; the grain is, however, first enveloped in a ball of mud above the size of a man's fist. The ball, with its seed, being dropped into the hole, is covered to the depth of two or three inches with light earth, and left to germinate. The hoe is the only implement made use of in the subsequent management of the crop.

The object of the ball of mud is obviously to supply sufficient moisture to enable the corn to spring up, whilst the too early evaporation of this moisture is prevented by the thin layer of earth which is thrown upon it.

The great depth of the hole, too, is not without its reason, which is obviously to shield the root of the future plant from the heat and dryness of the superficial earth, and thus enable it to grow alone by the greater moisture of the subsoil.

This fact leads us to indulge the expectation that the agricultural capacity of New Mexico will be greatly increased when deep ploughing, with the American plough, shall become general. I am informed that those few New Mexicans who have introduced ploughs from the States have already verified the fact that deep ploughing diminishes considerably the necessity for irrigation. The capacity of the Territory, in an agricultural point of view, is limited by, and dependent upon, the supply of water; yet it may not be an exaggeration to state that the supply, such as it is, if judiciously administered to the soil, would give sustenance to more than a million of human beings.

The price of corn is now, at this place, $3 the fanega, (about 2½ bush-

els.) It can sometimes be had, especially about the time of gathering the crop, for one-half the above price.

Wheat.—The climate and soil of New Mexico are eminently adapted to the growth of this Cereal. It is universally sown in the spring of the year, and, for the most part, during the month of April. The ground that receives it undergoes, as with the former crop, no further preparation than a single thorough irrigation. Being thus rendered soft and moist, the wheat is sown upon it and covered by the plough. After this, in order to smother the surface, a light log, as a substitute for the harrow, is dragged over it. Motion is given to the log by connecting each end of it (by a raw-hide rope) with the corresponding end of the ox yoke.

From one to three irrigations suffice to mature the crop, which is generally harvested in the month of September. The yield is never estimated here by a comparison with the land which produced it, but always with reference to the quantity sown. Thus, the farmer always says, for one fanega sown he has reaped so many. The product so estimated has a very wide range, varying, as I am credibly informed, from ten to *one hundred* fold. Trustworthy gentlemen from the valley of Taos tell me that they have known a single fanega sown there upon new lands to produce one hundred. Forty-fold is by no means uncommon; indeed, I may safely say that, with a sufficiency of water and judicious cultivation, forty for one might be made the average product.

There are at least five varieties of wheat known in New Mexico, and cultivated to a greater or less extent: 1st, a yellow wheat; 2d, a white; and 3d, a red variety; the ears or heads of these species are smooth; 4th, the common bearded wheat; and 5th, the "siete espigas," or seven-headed wheat, so called from the fact that a number of smaller heads shoot out around the original or main ear. This species may be that which has heretofore been known under the name of "California wheat."

The custom here is to sow very thin—perhaps not more than one-fourth of what is usual in the States. But the plant, in farmer's phrase, "tillers" so abundantly that, in the course of a short time after seeding, the surface of the ground appears to be thickly covered by the growing crop. One authentic instance has come to my notice of a single grain having produced half a pint of wheat. These extraordinary cases are, of course, uncommon, and are only mentioned to impress the fact that wheat tillers or multiplies its stalks in this country to an extent altogether unknown in the Atlantic States, or, perhaps, in any other portion of the Union except the Territory of Utah.

The wheat of New Mexico has but little straw, as its average height does not, perhaps, exceed three feet. Many crops in fact turn out well that do not exceed eighteen inches in height. I will very succinctly describe the manner of getting out and preparing the crop for the market. It is primitive to the last degree:

The matured wheat is cut, with the consumption of much labor and time, with an instrument similar, but far inferior, to the almost obsolete sickle. The harvesting cradle is here unknown, and perhaps unheard of. In getting out the wheat, no agricultural implement, not even the flail, is ever employed. It is done by the tramping of horses, mules, oxen, donkeys, or goats, driven around upon a circular earthern floor. For this purpose goats are more frequently made use of than other animals. The farmer has no farming machine to facilitate the separation of the grain

from the chaff and other impurities. He patiently awaits the coming on of a suitable wind, when the straw is blown off from the wheat by tossing it high into the air with wooden forks constructed for the purpose.

To get rid of the chaff, the same labor is gone over again with a large spade, instead of the fork. Still, more or less of sand, gravel, and clay, remain. These impurities are imperfectly removed by washing the wheat in large and porous baskets. Another plan is to turn a small current of water through a trough filled with the grain. After being dried upon blankets or raw hides, the wheat is considered ready for the market or the mill.

I find I have omitted to mention, in the proper connexion, how the small stones and unthrashed ears of wheat are separated. For this purpose, a screen or sifter (if the words can be so applied) is thus made and moved; a large raw hide is procured, and is perforated, by burning, with a large number of very small holes. Two men move the sifter, each taking an end, by alternately jerking it rapidly towards each other. The wheat passes through the small perforations in the skin, leaving behind such impurities as the wind did not carry off in the previous processes.

The diseases to which the wheat crops of the States are so liable appear to be here entirely unknown; at all events, I have met with no one who has ever seen the Hessian fly or the joint worm. The much dreaded rust of the States is here effectually prevented by the clearness and dryness of the climate. However, at long intervals, the grasshopper has been known to appear in such countless multitudes as to cause most serious injury to the growing crop. This insect, after an absence of 18 years, reappeared in the valley of Taos in 1845. Since then they have gradually diminished, year by year, until they no longer prove a serious evil. In that year, however, they were so numerous and voracious as often to destroy an entire field of wheat in a single night, devouring not only the leaves, but the entire stalk down to the surface of the ground. The young and tender wheat was alone attacked; that which had acquired some height and hardness escaping almost untouched. Hence, early seeding was found to be the safeguard against their inroads. These insects were not only destructive to wheat, but also to cabbages, peas, beans, and almost all other tender and growing plants. They were, more or less, numerous and destructive in all parts of the Territory.

The New Mexican farmer carefully preserves the wheat straw, and upon it feeds his horses, mules, and donkeys during the winter months. It would seem to be remarkably nutritious, as these animals, when so fed and not overworked, remain at least in good condition, if not fat.

The price of wheat this year is $3 the fanega in some parts of the Territory, whilst in others it is sold at half that price. The wants of the United States troops furnish at this time the only market we have that is of much consequence. Flour, of the best quality, is now furnished to the army at $7 per 100 lbs. Should their purchases continue to be made here, instead of in St. Louis, as formerly, a few years will doubtless reduce the price to $3 per cwt.; whereas the freight alone on flour brought from the Mississippi valley has never fallen short of $8 per hundred.

Dairy Husbandry, &c.—I have never seen, since my first arrival in this country, in 1847, so much as a single ounce of New Mexican butter, though a little is said to be occasionally made. The butter that

used in this city is brought from Missouri, and varies in price from 50 to 75 cents. All persons who are acquainted with this country acknowledge it to be one of the finest grazing regions on the face of the earth; and were it not for the unchecked depredations of the Indians on all sides of us, it would be as preposterous to bring butter here as to "carry coals to Newcastle." The small herds of goats and sheep that find subsistence in the immediate vicinity of the town, and thus escape Indian robbery, furnish to the inhabitants a precarious supply of inferior milk and cheese. Cow's milk is still less attainable, especially during the winter months.

You ask in your Agricultural Circular, "How do you break oxen to the yoke?" The native oxen of New Mexico are subjected to the yoke at so early an age that the process of breaking is never one of much trouble or difficulty. The yoke is a rude and primitive affair. A light piece of cotton-wood is fashioned at either end, so as to adapt itself to the posterior part of the horns of the ox, to which it is securely lashed by strips of raw hide. A rope of the same material connects the central part of the yoke with the beam of the plough, or tongue of the wagon. This plan, of course, increases the burden as felt by the ox, and diminishes his effective strength. The custom, although a bad one, must needs continue to prevail here, as the country furnishes little or no timber that is well adapted to the construction of ox-bows. The Mexican *carreta*, or cart, is a two-wheeled vehicle, so heavy and so rudely contrived that the draught power of two, or at least one yoke of oxen, is consumed alone in moving it. This inconvenience is now somewhat remedied by the substitution of the wheels of American wagons, which are yearly brought here in large numbers by the merchants.

The New Mexican plough does not differ materially from the pictures familiar to school boys of the Roman plough, anterior to the Christian era. A piece of timber, with two branches, is the material of which it is made. One branch serves for the beam, and is left about six feet in length; the other is left eighteen inches or two feet long, and answers for the plough-share. A straight piece of wood is attached to the after-part of this implement for a handle, by which it is directed. The oxen are urged on by a small stick, some five or six feet in length, armed at the end with a sharp nail. This is a cruel instrument, and is often used with such freedom as to leave the sides of the ox covered with blood.

Grasses.—Artificial meadows are entirely unknown in this Territory; nor do the native population ever make hay of any kind. Since General Kearney's invasion, however, the natural grasses of the country have been cut and cured, in quantities greater or less, in proportion to the wants of the cavalry. Excellent hay, thus made, has been this year delivered to the quartermaster in Santa Fé at $20 per ton. The *grama* grass, which is not found in any of the States, covers pretty generally the entire surface of New Mexico, both mountains and valleys. For the most part, it does not cover the ground very thickly; but in certain localities it is found sufficiently thick and luxuriant to be cut for hay. All experience proves it to be more nutritious than any cultivated grasses with which we are acquainted. Mules, and even horses, (the native, and those from a distance, after one year's acclimation,) will remain fat upon it alone, if otherwise well treated. Its fattening properties are due partly to the oil of the seeds, which are very numerous,

and partly to its being well cured, *in situ*, by the natural aridity of the climate in the dry season. As the atmosphere is not sufficiently humid to produce vegetable decomposition, this grass retains its nutriment as long as it lasts. Hence it is that the sheep of New Mexico require no winter feeding.

I doubt whether this grass could be profitably introduced into any of the older States of the Union; as, where lands are very valuable, its yield per acre would perhaps be too small to prove remunerative. There are other valuable grasses in this Territory, but, being of minor relative importance, they cannot be noticed in the limits of this article.

Rye.—I have never seen any of this grain in the Territory, and I cannot learn that it has ever been introduced, even by way of experiment.

Barley, oats, and *buckwheat* all succeed admirably. These crops, however, have never been cultivated to any extent. Occasionally, only, an American farmer will be found who produces enough for his own wants. Oats are said to grow wild throughout the mountains in the northern parts of the Territory.

Root Crops.—With the exception of potatoes, all crops under this head succeed here far better than they do in the States. They certainly, as a general thing, attain to a great size, and contain much more saccharine matter. Mr. George Gould, of Taos county, has produced on old lands, unmanured, beets weighing as high as 17 pounds, turnips 16 pounds, and onions 1¼ pound. In December last, the late Governor Calhoun was presented with a beet which was within a fraction of a yard in circumference.

All fruits, grains, vegetables, and plants generally, that grow in this singularly clear and dry climate, are remarkable for their extraordinary sweetness. The corn-stalk abounds in saccharine matter to such an extent as to furnish the native population with molasses. It is true this article is hardly so good as the most inferior Louisiana molasses, but this is doubtless owing to their rude and imperfect mode of manufacturing it. Those persons who do not supply their own wants purchase it at the rate of $1 50 per gallon.

The beet, when grown in New Mexico, contains so unusual a quantity of saccharine matter that the manufacture of beet-sugar offers strong inducements to gentlemen of enterprise to embark in that business. A manufacturer would always find here a "protection" of at least ten cents on the pound, as that is the least cost of transportation alone to the merchants who import their sugar from St. Louis, and there is no apparent prospect that freight will materially diminish for a long series of years. The population of this Territory is something more than 60,000, and nearly all the sugar which they consume comes from St. Louis, Missouri. For the most part, the most inferior kind is brought, and its usual wholesale price ranges from 19 to 25 cents. Sugar brought from the valley of the Mississippi, in wagons, across a desert of nearly 900 miles in extent, surely could never compete with sugar made from the beet in this country, where labor is abundant at from $4 to $8 a month. The enterprise could not fail richly to repay the employment of skill and capital. But the manufacture of beet-sugar has never been attempted, perhaps, because there is no one in the country who has the slightest knowledge of the art.

Our Irish potatoes are of excellent quality, and their cultivation is sometimes very successful; but on many occasions, from some cause, which appears to be as yet unknown, the failure is complete. To say the least, the potato crop has heretofore been a very precarious one. A wild potato, similar to, if not identical with, the Irish potato, is found in the mountainous parts of the Territory, but they are too small and too sparse to repay the trouble of gathering them.

I had intended to speak of the grape culture, and wine manufacture—a very important interest of New Mexico—and also of sheep-growing, the most important of all; but as I have perhaps already written to a tiresome extent, it is proper that I should close.

Very respectfully, your obedient servant,

THOMAS E. MASSIE.

To the COMMISSIONER OF PATENTS.

BENTON, OREGON TERRITORY,
December 8, 1853.

SIR: Your Circular of the date of August, 1852, has just reached me, to which I proceed to make a brief reply.

In the production of wheat guano is not used at all in this Territory. The average product per acre, to the best of my knowledge, is about 30 bushels. The general time of seeding is from 25th August until the last of October; but my experience has taught me that the best time to sow wheat is in the month of May, in this climate, which gives it eleven or twelve months to grow and mature. When thus sown, its yield has been as high as 40 bushels an acre on land newly broken; quantity sown is from 1½ to 2 bushels. The yield per acre is increasing, from the better attention paid to farming.

The Hessian fly and the weevil are not known in this country.

The prices of wheat, at this time, cannot be considered as a general thing. It is now worth, at our barns, $3 per bushel, and our best markets are paying $5 per bushel; but this cannot last long.

Corn is not much raised, but with proper management we can raise a sufficiency for home use. I raised at the rate of 30 bushels per acre on the small spot I planted.

Oats I sow in October, about 2 bushels per acre, and the yield is most universally 40 bushels per acre.

Peas and *beans* do well. Peas enrich the land rather than exhaust it.

Butter.—Average yearly product of butter per cow, 75 pounds. Mode of churning is with the old-fashioned dasher churn. Average price per pound, 50 cents, though now selling at 75 cents at home.

Neat Cattle.—Cost of rearing till 3 years old is nothing more than a little salt and a little time to look after them; worth at that age, for beef, from 8 to 12 cents per pound.

Milch cows are worth from $60 to $85.

Horses and *Mules.*—The raising of these animals is profitable, the expense of rearing being small.

Sheep do well, and are profitable both for wool and for driving to the mines to be used for mutton.

Turnips, carrots, beets, &c., are very prolific, but are raised principally for home consumption.

Irish Potatoes.—Average yield per acre, 200 bushels. Most profitable varieties are the Kidney and large Blues.

Fruit culture is receiving great attention. We have most every variety of fruit trees adapted to our climate now in cultivation.

The above remarks are brief, and, should they be deemed worthy to be inserted in your valuable book, I shall be more than compensated.

Respectfully, &c.,

O. C. MOTLEY.

To the COMMISSIONER OF PATENTS.

V.

THE POTATO—ITS NATURAL HISTORY—DETERIORATION AND IMPROVEMENT.

Under the auspices of the New York State Agricultural Society, the Rev. C. E. Goodrich, of Utica, has devoted much time and research to the propagation and improvement of the potato; and his labors are regarded by the officers of said society, (very competent judges,) and others, as having developed facts of some importance in the course of experiments continued through several years. We copy from the proof-sheets of the Transactions of the Society for 1852, kindly furnished for that purpose by its secretary, B. P. Johnson, esq., so much as is deemed of general interest and as our limits will permit.

The Rev. Joel Blew, of Howard county, Maryland, has bestowed considerable thought on the diseases of this tuber, and made experiments in cultivating it, from whom a communication has been received on the subject. Indeed, the "potato rot" is a fruitful theme, and no disrespect is intended in declining to fill the annual agricultural report from this Bureau with speculations more voluminous than profitable.

I.—THE NATURAL HISTORY OF THE POTATO.

This subject is treated at some length in the Transactions for 1847, as before referred to. I here add some further facts:

A friend of the writer spent some time at Bogotá, a city of New Granada, situate upon the mountains, 8,500 feet above the sea, 5° of north latitude. During his residence there, in 1847 and 1848, he found the climate free from frost through the whole year. The thermometer never rises above 84°, nor sinks to the freezing point; nor does it ever vary more than 5° in any one day. There he found, as Humboldt had more than 40 years before, potatoes of the very best quality. The climate was found too cool for melons and many other tropical plants, which were brought on mules from warmer regions lower down the sides of the mountains. Here, too, many species of plants—as some varieties of peppers and cabbage—never cease growing. It is, hence, obvious that *the potato loves a cool, uniform, and long season,* the very reverse of what it finds here, where we frequently have *a hot, unsteady, and short season.* Nothing but the greatest constitutional vigor could ever have sustained the potato in a prosperous growth in the same soil and climate that produces melons, tomatoes, corn, egg-plants, &c. We see, from the foregoing facts, the reason why the potato flourishes in Iceland, and even in Siberia. Wherever it has shortened the season of its growth, and finds a few weeks of summer weather free from frost, there it will mature a crop. We see, too, why, in this climate, the potato does best in elevated, and even mountainous districts, where it finds a cool position and moist, mucky soil.

II.—THE TWO-FOLD SYMPATHY OF THE POTATO.

1. As a simply tropical plant, it requires, like the most of its class, *steady and uniform weather, but less heat than most of its associates.* It fears not only frost, but all sudden and extreme changes. From such changes I think most of the diseases occurring in my experience before 1850 arose.

2. As a mountain tropical plant, it will not only bear, but *requires for its best development, more air, moisture, and coolness than most other tropical plants.* The nasturtium, however, is found growing on the mountains of South America, in company with the potato, beyond the limits of all other cultivation. Exactly in harmony with these facts, the nasturtium will grow, both in England and the United States, in cooler positions than any other tropical plant, except the potato. The potato, in these respects, sympathizes with our common hardy plants. The damp and hot weather that injures grapes, plums, and gooseberries, by mildew, that rusts wheat, and rots cabbage and turnips, will, at the same time, mildew the potato.

III.—THE WEATHER OF 1851.

As the potato disease is ruled by the weather, so it seems in order first to speak of it. The season, as a whole, was wet from frequent and often heavy rains, and a state of things very different from that which existed in other and more remote parts of the country. It was also unusually steady, without those sudden changes and cold chills that characterize our climate in most years. *May,* and the first half of *June,* were, as a whole, dark, damp, and cool, and so unfavorable to tropical plants in general, but not so to the potato. The last half of *June,* and all of *July,* were hot, damp, and often excessively wet, the showers being intermitted with burning hot sunshine. August was cool, with few warm days—too cool, indeed, for the prosperity of common tropical plants, but favorable to the potato. *September* was warm to the middle of the month, the only thing which saved the corn crop, which had suffered from the wetness of June and July and the coolness of August.

IV.—DISEASE OF THE POTATO—A GENERAL VIEW.

According to Loudon, it is now one hundred, and according to some other writers it is one hundred and fifty, years since the potato began to be cultivated as a common field crop. In the absence of exact historical

dates, we have no very certain or definite account of potato disease until within the last few years. It has been referred to various causes.

1. *Insects, worms, &c.*—But unfortunately it happens that, though the potato, like other plants, has its natural enemies, from some of which it has at times suffered considerably, no one class of insects has yet been discovered whose ravages have been of a nature and extent sufficient to produce the disease in the form in which it has appeared. But admit the extent of injury claimed for insects, yet *the existing disease is not occasioned by their ravages, because clearly it is occasioned by another cause, adequate to its production, just in this form.* And where different varieties have been planted side by side, a portion of the varieties have been diseased, and another portion not. This result has followed regularly year by year—a fact quite inconsistent with the idea that it is occasioned by an insect.

2. *Deficient soil.*—But the disease often invades new soils of the most faultless character; nay, in this case, as in the preceding, one variety has exhibited disease, and one not, during the same year and in the same circumstances of culture.

3. *Fungus, mould, or mildew.*—This theory is doubtless partly true, but not true in the sense in which I have usually understood it to be explained. The mildew, so far from being the *originating* cause of the disease, is, as I suppose, but the *result and proof* of pre-existing causes, arising from the action of the weather on the constitutional weakness of the plant.

4. *Exhausted energy and consequent exposure is suggested as the true explanation of the disease in every case.*—This theory exhibits two aspects:

(A.) *First aspect of disease.*—In this case, cold, wet, and windy weather, following that which was hot, dry, and stimulating, seems to paralyze and deprave the circulation of the plant. Thus chemical changes overcome vital energies. Besides this, the action of the wind lacerates the foliage in many cases. On the return of warm weather, especially if it be sudden, the action of both sun and wind dries up the injured foliage before the exhausted circulation can be restored from the root, which, partaking of the general torpor of the plant, and secluded from the action of the atmosphere by the wetness of the soil, had nearly lost its action. The injury of such a chill is seen to be partly mechanical and partly chemical, and to be closely analogous to that which takes place with all vegetation under the permanent dark and damp chills of autumn. It is also not unlike the injury of hot-bed plants removed too early, and without due preparation. The proofs of such a morbid condition of the potato, thus theoretically stated, will now be exhibited.

(*a.*) *A pallid appearance of the leaves, and often a slightly crumpled state of their edges.*—There is a loss of that intense verdure that characterizes the potato in a state of high and healthful growth. The hue becomes yellowish, and sometimes reddish-green. It is such a change, however, as does not strike a careless observer. *This change of color is undoubtedly in all cases the first and leading indication of disease, and one that becomes a key to all the rest.* It is seen in many cases before the chill passes off, and always within two or three days after. No one can doubt that this appearance indicates a bad state both of circulation

and elaboration, on both of which economies not only the health, but the life, also, of a plant depends.

(*b.*) *Wilted leaves and falling flowers.*—Speedily after the change of color just noticed, the top or youngest leaf of the plant withers. It is usually but a *part* of the rosette of leaves that crowns the plant that thus wilts. The flowers, also, whether open or not, fall off without forming any balls. The stems of the flowers break off at the natural joint, a half inch below, through mere starvation

(*c.*) *A blue color on the point and edges of the upper and outer leaves particularly, and a yellow, iron-rust look on the lower and inner leaves.*—Can any one doubt that these marks indicate the formation of an acid in the leaf of the potato in cool weather, in June and July, any more than that whole forests of trees should exhibit the same appearances under the permanently damp, cool, and dark weather of September?

These indications follow closely upon the falling flowers and wilted leaf, and progress more or less rapidly, according to the severity of the chill. Sometimes, on any given day, you will find scarcely a discolored leaf; and then in three or four days a whole field will be discolored by them. These indications end in the speedy death of the whole leaf, the whole of the three indications (*a b c*) acting almost with the speed of frost. At other times these indications are scattering and act slowly. In such a case they soon disappear, and the crop recovers and grows on. In a few cases the vines also speedily die after the fall of the leaves; but more commonly they do not, but struggle a while to live without leaves, and eventually die of starvation.

(*d.*) *Decay of tubers.*—If the preceding signs of disease are very violent, the tubers are rarely injured, whether they are one quarter or even three quarters grown. But if its progress is slower and the foliage dies a lingering death, the tubers are sure to be affected by rot.

Just as often as severe chills in the middle of summer occur, so often will many or most of the old varieties exhibit these signs of disease, provided they recovered from the first attack. In reference to the foregoing signs of disease, I now ask, is the disease of the tubers a mystery? And is there any mystery in the exhibition of such signs of disease, coming, as always and only they do, in connexion with a chill?

(B.) *Second aspect of disease.*—This seems to arise from hot and wet weather, intermitted in many cases with calm, bright, and scalding sunshine. This engorges the plant beyond its powers of healthful elaboration. The constantly wet state of the soil hinders the action of the atmosphere upon it, and so enhances the previous difficulty. The cuticle of the whole plant, the leaf especially, formed amid such circumstances—circumstances akin to the condition of a hot-bed plant, with too much heat and water and too little air—the cuticle, I say, thus formed, is necessarily tender. Then the hot sun acting on the plant with its juices thus diseased, and its cuticle thus tender, greatly injures it.

The visible morbid indications arising out of these circumstances are the following:

(*a.*) *A spotted and livid appearance of the leaves,* sometimes interspersed with the pale aspect noticed in (A)—(a) above, and giving the leaves of the plant an appearance of irregular patch-work.

(*b.*) *The withered leaf and falling flower* also appear, but much less than in the first aspect. The flowers, especially, fall much less speedily

than in that case, and only after being fully and for a considerable time expanded. Strong varieties, indeed, in this state of weather, set seed-balls freely.

(*c.*) *Steel blue tips on the upper leaves*, and iron-rust stains on the inner and lower ones, appear as before, but less frequently.

(*d.*) *Mould or mildew.*—This is the one mark of disease, in this second aspect of it, that rivets the attention. It breaks out everywhere upon the plant.

(*a.*) *Upon the leaves*, beginning in the dark, livid spots, and spreading, like a contagious cuticular affection upon an animal, until it destroys the whole leaf. This mark is obviously a parasitic fungus, which feeds on the depraved juices of the plant.

(*b.*) *On the stems*, especially two or three inches from the upper extremities of the plant. In this case it destroys the whole cuticle, but in moderate cases does not destroy the stem, whose internal circulation yet continues. The stem above this point is as green as before, and frequently is broken partly off by the wind, hangs down, and continues to grow.

(*c.*) *The flower stems* also become affected with mildew, frequently, but not always, dying. Often the balls, formed and forming, continue to grow.

(*d.*) The balls, whether small or full-grown, are seized, if small, with mildew; if full grown, with a brown appearance, which pervades the whole structure, just as in the case of melons, tomatoes, and egg plants, noticed in my former essays on this subject. (See Transactions for 1847, pages 442, 443.) Those full grown balls do not usually rot, but continue firm and unnaturally hard. On one of my South American varieties I had nearly one bushel of balls in this condition, amounting to about one-fourth of the crop of balls. The balls that set late, on all sorts, after the season of mildew passed away, set and matured without an attack of this sort.

(*e.*) *The tubers*, so far as my experience goes in 1850 and 1851, are less likely to be diseased than under the first aspect of disease. Disease also comes upon them, I think; while as yet the mildew has made very little development. Here, as in the first aspect of disease, the strongest varieties suffer least; some of my home seedlings, and most of my foreign sorts, scarcely at all. Here, also, if the first attack is light, the plant recovers and continues to grow, but may, in fitting weather, suffer a second attack. Unfavorable weather may be of that mixed character that the two aspects of disease shall be mingled, more or less. Indeed, they obviously are not very different, each having many of the same indications, and each being the result of severities of weather.

Observations on both aspects of disease.

1. The first aspect of disease alone prevailed previously to 1850; the second has been noticed mainly and almost exclusively in 1850 and 1851. I make this remark with much diffidence. The field is wide and mainly untrodden, and may need renewed observation in coming years.

The preceding description of disease has cost me much time and observation, and is made with the consciousness that I have reported the indications of nature as wisely and truly as I was able.

2. The months of June and July, particularly from the 25th of June to the 20th of July, is the season when the potato is most likely to be diseased. That is the season when the changes of weather are most sudden, and when the potato exhibits the largest quantity of foliage, and in the most tender and susceptible condition. Those who judge of the potato disease mostly from the indications on the tuber, will not ordinarily find it until a much later period.

3. These two aspects of disease are seen to be in exact sympathy with the two-fold sympathy of the potato. (See p. 355, in No. II.) The first aspect of disease is suffered in common with most other tropicals cultivated in this climate. This point is fully illustrated in the Transactions for 1847, pages 442—444, and for 1848, pages 411—414. So the second aspect of disease is suffered in common with many hardy plants and fruits—such as plums, gooseberries, walnuts, apples, &c., and some vegetables—as carrots, turnips, and cabbage.

V.—ACTUAL OCCURRENCE OF DISEASE IN 1851.

June 28.—Potatoes have now been up about one month. Noticed to-day withered leaves and falling flowers on some sorts got from Buffalo, and others from near New York city, and also in the old early Pink-eye.

June 30.—Saw a few steel-blue tips on the leaves of some of the weaker sorts. The weather, for two weeks, has been damp and hot. Plums are rotting badly. Gooseberries and peaches are scalding on the sun-side.

July 3.—Most ordinary varieties are now dropping their flowers, whether open or not. Potato disease reported at Portsmouth.

July 7.—Weather still damp and hot. Some foreign sorts, received this year, are setting new balls very freely.

July 23.—Color of foliage has long been bad; it now exhibits a pale, sickly green, intermingled with dark, livid spots. Blue tips are now abundant on feeble sorts. Saw the first mildew to-day. It occurred on varieties from the western part of the State, in a position where they were planted rather closely and grew luxuriantly. Saw many mildewed leaves in the field of a neighbor. This exhibition of mildew is four weeks later than last year; exactly in harmony with the relative commencement of hot and wet weather, which began, in 1850, July 14; in 1851, June 14. Diseased potatoes first seen in the Utica market to-day.

July 23 to 30.—Balls setting quite freely on some foreign sorts, on the seedlings derived from them, and on some of my home seedlings.

July 25.—Hot, wet weather. Potatoes closely planted and falling down badly; present many yellow leaves, dying and dead, in the centre of the plant.

July 26.—Found one diseased tuber. Potato disease reported in Ireland.

July 28.—Hot and wet weather, with severe, scorching sunshine. The aspect of the foliage very bad. Mildew, first seen on the 23d, is now everywhere apparent on all the old varieties, and usually in proportion as they are close planted and have grown luxuriantly. These indications are scarcely seen in my best foreign sorts and home-seedlings.

July 29.—Noticed that, in extreme cases, the mildew extends to every part of the plant, stems, leaves, flowers, and balls. Considering the engorged state of the plant, after three weeks of continuous, hot, wet weather, intermingled with hot, burning sunshine, one cannot but fear the worst consequences to the potato crop. The progress of the mildew is very rapid.

July 31.—Three days of cooler weather, without rain, produces a little check to the progress of mildew. The diseased leaves are sloughing off, while its progress is often arrested on a single leaf, the diseased part falling off, and the remainder continuing green. The drier and cooler state of the atmosphere seems to have strengthened the cuticle, and allowed the engorged juices to dissipate, thus removing the cause of mildew.

August, being mostly a cool, dry month, was favorable to the health of the potato, especially as a means of checking the progress of mildew.

August 13.—The foliage of my ordinary field-crops is nearly all brown. The cool weather of the last two weeks has undoubtedly saved the potato crop in Central New York. Indeed, I think that one week's continuance of such weather, as had for some time been in existence previously to July 27, would have destroyed all common varieties of potatoes, root and branch.

August 15 to 19.—Seed-balls are setting very freely. Many sorts, as the yam potato, and some, both of my home and foreign seedlings, that had refused to set during the continuance of the mildew, are now setting freely. As most of these varieties had manifested great permanence of flowers, the failure to set fruit undoubtedly arose from want of sufficient dryness in the air for the delicate operation of fructification. That this failure to set seed-balls did not arise from weakness is evident from another most remarkable fact: the flower-stems, even the small ones that had shed single flowers, subsequently turned to leaf stems, and grew, in some instances, from six to ten inches in length; and, where this was not the case, they became covered with leaves; these leaves and stems were doubtless the result of those juices originally elaborated for the support of the seed-balls which failed of setting. In the case of old and feeble varieties the flowers usually fell while yet in the bud, and the very stems on which they grew often withered from weakness, or were dwarfed.

VI.—RESULTS OF THE SEASON.

1. My foreign sorts, generally, except some imported this year in a shrivelled and feeble state, have substantially resisted the mildew, and even in this excepted case they recovered, set more fruit, and were eventually killed by the frost. My seedlings, also, both home and foreign, were generally but little injured.

2. I have seen no single hill of potatoes this year entirely exempt from mildew, although I had many on which a careless and ignorant observer would have noticed no signs of disease.

3. The seed-balls of this year have, in many cases, been very large; in one case the larger balls weighing one-half ounce each.

4. Fruit generally has been injured. Plums, on my sandy soil, have been a failing crop, though setting abundantly, and also protected from

the curculio. They rotted when two-thirds grown, partly after and partly before the untimely fall of the leaf. The Elfrey, Damson, Prince's Imperial Gage, and the Yellow Gage all did tolerably well, and in the order here indicated; but most other sorts failed almost entirely. My neighbors, who had plums on heavy clay soil, were much more successful. Grapes failed exactly as plums did.* Gooseberries and peaches were both injured by a sun-scald on the sun-side of the fruit. Apples—many varieties were spotted and dwarfed worse than I ever knew the same sorts to be before. Others were not sound, and showed a disposition to rot as I have never known the same sorts to do before. Walnuts, both shag barks and black, were very poor, the meat being either shrivelled or bad in flavor.

5. Tropical plants were injured the first half of June by the coolness of the weather. During the long season of mildew, they suffered, not however, I think, from that cause, but from profuse rain. The ripening fruit was injured in August by the general coolness of the weather.

6. From all the foregoing considerations combined, I conclude that the weather of 1851 was peculiarly unfavorable to the health of the potato, and would have been so had it occurred fifty years ago. The timely cool, dry weather of August saved the crop from much rot; but, as the vines were already dying, the crop has been light from the smallness of the tuber. The foliage of the crop in Oneida county was generally all dead by the middle of August.

7. In parts of our country where the season was dry and hot, or dry and cool, the preceding suffering of the potato crop was not, of course, felt, and will scarcely be appreciated.

APPENDIX TO ARTICLES ON POTATO DISEASE IN 1851.

MISCELLANEOUS FACTS AND OBSERVATIONS.

1. *Culture of Potatoes in the Southern States.*—"In Mississippi and parts adjacent, the best common potatoes that we have ever seen were planted in November and December. Plough the ground deep—not less than ten inches—twenty would be better—open a deep furrow and fill it with good stable manure, well trampled down; cover it slightly with earth and lay the tubers on ten or twelve inches apart; then cover with a heavy furrow turned up from each side and smoothed down with a hoe. Average the furrow so that the water will not stand, and you will have a good crop."—*American Agriculturist, December,* 1847.

The noticeable points here are the *earliness and depth of planting.* These points have both been urged in the preceding essays. They give deep and wide-spread space to the root, and thus secure the plant from drought, heat, and sudden changes, while the crop is matured before the

* No one who watched the progress and appearance of mildew on the wood and leaf of the grape can doubt that its cause was one with the potato disease. The unnatural hardness and the brown tinge of the berry of the grape, without and within, corresponded exactly, moreover, with the similar appearance of the potato ball this year, and with that of diseased melons and tomatoes in former years.

highest heats and drought of summer. The usage of the South is based on the implication that *the potato requires cool and moist culture.*

2. *Culture of the potato in cold and wet weather in France.*—In the northeast part of France lies the district called Ban de la Roche. It was the residence of the celebrated Oberlin. In the life of that excellent man, (Philadelphia edition, 1830, page 84,) we have the following record:

"By his extraordinary efforts and unabated exertions he averted from his parishioners, in 1812, 1816, and 1817, the horrors of approaching famine. The new crop of potatoes that Oberlin had lately introduced formed the principal subsistence of the people during those disastrous years, *when the season was so rainy and cold that they could not get in two-thirds of the grain at all.*"

The single point which I wish to notice here is the fact that, in a *cold and wet season,* when grain could not be obtained for food, the potato was productive, and became the chief reliance of the people. The climate of the northeast of France is much cooler than that of New York and New England, and much less exposed to severe and sudden changes. Here is proof that the moist and cool soils—such as are usually found in mountainous districts—are congenial to the potato. The last two years noticed above will be well remembered as having been years of scarcity and suffering in our own country. During one of them, (1816, I think,) we suffered at least a slight frost in every month of the year. The potatoes were excellent, and the grass, though short, made very rich hay. Rye was sold at $2 per bushel, and other grain correspondingly high that year.

3. *The potato not an acclimated plant.*—The impression is widespread that tender tropical plants can be gradually carried northward, and hardened to the climate until they will bear frost, and flourish there as well as in their native clime. The whole impression is erroneous. Tropical plants may shorten the period of their maturity, and a few probably may be budded or grafted on hardy northern varieties that are nearly related, and thus a little strengthened. But this is the utmost that can be done. The fact that our summers are, while they last, nearly as hot as tropical ones, is the only reason why we can cultivate such plants as corn, cucumbers, melons, pumpkins, squashes, tomatoes, &c. But no one of these bears frost now, or matures good fruit in a short, cool, or wet season, any better than the first year they were introduced. Nay, some species of southern plants, when first introduced, possess a vigor which they afterwards lose.

My Bogotá potatoes, imported in 1848, bear the high dry heats, the wet chills, the lacerating winds, and the sudden changes of this climate, better than any of our old varieties. But they require a long season to mature their tubers, and four years of cultivation have done nothing, or at least little, to shorten it. Nothing, I think, but reproduction from the seed-ball will shorten them, or any plant similarly situated. One reproduction has already shortened the period of maturity in this variety, but not sufficiently. A second reproduction will, I hope, shorten them to the requirements of our climate. As the potato is a mountainous plant, cultivated over a wide extent of latitude, so it is possible, among numerous importations, to find some whose period of maturity will be found exactly fitted to our own climate. So it has been in my experience.

4. *The curled leaf.*—This seems to be a constitutional defect that belongs mainly, if not exclusively, in my experience, to the red varieties. The old red, one of our strongest and best old sorts, has it. My large family of home seedlings, derived from it, show it in some of the varieties, even where that variety is much stronger than the parent. So, also, two varieties of reds, sent me from abroad, exhibit it, although the seed was plump and fresh. I have not examined it further than to notice that it comes on early in the season, and hopelessly dwarfs it, but does not disease the tubers.

5. *The relation between bearing seed-balls and the health and vigor of varieties.*—The following thoughts are suggested with great diffidence, though strongly confirmed by the experience of past years. The general impression is that *seed ball bearing is a test of hardiness among varieties of potatoes.* I think the doctrine in general is true, but it has many exceptions and qualifications. The capacity of a plant or tree to bear fruit seems often to depend not entirely on the general vigor of the plant or tree, but also upon the particular character of the flower or of the season. The tree may possess most unquestionable vigor, while the flower may habitually be deficient either in some indispensable organ, or in the vigor of that organ. Those acquainted with the controversy about pistulate and staminate strawberries will understand me. A wet, cold, and windy season at the time plants are in flower, frequently prevents their fructification. Some varieties of pears and plums, as well as of melons and cucumbers, frequently thus suffer. When once a plant or tree has established a character for regular fruit-bearing, and subsequently, and almost habitually, fails to do so, there is undoubted evidence of depreciated energy. The following facts on this subject are clearly ascertained in my experience in regard to the potato:

(1.) All our old varieties in these days of disease drop their flowers without setting fruit. The exceptions are so few as not to be worth naming. The flowers frequently fall when in mere bud, and long before they expand.

(2.) We formerly had a very good potato which bore no flower, and was called the "no-blow."

(3.) The yam potato has exhibited, in the cultivation of 1851, a good degree of vigor, much more than any of the old sorts. Its numerous large white flowers exhibited a marked permanence, but not one of them set for fruit during the prevalence of mildew in the month of July. In August, under cooler and drier weather, they set and matured a moderate quantity of balls. Here I think the fault was in the character (I will not say weakness) of the flower itself, or possibly the weather was too damp for fructification.

(4.) Some foreign sorts, whose tubers were imported in an exhausted state last April, and became liable to mildew in July, set balls earlier than any others, and in amount beyond anything I ever witnessed. *They set them before the occurrence of mildew, while it continued, and after it passed away.* The tubers in this case were very small.

(5.) Other sorts, both home and foreign, set fruit moderately, *both during and after mildew.*

(6.) A variety of home seedlings, which I deem stronger than any other, bore but 3 balls in 25 hills, although the foliage had an unusually upright growth, with numerous flowers.

(7.) Another home seedling, of the same family, and growing near

the preceding, bore one quart of balls in 28 hills; and yet, whether you regard its foliage or tubers, its vigor was little above our old sorts, and by no means equal to that of the family to which it belonged.

(8.) The old Kidney potato was one of the first to feel disease, yet it bears a little seed almost every year upon a few scattering hills found among my field crops. These facts are not easily harmonized with any theory. A variety of potatoes cannot reasonably be expected to bear a heavy crop of balls and tubers at the same time. Both balls and tubers are the result of elaboration in the foliage. The material thus elaborated is derived from the air and earth. Now, if in a given position one variety bears a heavy crop of sound tubers, it is not to be expected that another variety should do the same, and also yield a heavy crop of balls—since, in the last case, the draught made upon the elaborating energy of the plant must have been at least double that of the other; and as the seeds of all plants always contain more mineral ingredients derived from the soil than simple wood, bulbs, or tubers, so, in the case of large crops of potato balls, there is proportionably larger quantities abstracted of important material from the soil than in the case of a simple crop of tubers. No one expects that, during the same year, a tree should make a stout growth of new wood and also of fruit. Unquestionably, the stripping off of the very young balls, or, better, of the flowers, would add, in the case of varieties given to bearing, heavy crops of balls to the crop of tubers. But whether this labor would prove profitable in the end is a question not readily settled, depending on the price of labor, &c. May it not be suggested as probable that in the native land of the potato, where the season of vegetable growth never ceases, the seed balls and tubers are matured successively?

My Chili potatoes of 1851 bore enormously this year. These balls matured—at least the early sets, which comprehended nearly the whole crop—before the tubers were set, and they were actually gathered in the last four days of August; in the month succeeding, the tubers were mainly produced. Now, suppose this variety could have grown until the first of November, as it doubtless does in most places where the potato is a native, it might have exhibited a large crop of tubers, also; as it was, they were sufficiently numerous, but small, although the vines were green until killed by frost.

Perhaps we have, among our hardy trees and plants, some analogical proof of this sentiment. While a large part of our fruits form bearing wood and fruit in *alternate years*, others of them produce them in different parts of the *same season*. Thus, the raspberry, blackberry, currant, gooseberry, strawberry, tulip, hyacinth, &c., seem in a good degree to form their flowers and fruits in the *early part* of the season; while the fruit bearing wood for the next year, the bulbs and runners, are formed in the *latter part* of the season. So the plum, peach, and other stone-fruits form their *stones* in the *early part of the summer;* while the *mere pulp*, whose formation makes a much lighter draught on the soil, is formed *later in the year*. It is familiar to every gardener, that the draught made on the energy of a plant to form the pod, and almost the full sized berry of the *bean* and the *pea*, is much less than that necessary to give them maturity; hence, if the first sets of beans and peas are permitted to ripen upon the vines, the plant, in most cases, soon dies; while if they are plucked green for market, the plants of most

varieties will set a second, and even, in some cases, a third crop of fruit. We need light on the natural history of the potato; and it is desirable that a State, that for eight successive years has suffered a loss, directly and indirectly, of about half a million of dollars annually by the disease of the potato, should take some efficient means to gather information on this subject. An agent sent to South America, to travel in the native region of the potato for one or two years, might gather rich materials in the study of its natural history.

6. *The liability of the potato to rot not always proportional to its weakness.*—A sort which, from its weakness, yields readily to morbid influences, may lose its foliage so suddenly as to hinder the transmission of the morbid circulation to the tubers. In this case, the tubers will usually be sound, though, if the attack were early, they will be small. In the case of a sort considerably stronger, but not entirely hardy, the disease will be less rapid and more lingering. In this case, the crop will be larger, but the tubers will be more or less diseased. Had a man just two such varieties of potatoes, it would be a difficult question to settle which of them he should plant.

7. *The disease of the potato not specific.*—Some diseases—as measles, whooping-cough, small pox, &c.—are specific; they have a fixed type. Their severity may vary with personal constitution, season of the year, and atmospheric influences; but they have a positive, unmistakable character. On the other hand, such affections as common colds, dyspepsia, and rheumatism have not this specific character; certainly not in their incipient and lighter manifestations. Their existence may be often questionable. Now, the disease of the potato may be compared with this latter class of diseases. It being the result of an infelicity of weather, may exhibit any degree of severity, and end with every variety of result—from that which withers a few leaves of the foliage to that which blackens it, as with sudden frost, or to that which more gradually destroys the whole crop. If this position be true, it obviously follows that the disease admits of no specific remedy. We must improve the constitutional energy of the race, so that it will meet ordinary atmospheric influences without substantial injury. In one aspect of the disease, it suffers with all other tropical plants cultivated here; in another, it suffers in common with most hardy plants. Both aspects of disease are explicable on the common principles of physiology. I doubt not that we should find, could the history of agriculture be accurately written for the period of the past century, that frequent traces of this disease would be found at various times. With just as much certainty I should expect that traces of it would be found on the Andes, and where the potato grows indigenously.

8. Disease does not ordinarily communicate from the injured to the strong tuber. In the autumn of nearly every year, for three or four past, I have stored partially diseased tubers with those that were strong—the small culls of my market potatoes. They were all designed for feeding to stock; often a portion of them have remained until spring. They have then been found a mingled heap of small sound potatoes in a pulpy, rotten mass. Had the heap been large enough to heat, doubtless all would have been lost. The fact is, the potato has a less permeable skin than any other culinary root. This impermeability forbids the transmission of ordinary liquids through it; hence it is the last root to wither

in the sun, and the last to absorb moisture. The withering of potatoes, in ordinary cases, in the spring, is the result, not of the transpiration of their juices, but of their loss by germination.

9. *New modification of disease.*—I have a new seedling in the family of my home varieties; it is quite hardy in foliage, has a very upright growth, yields well, and is a good tuber for the table. On digging, it exhibited a diseased condition entirely unlike the pervading one. It consisted in a small, wet, rotten spot on the end of the tuber, where the stolon was inserted; it extended, perhaps, to one-fifth of the whole crop of the variety. On cutting it off, the tuber seemed to heal naturally, and the injury was small. This variety grew late; perhaps the injured part was the result of morbid decomposition amid the damps and chills of autumn.

10. The value of green-sward soil for potato crops.

(1.) It affords, as it gradually decomposes, the most natural nourishment of the potato.

(2.) It is a slow conductor of heat, and so preserves an equable temperature about the root.

(3.) It preserves moisture in the soil.

(4.) It forms a loose mass, in which the tubers may readily form. Coarse manure subserves all these purposes, but in a much less perfect and economical manner, and, while the potato is weak, in a manner much less safe.

11. *Mode of securing the best tubers for seed.*—Besides the frequent renewal of the potato from the seed-ball—a thing never long to be neglected—something may be done to *continue* the vigor of existing valuable varieties.

(1.) Let every cultivator plant a small plat for seed in good medium soil and fair exposure; thus he will be likely to secure tubers of the highest health.

(2.) For ordinary winter stores such seed may be planted in somewhat richer soil. The forcing of it by a richer cultivation, for one season, will not be likely to enfeeble it sufficiently to disease it much, while the crop may be large.

(3.) Another portion of seed may be planted in very rich soil, where it may yield a very heavy crop for early market; but it will be likely to be sold and eaten before any morbid tendencies which such a course of cultivation might produce would be likely to be developed. None of these last should be used for seed.

12. *A seeming anomaly.*—A variety planted very early will sometimes mature safely, when the same sort, planted later, so as to fall under the influence of bad weather, will be diseased. So, also, when disease comes very early, a late growing variety may just escape morbid influences, which come early, and, when better weather comes, mature sound tubers.

13. *The general improvableness of the potato, by reproduction, being admitted, what is the probability of success in a given case?*—The answer undoubtedly will be, that success will be in proportion to the elevated point from which you start. There will always be a tendency in like to produce like.

(1.) Suppose you start with a foreign sort whose first and leading quality is hardiness—one whose flesh, perhaps, is yellow and heavy,

and whose maturity is late: the seed-balls of such a variety will produce a family of seedlings the most of which will be hardy, though few will be highly improved in quality of flesh and time of maturity. They will need, therefore, a second or third reproduction.

(2.) Suppose you start with seed-balls from a home variety which possesses fine shape, color, and white and dry flesh, but is deficient in hardiness: the result from such seed-balls will probably be a family of seedlings which will resemble the parents in all leading qualities, and some few of which will, moreover, exhibit a fair improvement in hardiness, though still needing a second or third reproduction from the seed-ball.

(3.) Suppose the case of a variety, either imported or long cultivated at home—one that possesses a combination of all good qualities. Here it should be remembered that these qualities, particularly hardiness, will one day wear out. It should, therefore, be reproduced from the seed-balls, even though you continue to cultivate the original variety for many years afterwards. In the case of a family of seedlings from such a variety, you may expect to get, proportionably, a very large number of seedlings of good quality the first time you sow seed. Such are the results of my short experience. The proofs of these positions will be seen, or inferred, to a considerable extent, in the article to which this is an appendix.

14. *On the possible occurrence of potato disease in the native clime of that plant.*—

(1.) The potato disease is reported (see Report of the Commissioner of Patents for 1847, pp. 141, 142) to have occurred at Bogotá, in New Granada, and in Peru. This asserted fact is supposed by some to be inconsistent with any and all explanations of the cause. This inference, however, is contradicted by undoubted analogical facts; while it tends to discourage all further examination of the subject.

(2.) The general laws of vegetable physiology are alike applicable to all climes.

(3.) Climate, also, however benignant and uniform it may usually be in a particular place, is not unchangeable. In a portion of France, near Strasburgh, as emigrants have informed me, a succession of unfavorable seasons, within the period of the present generation, so far discouraged the culture of the grape that it was almost entirely abandoned, and was not resumed until recently. The olive, also, was once extensively cultivated in the south of France, but in the hard winters of 1709, 1766, 1787, 1789, and 1820, it was almost totally destroyed. Now, instead of raising a tolerable supply from the country, large quantities are imported from Spain. (See Kenrick's Orchardist, under the word *Olive.*) Other and simular cases of failing vegetation, under occasional severities of the weather, are common in the annals of agriculture and pomology.

(4.) The potato disease has been shown to result from severities of weather, according to well ascertained physiological laws. When it has grown old, and is subjected to too stimulating a course of culture in a climate that was never quite congenial, it becomes diseased in foliage, and also often in tuber.

(5.) Now, suppose that in the native region of the potato the usual steady temperature of the climate is interrupted by chills, rains, and lacerating winds, then, by every consideration of permanence in physiological

principles, disease ought to be the result. So, also, should the damp and hot weather that is common in the plains, below the common location of potato culture there, invade the higher regions on the mountain plains, the same result must follow. It will be said that in a climate noted for its great mildness and uniformity, such changes, and of course such consequences, would not be likely to occur. True, most true; but who will undertake to say that, with such and similar facts occurring in the history of other plants, and standing out on the page of agricultural history, the thing is impossible. And when they occur, like causes must produce like effects.

It should not be forgotten, moreover, that in the mild and genial climate of the Andes, many varieties of potatoes are probably cultivated that would not bear the climate here at all. Such varieties would be likely to suffer under slight severities—such, for instance, as our common varieties would pass through uninjured. These varieties would be the first to suffer there in a season in the least degree incongenial, and this suffering would be sufficient to establish the fact of the occurrence of potato disease there, the relative malignity of which we here could not judge in our ignorance of all the facts in the case.

15. *On the relative tendency of moist and dry soils to produce seed balls.*—

(1.) The yam and four varieties of Chili potatoes, imported in 1851, bore seed-balls equally well on moist and dry soils. There was at the same time but little difference between the two positions in foliage and tubers.

(2.) Of my many sorts of Bogotás—both the original importations of 1848 and the numerous seedlings of 1849—none bore seed on the moist ground, though the health of the foliage and tubers was equal in the two positions.

16. *On the difficulty of getting valuable new varieties of potatoes by importation and reproduction.*—The attempt to improve the potato is not an easy one. It must be made ordinarily with much labor, patience, and skill.

(1.) The reproduction should be made *on an adequate scale,* since, in the case of seedlings from a home variety, but few out of hundreds will combine every good quality, especially hardiness, at the first time of reproduction. So, also, in the case of seedlings from a foreign sort, though most will be hardy, yet few will combine all other good qualities short of a second reproduction.

(2.) So, in importations from a foreign land, not only will there be much expense ordinarily, but, as the imported tubers will come from a great variety of climates, it may be, that out of numerous hardy sorts no one will be found exactly fitted to this climate, in its time of maturity. Out of nine varieties noticed above, I have found but one certainly, another with some probability, fitted to all the requirements of this climate.

17. *Potato disease not mysterious.*—Leaves are the means of elaborating the juices of the plant. The quantity and quality of their elaboration will determine the quantity and quality of the crop. If the leaves are early destroyed, before the tubers of the potatoes are fully grown, they cannot be expected to increase subsequently to that destruction. So, if the leaves are diseased to any extent, the elaboration will be unhealthful in the same proportion. It is not wonderful, then, that diseased foliage should produce diseased tubers.

(1.) It is a matter of common experience that tomatoes, melons of all sorts, cucumbers, summer squashes, egg-plants, and most other tropical plants usually cultivated here, are occasionally diseased in seasons of unsteady and extreme weather, and that the potato is diseased under the influence of the same weather.

(2.) Again: it is equally a matter of experience that, in certain other states of weather—when hot and damp—wheat rusts, plums and grapes suffer mildew on the foliage, and rot upon the fruit; nuts are imperfect; cabbage and turnips decay. Meanwhile, under the influence of the same weather, the potato rots, also. Thus, the potato shows a double sympathy, *i. e.,* both with tropical and hardy plants.

18. *California potatoes fail in Central New York, while potatoes carried from the latter place improve in the former.*—In the spring of 1851, California tubers were brought by a returning emigrant, and planted on the grounds of Wm. R. Miller and others, in the town of Marcy, county of Oneida. I saw them on the 5th of August; they had made a fine growth of vine, but were suffering simultaneously and equally with our old varieties.

On the other hand it is said, on good authority, that potatoes carried from the old States recover their tone of health when planted in California. Now, all this is natural.

(1.) A potato brought from California to this climate endures a change from one that is very *uniform* and *mild* to one that is *unsteady* and extreme. Is it strange that it suffers?

(2.) On the contrary, a potato transferred from this climate to California will there find much less to try its constitutional vigor than here. These results, then, so far from being strange, are just what the circumstances demanded, and are similar to what occurs in the history of other plants.

19. *Influence of wide planting.*—I noticed a fact during the past season which, though new, is perfectly natural. Single hills, single rows, rows planted widely apart, and hills at the end of rows and on the windward side, withstand disease better than those otherwise situated. Hence I infer that wide planting and open, airy positions are both favorable to the health of the potato, by securing a freer access of sun and air, and thereby promoting a more healthful action of the foliage, and of course a more healthful elaboration. Numerous cases were noticed, near the close of the season, in which potatoes situated as above described exhibited green foliage, while all around them were dead. Has this fact any bearing on discussions on this subject?

20. *Disease modified by shape of foliage—an upright foliage best.*—My old varieties of potatoes seemed to be diseased irrespective of the shape of the foliage; but, among my new seedlings, *those* are most healthful that exhibit a tall and upright foliage. I do not say that this was universally the case. Some very strong varieties fell to the ground early; but the fact proved true often enough to constitute a rule. This fact needs no comment, other than that *this form of foliage admits the freest and most natural operation of air and light.* Here, again, is a fact that pours a flood of light on the question—Is the disease of the potato the result of weather, climate, and exhaustion, as contended in these papers,

or is it the result of the attack of insects, deficiencies of soil, or fungi, as others think? (Vide Mr. Delafield's experience in wide planting of the potato—Trans. 1850, page 498.)

21. *Inefficiency of supposed antidotes.*—As mildew has been principally concerned in the potato disease during the last two years, and knowing the effect of sulphur in resisting it upon the grape, I was induced to make a similar application of it to the potato. It was mixed with some other substances, as follows: sulphur, ten pounds; wheat flour, three quarts; lime, slacked, two quarts; unleached ashes, eight quarts; and plaster of Paris equal to all the other articles combined. This mixture was made by no particular rule. The wheat flour was for the purpose of making the mass adhere to the leaves of the potato. The other articles will all be seen to be antiseptics. The whole was most thoroughly mixed by being passed together through a sieve before being used. It was applied early in the morning, while the dew was upon the plant, with a small sieve, at the end of a long handle. The application was made to different sorts of potatoes, some of which were considerably affected with mildew, and some very little. Such was the state of the weather after its application, which was made August 6, that it remained upon the foliage—at least, more or less of it—eight or ten days. The application had no perceptible influence either for good or evil upon the crop.

22. *The cause of disease in late-ripening varieties.*—

(1.) It is a settled point in the culture of tropical plants in this climate that their elaborations are less healthful in the cool, dark, and damp weather of autumn than at an earlier period. Melons of all sorts, cucumbers, tomatoes, pumpkins, beans, and even hardy plants—as peas—are never so rich and healthful, when forming their fruits or pods late in the season, as at an earlier period; all this is equally true of the potato. A variety that matures very late, and so, equally, early sorts that are planted very late, will become diseased from that very circumstance.

(2.) There is, perhaps, another reason: while the skin of the mature tuber is very impervious to liquids, not even withering readily under the combined influence of sun and air, the skin of the young potato is very tender, and brobably suffers from cold and dampness in the soil in autumn. Whatever may be the explications of the fact, some varieties that I cultivate, whose foliage, under every variety of weather, is strong, but whose tubers, instead of commencing their formation about the 20th of June, as is common, do not begin their growth until the 20th of August, and even in some cases much later—some such hardy varieties, I say, are found diseased in tuber late in autumn.

23. *On the use of small potatoes for seed.*—Practically, I have found no difference in results between the use of large and small potatoes for seed; my experiments in this respect have extended to various kinds, on various soils, and through many years; I have not, however, practised it upon the same variety, and on the same soil, and through a succession of years. Theoretically, I should be opposed to this latter course; an occasional use of small potatoes for seed, especially where you do not save the crop for the seed of the next year, I think entirely safe, neither leading to disease nor diminution of crop.

24. *Reasons of the increased liability of the potato to disease in late years.*—This increased liability is a painful fact. The reason of that fact, as adduced in the essays of former years, is *exhausted energy*. (See Transactions for 1847 and 1848.) This exhaustion of energy is believed to be the result of long cultivation from the tubers, instead of occasional reproduction from the seed-balls. Our climate, moreover, is clearly less congenial than its native one, being shorter in season, less uniform, and exhibiting wider extremes of temperature. We have, also, over-stimulated it in our anxiety to get large crops. Manuring it for this purpose has made the plant more vascular, as well as overworked its excitability. The proofs of these positions, formerly adduced, were largely inferential and collateral. The remedy was, also, of the same character: that remedy was reproduction from our hardiest old sorts, reimportation from its native clime, and reproduction from such imported sorts, when they were not quite fitted to our climate, in the first instance, by length of season. The confident tone in which this remedy was proposed was considered by some chimerical. The justification of that confidence is now found in simple matters of fact, respectably attested, and still open to the scrutiny of the incredulous. In short, importations have been made, seedlings have been produced from them, and also from our old varieties. The result of all is, such a character for hardiness and all other good qualities as affords the assurance that a few varieties of the highest character have already been obtained, and that speedily such varieties will be obtained in great numbers. Meanwhile, all other remedies for potato disease, in the shape of change or renewal of soil, antiseptic remedies, and remedies directed to the repulsion of insects, have failed, or at best have been but temporary in their influence, and have not reached the root of the evil.

I have not in this, or in former papers, attempted a minute exhibition of the mode in which, probably, vegetable productions become degenerated by age. This is not a work for me, but for the most acute and discerning of vegetable physiologists. Excepting the slight show of explanation here, and in former papers, (see Transactions for 1847, pp. 453—454; and for 1848, pp. 418—421,) I have contented myself with the simple assumption of generally admitted facts.

Experiment—Burying Potatoes.

The annexed account of an experiment made by Mr. Goodrich during the past year having been received while the Transactions are being printed, and being important as regards the disease of the potato, we give it an insertion:

May 8, 1851.—I buried twenty tubers of potatoes about two feet deep in the cellar of an out house. The object was to ascertain whether they could be preserved over one summer, so as to be used the second year for seed. The place of deposite was favorable, as the cellar was cool, and underlaid with living quicksand about three feet from the surface, whose temperature is to-day, at two feet from the surface, fifty-five degrees. They were deposited in a flower pot, and this set in another one, larger; the whole was covered with an earthern plate, and this again by a board; no earth was put in. The sorts of potatoes deposited were two varieties of home seedlings of 1849, one Chilian, and three of more common sorts.

Results and Suggestions.

They were dug out May 20, 1852, having been buried one year and twelve days.

1. They all had grown during the last year and formed vines, which had decayed much as they would have done in a heap in the field. The tubers formed amounted to forty-eight—some of them very small. They were none of them so large as those buried; and were by weight, probably, from one-third to one half the weight of those buried.

2. The old tubers were mostly decayed, as in ordinary experience; but one of them was found sound, except that it was a little cracked; while some others, though retaining their shape, were soft.

3. The tubers were colored like the originals, but not so deeply.

4. They were all sound, since they endured none of those severe atmospheric changes which are conceived to be the cause of the disease, as manifesting itself in recent years.

5. They were found, when opened, beginning to sprout. This is a proof of the strong tendency of the potato to germinate when the appropiate season of the year arrives.

6. As they had no access to soil or water, other than the pervasion of the flower-pot by moist air from below, so their growth must have been the result of a mere transfer of matter from the old tubers to the new vines and tubers.

7. They were planted, except the very small ones, May 21st, in nineteen hills, and are to day, July 31st, quite as flourishing as other hills planted with the same varieties of seed.

8. On the 25th of June, just thirty-four days from the time these new tubers were planted, I discovered that the old sound tuber, noticed in No. 2, above, was sprouting, the flower-pot containing it and the other rubbish of this experiment having been left in a somewhat dark and cool position. It was at once planted, and has made a feeble growth of two sprouts four inches long.

9. To those who, on opening heaps of potatoes that had been covered too warmly during the winter, have found young tubers in the middle of the heap half grown, this experiment will not seem at all incredible. Had they been placed in an open box, but still without earth, and set upon the bottom of the cellar, so as to imbibe a little moisture, the superior access to light and warmth which they would have thus enjoyed would probably have made the foregoing results larger.

This experiment, I think, strongly corroborates the suggestions made in late years that the heat and light of our climate are evidently too great for the normal requirements of the potato, and that this excess, taken in connexion with the sudden and severe changes of our climate, indicates the true immediate cause of that disease which has made such powerful ravages during the last nine years. When we superadd to this cause others—such as a course of culture too stimulating, and a neglect to raise it frequently from the seed ball—we have all the needful facts for forming a theory of the potato disease—a disease which is, then, no longer an inscrutable mystery, but a common liability incident to all tropical plants when cultivated in incongenial circumstances.

C. E. GOODRICH.

VI.

SOUTHERN AGRICULTURAL EXHAUSTION, AND ITS REMEDY.*

The great error of Southern agriculture is the general practice of exhausting culture—the almost universal deterioration of the productive power of the soil, which power is the main and essential foundation of all agricultural wealth. The merchant or manufacturer who was using (without replacing) any part of his capital to swell his early income, or the ship owner who used as profit all his receipts from freights, allowing nothing for repairs or deteriorations of capital, would be accounted by all as in the sure road to bankruptcy. The joint-stock company that should, in good faith, (as many have done by designed fraud,) annually pay out something of what ought to be its reserved fund, or of its actual capital, to add so much to the dividends, would soon reach the point of being obliged to reduce the dividends below the original fair rate, and, in enough time, all the capital would be so absorbed. Yet this unprofitable procedure, which would be deemed the most marvellous folly in regard to any other kind of capital invested, is precisely that which is still generally pursued by the cultivators of the soil in all the cotton-producing States, and which prevailed as generally, and much longer, in my own country, and which, even now, is more usual there than the opposite course of fertilizing culture. The recuperative powers of nature are indeed continually operating, and to great effect, to repair the waste of fertility caused by the destructive industry of man; and but for this natural and imperfect remedy, all these Southern States (and most of the Northern, likewise) would be already barren deserts, in which agricultural labors would be hopeless of reward, and civilized man could not exist. Let me not be understood as extending censure to all Southern agriculture, and charging this great defect as being universal. It is truly very general, but there are numerous exceptions, of which it is not my purpose to treat. My present business is with errors and defects of Southern agriculture, and with its points of admitted excellence; as, for example, the elaborate system of rice culture, and for other tillage, the very general and commendable attention paid to the collection of materials for putrescent manures.

* This interesting paper was read by Edmund Ruffin, esq., of Virginia, the justly celebrated American agriculturist, at the late fair of the South Carolina Institute, in Charleston, South Carolina, which we had the pleasure of attending. The author has kindly furnished us a corrected copy, which we hasten to lay before our readers, omitting only the introductory portions, which are of local or personal character.—*Editor of De Bow's Review, New Orleans.*

Nothing has appeared to me more remarkable in the agriculture of this region than the close neighborhood (often, indeed, seen on the same property) of the best husbandry in some respects, and almost the worst in most others. The great error of exhausting the fertility of the soil is not peculiar to cotton culture or to the Southern States. It belongs, from necessity, to the agriculture of every newly-settled country, and especially where the land, before being brought under tillage, was in the forest state. When first settled upon, forest land costs almost nothing, and labor is scarce and dear. Even if labor is more abundant, it still will be long before enough land can be cleared to allow changes of culture and rest to the fields; and for some years after each new clearing, it would be even beneficial to continue the tillage of corn, tobacco, or cotton, so as effectually to kill all remains of the forest growth. But as soon as enough land can be brought under culture, and has been put in clean condition, so as to allow space for change of crops and due respite from continual tillage, the previous exhausting course will no longer be best even for early profit. Even in a new country, while land is yet fertile, it is cheaper to preserve that fertility from any exhaustion than it is to reduce it considerably. And in an older agricultural country, like South Carolina, having abundant resources in marl and lime for improving fertility, it would be much cheaper and more profitable to improve an acre of before exhausted land than it is to clear and bring under culture an acre of ordinary land from the forest state, allowing that both pieces are to be brought to the same power and rate of production. New settlers are not censurable for beginning this exhausting culture. But they and their successors are not the less condemnable for continuing it after the circumstances which justified it have ceased. The system was first begun in Eastern Virginia, because it was the first settled part of the present United States, and it continued to prevail, almost universally, until since the course of my adult life began, and only has partially ceased since because the country was nearly reduced to barrenness and the proprietors to ruin. From this erroneous policy so long pursued in Virginia, and the manifest and well-known disastrous results in the general and seemingly desperate sterility of the older settled portion of the State, the younger Southern States might have taken warning, and have learned to profit by the woful and costly experience of others. But it seems that every agricultural community must and will run the same race of exhausting culture and impoverishment of land and its cultivators before being convinced of the propriety of commencing an opposite course, after the best means and facilities for making that beneficial change have been greatly impaired by the lapse of time, and progress of waste of fertility—if, indeed, these means are not then irretrievably forfeited. If, at this time, the work of improvement, with the aid of marl and lime, were properly begun and prosecuted, there would be found here incalculable advantages over those of the pioneers in the like work in Virginia. These advantages would be—first, a ten-fold better supply of far richer and cheaper marl than is found in Virginia; second, much more remaining organic matter, or original fertility of the soil, as yet unexhausted; third, full information to be obtained of the operations and opinions of thousands of experienced and successful marlers to refer to, of which advantage there was almost nothing existing 30 years ago. In South Carolina more marling could now be done in a year, and in a proper manner, than was done in Virginia for the first 20 years; and, though judging merely by analogy, I infer that the benefit would not be less great in this region than in my own. And now I will state, from unquestionable official documents, something of what has been effected in Virginia—not merely in cases of particular farms, and those entirely marled, which might show tripled or quadrupled products and market returns, and ten-fold *intrinsic* value, compared to their former low condition—but cases showing the bearing of the comparatively few marled and limed farms on the aggregate assessed value of all the lands in lower Virginia, and upon the receipts of land-tax from the same, although not one-twentieth part of the whole tide-water district has yet been improved in fertility, or is the least better (and probably the great remainder is much poorer) than when the marling of other lands first began to raise the general average of assessed values throughout this whole district. It appears, from the latest State assessment of lands in Virginia for 1850, that the actual increase of value in the tide-water district only, since 1838, the previous assessment, was more than $17,000,000. On this increase of valuation, and at the same rate of taxation, there is more than $17,000 increase of land-tax alone accruing annually to the State treasury. It is obvious that any increased value of lands, caused by their increased production, would necessarily require an increase of labor and of farming stock, and would produce proportional increase of general wealth of the improvers, and would add other receipts from taxes in proportion, all serving still more to augment the public revenue.

The recent addition to the aggregate value of lands in Eastern Virginia is admitted to be the effect of agricultural improvements; and that, more than all, the net increase is due to marling and liming only, would be equally evident if I could here adduce the proofs, as I have done elsewhere.* Further: though 1838 was the date of the earliest assessment made after marling and liming had begun to increase aggregate production and value of lands, it is an unquestionable fact, that the general improvement had been greater and values much lower about 1828. And if this earlier time and greatest depression had been marked by an assessment, then made, the full increased value of lands from that time would have appeared at least $30,000,000 in 1850, instead of $17,250,000, counting from the already partially advanced improvement and enhanced values of 1838. However, even if these, my deductions and estimates, go for nothing, there will still remain the proof, by official documents, of the actual increase of value of lands in twelve years, of $17,250,000, or nearly $1,500,000 yearly. Now bear in mind that these are not the results of the improving of all the tide-water region, nor all of its much smaller arable portion, but probably of not more than one-twentieth of the cultivated land. All the remainder, if uncultivated, is stationary; and, if cultivated, is generally in a continued course of exhaustion; and the small quantity of enriched land had first to make up for all deficiencies of the impoverished, and lessening of production throughout the whole tide-water district; and after all such deductions, still exhibited a clear surplus of $17,250,000 of increased aggregate value. This is the

* In a communication recently made to the State Agricultural Society of Virginia, on "some of the results of the improvement of lands by calcareous manures, on public interests in Virginia, in the increase of production, population, general wealth, and revenue to the treasury."

result of but the beginning, and a very recent beginning, of measures for improvement, executed in every case imperfectly, often injudiciously, and sometimes injuriously, and altogether on less than one twentieth of the space on which calcareous manures are available. The great omitted space will hereafter be fertilized in the same manner. Then the actual increase of value of lands, founded on increased production, will be counted by hundreds of millions of dollars. And this anticipated enormous amount of fertility and capital to be created might have been now in possession if our improvements by calcareous manures had been begun 30 years earlier, instead of there having been continued, through all that time, the progress of wasting and destroying the remaining powers of the soil. South Carolina began exhausting culture much later, and is now full 50 years less advanced towards the lowest depth of that full descent which we had nearly completed. If that future of 50 years of continued exhaustion could be now cut off, and the improvement of Lower South Carolina, by calcareous manures, could be at once begun, and continued, the loss of at least $100,000,000 of now remaining value would be saved, and a gain of $300,000,000, from improvement, would be reached sooner by the same 50 years. This would be better, by all this great value, than even the following out precisely the first sinking and now rising course of Lower Virginia. In that region, the cultivators waited until the fertility of the land had so nearly expired that it was supposed to be in *articulo mortis*—at the last gasp—before the work of resuscitation was begun. The comparative results of the opposite systems of improving and exhausting cultivation may be thus illustrated: Suppose a certain investment of capital will yield 20 per cent. of present annual interest, or net products, and two persons invest equal amounts in the business: the more provident one draws or spends but fifteen per cent. annually of his income, and leaves the remaining five per cent. to accumulate, and to be added to his interest-bearing capital. The other proprietor draws each year, and spends all of the certain and annual average returns of his capital, and five per cent. more of the capital stock itself. He reasons (may I say it) like many cotton-planters, and infers that so small a detraction from his capital will do no harm, as he will have so much the more of quick returns for immediate use or reinvestment. In less than twenty years, one of these individuals will have doubled his original capital, and also his twenty per cent. income, and the other will have exhausted his entire fund. But it may be said (as alleged in regard to the squanderers of fertility) that, as the latter person had received so much more of annual returns at first, he might have reinvested, and thus have retained his over-draughts of annual products. If a planter—and, of course, his over-draughts had been from the fertility of his land—he might have bought another plantation, to work and to wear out in like manner. But even if so, wherein would be the gain? He would have had the disadvantages of a change of investment, of removal, and making a new settlement. But where one man would so save and reinvest his over-draughts from his capital, two others would use, or perhaps spend theirs, as if so much actual clear profit, or permanent income. When the land is utterly worn out, and the total capital of fertility wasted, (or the small remnant is incapable of paying the expense of further cultivation,) it will most generally be found that the channels into which the early full streams of income flowed are then as dry as the sources. I do not mean that it necessarily follows that the planter who exhausts his land also lessens his general wealth. Would that it were so! for, then, such certain and immediate retribution would speedily stop the whole course of wrong-doing, and prevent all the consequent evils. It may be rarely, and it might be never the case, that the exhauster of land becomes absolutely poorer during the operation. He will have helped to impoverish his country, and to ruin it finally, (by the same general policy being continued;) he will have destroyed as much of God's bounties as the wasted fertility, if remaining, would have supplied forever; and as many human beings as those supplies would have supported will be prevented from existing. And yet the mighty destroyer may have increased his own wealth; nevertheless, he does not escape his own, and even the largest, share of the general loss he has caused. While thus destroying—say $20,000 worth of fertility, the planter, by the exercise of industry, economy, and talent in other departments of his business, or from other resources, may have grown richer by $10,000. But if, as I believe is always true, it is as cheap and profitable to save as to waste fertility in the whole term of culture, then the planter, in this case, might have gained in all $30,000 of capital if he had saved instead of wasting the original productive power of his land. Even if admitting the common fallacy which prevails in every newly-settled country—that it is profitable to each individual cultivator to wear out his land, still, by his doing so, and all his fellow-proprietors doing the like, while each one might be adding to his individual wealth, the joint labors of all would be exhausting the common stock of wealth, and greatly impairing the common welfare and interest of all. The average life of a man is long enough to reduce the fertility of his cultivated land to one half, or less. Thus, one generation of exhausting cultivators, if working together, would reduce their country to one-half of its former production, and, in proportion, would be reduced the general income, wealth, and means of living—population and the products of taxation—and, in time, would as much decline the measure of moral, intellectual, and social advantages—the political power and military strength of the commonwealth. The destructive operations of the exhausting cultivator have a most important influence—far beyond his own lands and his own personal interests. He reduces the wealth and population of his country and the world, and obstructs the progress and benefits of education, the social virtues, and even moral and religious culture. For, upon the productions of the earth depend, more or less, the measure to be obtained by the people of any country, of these and all other blessings which a community can enjoy. There is, however, one very numerous class of exceptions to this general rule, which is, when an agricultural people, or interest, is tributary to some other people or interest, whether foreign or at home. Such exceptions are presented in different modes: by the agriculture of Cuba being tributary to Spain; of many other countries to their own despotic and oppressive home governments; and of the Southern States of this confederacy, to greater or less extent, to different pauper and plundering interests of the Northern States, which, through legislative enactments, have been mainly fostered and supported by levying tribute upon Southern agriculture and industry.

The reason why such woful results of impoverishment of lands as

have been stated are not seen to follow the causes, and speedily, is, that the causes are not all in action at once and equal progress. The labors of exhausting culture, also, are necessarily suspended as each of the cultivator's fields is successively worn out. And when tillage so ceases, and any space is thus left at rest, nature immediately goes to work to recruit and replace as much as possible of the wasted fertility, until another destroyer, after many years, shall return again to waste, and in much shorter time than before, the smaller stock of fertility so renewed. Thus the whole territory, so scourged, is not destroyed at one operation. But though these changes and partial recoveries are continually, to some extent, counteracting the labors for destruction, still the latter work is in general progress. It may require (as it did in my native region) more than two hundred years from the first settlement to reach the lowest degradation; but that final result is not the less certainly to be produced by the continued action of the causes. I have witnessed, at home, nearly the last stage of decline. But I have also witnessed, subsequently, and over large spaces, more than the complete resuscitation of the land, and great improvement in almost every respect, not only to individual, but to public, interests; not only in regard to fertility and wealth, but also in mental, moral, and social improvement.

Inasmuch as my remarks would seem to ascribe the most exhausting system of cultivation especially to the slave-holding States, the enemies of the institution of slavery might cite my opinions, if without the explanation which will now be offered, as indicating that slave-labor and exhausting tillage were necessarily connected as cause and effect. I readily admit that our slave-labor has served greatly to facilitate our exhausting cultivation; but only because it is a great facility—far superior to any found in the non-slave-holding States—for all agricultural operations. Of course, if our operations are exhausting of fertility, then certainly our command of cheaper and more abundant labor enables us to do the work of exhaustion, as well as all other work, more rapidly and effectually. But if directed to improving, instead of destroying, fertility, then this great and valuable aid of slave labor will as much more advance improvement as it has generally heretofore advanced exhaustion. The enunciation of this proposition is, perhaps, enough. But if any, from prejudice, should deny or doubt its truth, they may see the practical proofs on all the most improved and profitable farms of Lower and Middle Virginia. On the lands of our best improvers and farmers—such as Richard Sampson, Hill Carter, John A. Selden, William B. Harrison, Willoughby Newton, and many others—slave-labor is used, not only exclusively, and in larger than usual proportion, (because more required on very productive land,) but is deemed indispensable to the greatest profits, and operating to produce more increase of fertility and more agricultural profit than can be exhibited from any purely agricultural labors and capital north of Mason and Dixon's line. There is another and stronger reason for the greater exhausting effects of Southern agriculture, and therefore of tillage by slave labor: the great crops of all the slave-holding States, and especially of the more Southern—corn, tobacco, and cotton—are all tilled crops. The frequent turning and loosening of the earth, by the plough and hoe—and far more when continued, without intermission, year after year—advance the decomposition and waste all organic matter, and expose the soil of all but the most level surfaces to destructive washing by rains—and rains the more heavy and destructive in power in proportion as approaching the South. The Northern farmer is guarded from the worst of these results, not because he uses free labor, but because his labor is so scarce and dear that he uses as little as possible for his purposes. Besides this consideration, his climate is more suitable to grass than to grain, and his other large crops are much more generally broadcast than tilled. These are sufficient causes why, in general, the culture of land in the Northern States should be less exhausting than in the Southern, without detracting anything from the superior advantages which we of the South enjoy in the use of African slave labor.

At the risk of uttering what may be deemed trite or superfluous to many of those who now honor me by their attention, I beg leave to state concisely the fundamental laws, as I conceive them to be, of supply and exhaustion of fertilizing matters to soils and aliment to plants.

All vegetable growth is supported, for a small part, by the alimentary principles in the soil, (or by what we understand as its fertility,) and partly, and for much the larger portion, by matters supplied, either directly or indirectly, from the atmosphere. More than nine-tenths, usually, of the substance of every plant is composed of the same four elements, three of which—oxygen, nitrogen, and carbon—compose the whole atmosphere; the fourth—hydrogen—is one of the constituent parts of water; and, also, as a part of the dissolved water, hydrogen is always present in the atmosphere, and in great quantity. Thus, all these principal elements of plants are superabundant, and always surrounding every growing plant; and from the atmosphere (or through the water in the soil) very much the larger portion of these joint supplies is furnished to plants; and so it is of each particular element, except nitrogen, much the smallest ingredient, and yet the richest and most important of all organic manuring substances, and of all plants. This, for the greater part, if not for all of its small share in plants, it seems, is not generally derived, even partially, from the air, though so abundant therein, but from the soil, or from organic manures given to the soil.

But, though bountiful nature has offered these chief alimentary principles and ingredients of vegetable growth in as inexhaustible profusion as the atmosphere itself which they compose, still, their availability and beneficial use for plants are limited in some measure to man's labors and care to secure their benefits. Thus, for illustration: suppose the natural supplies of food for plants furnished by the atmosphere to be three-fourths of all received, and that one fourth only of the growth of any crop is derived from the soil and its fertility, still, a strict proportion between the amount of supplies from these two different sources does not the less exist. If the cultivator's land at one time, from its natural or acquired fertility, affords to the growing crop alimentary principles of value to be designated as five, there will be added thereto other alimentary parts, equal to fifteen in value, from the atmosphere. The crop will be made up of, and will contain, the whole twenty parts, of which five only were derived from, and served to reduce by so much, the fertility of the soil. These proportions are stated merely for illustration, and, of course, are inaccurate; but the theory or principle is correct, and the law of fertilization and exhaustion thence deduced is as certainly sound. Then, upon these premises, there is taken from the land, for the support

of the crop, but one-fourth of the aliment derived from all sources for that purpose. And, if no other causes of destruction of fertility were in operation, one green or manuring crop (wholly given to the land, and wholly used as manure) would supply to the field as much of alimentary or fertilizing matter as would be drawn thence by three other crops removed for consumption or sale. But in practice there *are* usually at work important agencies for destruction of fertility, besides the mere supply of aliment to growing crops. Such agencies are the washing off of soluble parts, and even the soil itself, by heavy rains; the hastening of decomposition and waste of organic matter, by frequent tillage processes and changes of exposure; and ploughing or other working of land when too wet, either from rain or want of drainage. Also, a cover of weeds left to rot on the surface, or any crop ploughed under, green or dry, as manure, is subject to more or less waste of its alimentary principles in the course of the ensuing decomposition. Therefore, it is nearer the facts that two years' crops or culture, for market or removal, would require one year's growth of some manuring crop to replace, and to maintain undiminished or increasing the productive power of the field. The poorest, and also the cheapest, of such manuring crops will be the natural or "volunteer" growth of weeds on lands left uncultivated, and not grazed; and the best of all will be furnished in the whole product of a broadcast-sown and entire crop of your own most fertilizing and valuable field peas.

Thus, of each manuring crop, (as of all others,) or of the fertilizing matter thus given to the land, the cultivator has contributed but five parts from the land, or its previous manuring, and the atmosphere has supplied fifteen parts. If, then, the cultivator, by still more increasing his own contributions, will give ten parts of alimentary matter to the land and crop, there will be added thereto from the atmosphere in the same three-fold proportion, or thirty parts, and the whole new productive power will be equal to forty. And if the soil is fitted by its natural constitution, or the artificial change induced by calcareous applications, to fix and retain this double supply of organic matter, the land will not only be made, but will remain of as much increased fertility, under the subsequent like course of receiving one year's product for manure for every two other crops removed. But, on the other hand, if more exhausting culture had been allowed, instead of either increased or maintained production, or if the crops take away more organic matter than nature's three-fold contributions will replace, then a downward progress must begin, and will proceed, whether slowly or quickly, to extreme poverty of the land, its profitless cultivation, and final abandonment. In this, the more usual case, the cultivator's contributions of aliment (obtained from the soil) are reduced from the former value, designated as five, first to four, and next successively to three, two, and finally less than one; and nature keeps equal pace in reducing her proportional supplies from fifteen first to twelve, and so on to nine and six, and less than three parts. So the strongest inducement is offered to enrich, rather than exhaust the soil; for whatever amount of fertility the cultivator shall bestow, or whatever abstraction from a previous rate of supply he shall make, either the gain or the loss will be tripled in the account of supplies from the atmosphere furnished or withheld by nature.

In another and more practical point of view, the loss incurred by

exhausting culture may be plainly exhibited. According to my views, (elsewhere fully stated,*) soils supposed to be properly constituted as to mineral ingredients do not demand, for the maintaining and increasing of their rate of production, more than the resting, or the growth of two years in every five, mainly to be left on the land as manure.

These are the proportions of the five-field rotation, now extensively used on the most improving parts of Virginia. And one of these two years the field is grazed, so that parts of its growth of grass are consumed, instead of all remaining on the field for manure. To meet the same demands, the more Southern planter might leave his field to be covered by its growth of weeds (or natural grasses) one year, (and also to be grazed,) and a broadcast crop of pea-vines to be ploughed under in another, for every three crops of grain and cotton. But the ready answer to this, (and I have heard it many times,) is, "What! lose two crops in every five years? I cannot afford to lose even one." It may be that the planter is so diligent and careful in collecting materials for prepared manure that he can extend a thin and poor application, and in the drills only, over nearly half his cotton field; and perhaps he persuades himself that this application will obviate the necessity for rest and manuring crops to the land.

The result will not fulfil this expectation. But even if it could, the manuring thus given directly by the labor of the planter is more costly than if he would allow time and opportunity for nature to help to manure for him; whether alone, or still better if aided by preparing for and sowing the native pea, to the production of which your climate is so eminently favorable. All the accumulations of leaves raked from the poor pine forest, with the slight additional value which may be derived from the otherwise profitless maintenance of poor cattle, will supply less of food to plants, and at greater cost, than would be furnished by an unmixed growth of peas, all left to serve as manure.

The native or Southern pea, (as it ought to be called,) of such general and extensive culture in this and other Southern States, is the most valuable for manuring crops, and also offers peculiar and great advantages as a rotation crop. The seeds (in common with other peas and beans) are more nutritious, as food for man and beast, than any of the Cereal grains. The other parts of the plant furnish the best and most palatable provender for beasts. They may be so well made in your climate, as a secondary growth under corn, that it is never allowed to be a primary crop, or to have entire possession of the land. It will grow well broadcast, and either in that way, or still better if tilled; and is of an admirable and cleansing growth. It is even better than clover as a preparing and manuring crop for wheat. In one or other of the various modes in which the pea-crop may be produced, it may be made to suit well in a rotation with any other crops. Though for a long time I had believed in some of the great advantages of the pea-crop, and had even commenced its culture as a manuring crop, and on a large scale, it was not until I afterwards saw the culture, growth, and uses in South Carolina, that I learned to esti-

* In a recent communication to the Virginia State Agricultural Society, entitled "New Views of the Theory and Laws of Rotation of Crops, and their Practical Application." These views I deem especially applicable to the agricultural condition of South Carolina, and of importance next to the main subject of the present address.

mate its value properly, and perhaps more fully than is done by any who, in this State, avail themselves so largely of some of its benefits. Since, I have made this crop a most important member of my rotation, and its culture, as a manuring crop, has now become general in my neighborhood and is rapidly extending to more distant places. If all the advantages offered by this crop were fully appreciated and availed of, the possession of this plant in your climate would be one of the greatest agricultural blessings of this and the more Southern States. For my individual share of this benefit, stinted as it is by our colder climate, I estimate it as adding, at least, one thousand bushels of wheat annually to my crop.

From this digression to a particular branch, I will now return to the general subject of the neglect of rest and manuring crops for land.

The incessant cultivator does not the less rest, and lose the use of his land, by refusing any cessation of tillage so long as he can avoid it. If such cultivators manure so abundantly that there is no general decline of production, then they do not come under my past remarks and censure. If there be any such, I will only say of their mode of maintaining fertility that it is less effectual, and more costly, than if aided, and substituted in part, by manuring crops and a judicious rotation of crops. But as to many other planters, who, whether slowly or rapidly, are certainly impoverishing their lands, they will, at some future period, be compelled to allow a greater proportion of time for the land to rest, and to greater disadvantage and less profit, than if allowing regularly either one year in three, or two in five. Suppose the land to yield cotton (or sometimes corn) continuously for thirty or even forty years, or, with much manuring, sixty. In such cases, it is true, there were as many crops obtained as the land was kept years for tillage. But after the first few years, the products were declining; and for the last five or ten years, on the general average, they scarcely paid more than the expenses of cultivation. The crops, also, suffered, during the whole time, the evils of a want of rotation, and the land of want of change of condition. At the close, the land *must* be turned out to rest, because manifestly not worth longer cropping. This compelled cessation and rest will continue for twenty, thirty, or forty years, when the land will be again cleared of its second (or perhaps its third) growth of trees; and with this and other extra labors, will be again brought under continued tillage, to be again, and much more speedily, exhausted of its smaller recovered amount of productive power. In this manner, though at long intervals, more than the full proportion of rest required by an improving system of rotation is given to the land, and enforced by its exhaustion; and the manner is such as to make the least return of benefit for the greatest expense incurred, or the respite of the land from cultivation.

My former engagements in South Carolina, and the then especial objects of my investigations and labors, served to make me better acquainted with a large portion of your territory than any other as extensive elsewhere. From that acquaintance was derived the opinion—which I have since asserted and still maintain—that no other as extensive region known to me possesses half so great advantages and resources for agricultural improvement, or more needs the employment of these means. The proper and full use of your wonderfully abundant, rich, and easily accessible marl, and the recent shells and other marine remains, offer the best principal and indispensable means for fertilization, and which

are available for half your territory. Another great resource, and almost as much neglected, is presented in your great inland swamps, now only wide-spread seed-beds of disease, pestilence, and death; and which, by drainage, with certainty and great profit, might be converted to dry fields of exuberant fertility. It is true that existing legal obstacles oppose these extensive plans for drainage; but these difficulties might be removed by wise legislation, with great benefit to the interests of all concerned, and improvements might be permitted and invited which would render these now worthless and pestilential swamps as fruitful as the celebrated borders of the Po.

The draining of the inland swamps of rich alluvial soil, together with the general application of marl to these and also to the now cultivated higher ground, would go far to remove the long prevailing unhealthiness to which Lower South Carolina is subject, and which is the only important evil which is not entirely in the power of the inhabitants to remedy. I will not presume to say how far this great evil may be lessened by these works of industry and improvement. But, when so much of your country consists of low and wet swamp, and of partially wet higher lands, and all easy to be drained, it does not seem over-sanguine to suppose that, with such drainage and the general extension of the also sanitary operations of marling and liming, the country would be as much improved in healthiness as in fertility. Such change to greater healthiness has been most marked in my own country, in the extensively marled neighborhoods, even where there have been no considerable draining operations executed or required. This improvement of health is ascribed, by all who have experienced the benefical change, mainly to the sanitary influences of the now calcareous soil.

Your extensive and rich river swamp-lands offer another great object for improvement and increase of agricultural profit and wealth. Even the sandy "pine barrens," now unfit for tillage or for any useful production, other than the magnificent forests which cover them, if made calcareous and put under Bermuda grass, (the curse of tillage lands so infested,) would be made as valuable land for pasturage as the equally barren chalk downs of England.

Your high lands are mostly level, or of gently undulating surface, and easy to till, and the soils generally well suited to your great staple crops—corn and cotton. The navigable rivers which pervade Lower South Carolina, in their number and character, present a remarkable geographical feature, as singular as it is valuable. The main canals required for extensive drainage of the inland swamps would be so many additions to the existing navigable highways. So low are the intervening swamp-lands, that nearly all the deep navigable rivers might be connected by canals of level or nearly level water; and in that respect, Lower South Carolina might possess the peculiar facilities of Holland for extensive inland navigation. These connecting canals, by diverting some of the superfluous supply of fresh water of some rivers to others where it is deficient, might, perhaps, serve to extend greatly the present area of tide-covered land capable of being flooded for rice culture. If such canals, mainly for drainage, but serving, also, for navigation, were made to connect the Edisto with the Ashley, the Cooper, and the Santee, there would be another incidental advantage as remarkable as it would be valuable. The excavation of the canals through the great

swamps, (and certainly between those stretching from the Ashley nearly to the Santee,) would generally penetrate into marl of the richest quality, lying a few feet below the surface of the swamps. If duly appreciated, this rich calcareous earth, to be used as manure, would go far to reimburse the cost of the excavation; and, if used for lime burning, would furnish good lime, and at one-third of the price of that for which South Carolina has paid and continues to pay millions of dollars to the lime burners of New England. This voluntary tribute, at least, which is one of so many unnecessarily paid by the South to the North, might be ended to the immediate and great profit of both the sellers and the buyers of the substituted lime, made of the abundant, cheap, and excellent native material. The buying of Northern lime by South Carolina and Georgia is as unprofitable and as absurd a procedure as the usage of importing Northern hay. But of these, and of many similar things, we of the South have no right to blame any but ourselves. All the commodities which we import from the Northern States, and which might be more cheaply provided at home, serve, indeed, to make up an enormous amount of annual tribute. But this part of our general burden is fairly and properly levied by Northern enterprise and industry upon Southern listlessness and indolence. Very different, however, is the case as to the far greater proportion of the general amount of tribute paid by Southern to Northern interests, from which we have no defence, because government induces and enforces the payment by the legislative machinery of protecting duties and the indirect bounty system. But I am straying from my designed subject—the improvement of Southern agriculture to its governmental and political oppression. Putting aside all speculative and untried subjects and modes of improvement, and counting upon nothing more than the proper use of your calcareous manures and judicious tillage, and the early results of both, and supposing that your country should be so benefited only in the same degree as has been the small portion of mine, already marled or limed, the most moderate estimate of the agricultural values so to be created would now appear to you so greatly exaggerated as to be altogether incredible. But however much I would desire to avoid the position of a discredited witness, I will not be restrained by that fear from stating general results, which are notorious in Virginia, and to sustain the truth of which thousands of particular facts could be adduced. These results, susceptible of clear proof, or exhibited by official documents, are, that thousands of farms have been doubled or tripled, and some quadrupled in production, and the general wealth of their proprietors as much increased. The assessed values of marled lands have been increased by many millions of dollars, while those of similar lands, not so treated, have continued to decline as all did before; and the treasury of the commonwealth is already benefited by many thousands of dollars received annually from the counties containing these improved lands, and derived from them; while the revenue from lands of the neighboring, and before similar counties, is still decreasing.

So far I have spoken as to benefits which have already occurred, and which are unquestionable, and which have been derived from resources and facilities for improvement not to be compared, in amount and value, with those of South Carolina. I have elsewhere estimated the possible future and full fruition of this system of improvement, in Lower Virginia only, at $500,000,000 of increased pecuniary value of capital thereby to be created. The full employment of your much greater resources of this kind, and over as wide a surface, would not be worth less. Then your other great resources, which have been named, but not estimated, would be so much more in addition.

But agricultural production and pecuniary values are not the only or the greatest gains; and though others rest upon opinion only, and are incapable of being measured, their existence and their value are not the less acknowledged by all judicious observers in our country, most improved in agricultural production by calcareous manures. The improvement of health has been mentioned; the improvement of economical and social habits, morals, and refinement, and better education for the growing generation, have been sure consequences of greatly increased and enduring agricultural profits; and these moral results will hereafter be increased in full proportion to the physical and industrial producing causes. Population, though a late effect, is already sensibly advanced by these agricultural causes. The strength—physical, intellectual, and moral—as well as the wealth and revenue of the commonwealth of Virginia, will soon derive new and great increase from the growing improvement of that one and smallest of the great divisions of her territory, which was the poorest by natural constitution, still more the poorest by long exhausting tillage, its best population gone, or going away, and the remaining portion sinking into apathy and degradation, and having no hope left, except that which was almost universally entertained, of fleeing from the ruined country, and renewing the like work of destruction on the fertile lands of the Far West. Terms of reproach and contempt (once not undeserved) have been so long and so freely bestowed on this tide-water region of Virginia, and had become so fixed by use, that it will be long before they will cease to be deemed applicable, or before many persons, who now know this region only by the memory of former report, will learn that it is not altogether land of galled and gullied slopes, or broomsedge-covered fields, over whose impoverished and dwindling population indolence and malarious disease contend for mastery.

From these matters, referred to for proof or illustration, I return to my main subject, more immediately connected with, and more likely to be interesting to, my auditors.

There is not one of the industrial classes of mankind more estimable for private worth and social virtue than the landholders and cultivators of the Southern States. With them, unbounded hospitality is so universal that it is not a distinguishing virtue; and, in truth, this virtue has been carried to such excess as to become of vicious tendency. Honorable, high-minded, kindly in feeling and action, both to neighbors and to strangers, ready to sacrifice self-interest for the public weal—such are ordinary qualities and characteristics of Southern planters. Many of the most intelligent men of this generally intelligent class are ready enough to accept, and to apply to themselves and their fellow-planters the name of "land-killers." But, while thus admitting, or even assuming, this term of jocose reproach, they have not deemed as censurable or injurious their conduct on which this reproach was predicated. They have regarded their "land-killing" policy and practice merely as affecting their own personal and individual interests; and, if judged by their continued action, they must believe that their interests are thereby best promoted.

Their error in regard to their own interests, great as it may be, is incomparably less than the mistake as to other and general interests not being thus affected. As I have already admitted, individuals may acquire wealth by this system of impoverishing culture, though the amount of accumulation is still much abated by the attendant waste of fertility. But with the impoverishment of its soil, a country, a people, must necessarily and equally be impoverished. Individual planters may desert the fields they have exhausted in South Carolina, and find new and fertile lands to exhaust in Alabama. And when the like work of waste and desolation is completed in Alabama, the spoilers (whether with or without retaining a portion of the spoils) may still proceed to Texas or to California. But South Carolina and Alabama must, nevertheless, suffer and pay the full penalty of all the impoverishment so produced. The people who remain to constitute these States respectively as communities, are not spared one tittle of the enormous evils produced—not only those of their own destructive labors, but of all the like and previous labors of their fellow-citizens and predecessors who had fled from the ruin which they had helped to produce. And these evils to the community and to posterity, greater than could be effected by the most powerful and malignant foreign enemies of any country, are the regular and deliberate work of benevolent and intelligent men, of worthy citizens, and true lovers of their country!

I will not pursue this uninviting theme to its end—that lowest depression which surely awaits every country and people subjected to the effects of the "land-killing" policy. The actual extent of progress toward that end throughout the Southern States ought to be sufficiently appalling to produce a thorough change of procedure and reformation of the agricultural system of the South.

In addition to all increase of the other benefits of agricultural improvement which have been cited—pecuniary, social, intellectual, and moral—there would be an equal increase of political power, both at home and abroad, which, at this and the near approaching time, would be especially important to the well-being and the defence of the Southern States, and the preservation of their yet remaining rights and always vital interests. If Virginia, South Carolina, and the other older slaveholding States had never been reduced in productiveness, but, on the contrary, had been improved according to their capacity, they would have retained nearly all the population that they have lost by emigration; and that retained population, with its increase, would have given them more than a doubled number of representatives in the Congress of the United States. This greater strength would have afforded abundant legislative safeguards against the plunderings and oppressions of tariffs, to protect Northern interests—compromises, so called, to swell Northern power; pension and boundary laws, for the same purposes; and all such acts to the injury of the South, effected by the great legislative strength of the now more powerful, and, to us, the hostile and predatory States of the Confederacy. Even after Virginia, with more than Esau-like fatuity, had sacrificed her magnificent Northwestern Territory, which now constitutes five great and fertile States, and a surplus, to make, by legislative fraud, a large part of a sixth State, and all of which are now among the most hostile to the rights of the people of the South—if Virginia had merely retained and improved the fertility of her present reduced surface, her people would not have removed. Their descendants would now be south of the Ohio, ready and able to maintain the rights of the Southern States, instead of a large proportion, as now, serving to swell the numbers and give efficient power to our most malignant enemies. The loss of both political and military strength to Virginia and South Carolina is not less than all other losses, the certain consequences of the impoverishment of their soil.*

If it were possible that, for all Lower South Carolina, the system of improvement could be directed by one mind and will, as much as the operations of any one great individual estate, the most magnificent results could be obtained with great and certain profit, and in a few years. Without any additional labor or capital more than now possessed for beginning the improvements, and with only the subsequent increase of means, which would be supplied by the clear profits of the improvements as they became productive, most of the lands accessible to marl or lime could be covered by these manures in ten years. In twenty years from this day, all such lands could be thus improved, and by that time might yield doubled or tripled general products, and would exhibit a proportionally greater increase of value as capital. The new clear profits of this one great improvement would be enough in amount to effect all the practicable drainage of inland and river swamps in twenty years more; or, in that additional time, the increased revenue of the State treasury, from these new sources only, would suffice to construct all the great works of drainage, which would be beyond the means of individual proprietors.

In all opinions expressed as to the values and effects of the agricultural improvements proposed for South Carolina, my data are the experienced and unquestionable results of like labors in Virginia. The legitimate deduction, and the only one for untried operations, is, that like causes will produce like effects in both these different localities. I cannot conceive any reason, founded on existing differences of climate, soil, or subjects of culture, that can make calcareous manures less efficient or less profitable with you than with us. Nevertheless, I have learned, from mere rumor, that, in the small extension of their use, by new operators, which occurred here, there was no general and important benefit obtained. And such, I must infer, was the conclusion reached by nearly all the makers and observers of these trials, from the irresistible though negative evidence (which only is before me) that nothing considerable of such improvements, or of public notoriety, has been effected in latter years. In the absence of all particular information of the actual trials, their results, and the accompanying circumstances, of course I cannot pretend or be expected to explain the causes of disappointment which must

*A condition made by the government of Virginia, in the act of cession to the United States of all her Northwestern Territory, was, that this territory should afterwards be divided into not more than five new States. Five have already been carved out of this great domain: Ohio, Indiana, Illinois, Michigan, and Wisconsin, and a space of 22,336 square miles remains, in the new Territory of Minnesota, which will hereafter constitute so much of another State, in violation of the act of cession by Virginia, and of the faith of the present Federal Government; and in which space, with all the Northwestern Territory, slavery was interdicted by the ordinance of 1787 of the Confederation. This space of 22,336 square miles, which ought to have been included in the five anti-slavery States already formed, but which will go to constitute a sixth, is nearly as large as South Carolina, and larger, by nearly 1,000 square miles, than the united surfaces of New Hampshire, Massachusetts, and Connecticut.

on the general result, as it seems that marling has languished, if not ceased in general, after a few faint efforts.* But I infer that the main and usual cause of supposed failure or of inconsiderable benefit, has been the same prevailing bad practice, before denounced, of incessant or at least much too frequent tillage, which does not permit the fields to receive and retain organic matter from their own growths especially. This cause had operated on nearly all the trials of marl made previous to my service in South Carolina. Of all such cases of alleged failure that I was enabled to see and investigate the circumstances, the causes were such as I now suppose of the still later failures. These cases of failure and of disappointment, and the known causes, were brought fully to view in my report of the agricultural survey; and from the more extended remarks, I will quote a short passage, to show my then opinion of the facts and the causes of previous failures, and my earnest warning against the general course pursued. After reciting the general facts of failure of the previous trials of marling, I proceeded in these words: "Can any opponents of marling desire more full admissions than these? And yet they all serve to illustrate what I have continually striven to impress, *that, without vegetable matter to combine with, calcareous manures will be of little value.* But, on the other hand, I have heard of no trial of marl on land in proper condition—that is, recently and sufficiently rested, and thereby provided with vegetable matter—in which the effect has not been very great *on the first crop.* And three or four of such results, only, would be enough to explain the cause, (of failure in all other cases,) and to prevent all inferences unfavorable to marling, if from a hundred failures of early efforts under reverse circumstances."

Then followed particular statements of two different experiments, carefully made that year, (and the circumstances noted at my request,) of marling on new land, and therefore not exhausted of its vegetable matter, and in which the products (which were of cotton) were nearly doubled in the first year of the application.

Here, then, even in the few lines quoted from the much more full precepts to the same purport, there is full evidence of my having stated, in advance of all later trials, the sure cause of failure; and, in the warning against that cause, I may claim to have predicted all later failures of like occurrence. And if there had been thousands of failures, preceded and accompanied by very frequent and exhausting tillage, all of them would but the more strongly confirm my long-entertained and often-expressed opinions and instructions as to the action of calcareous manures; and all such cases would not detract a little from the alleged available values. When urging the use of lime, I have never omitted to state that it gave no fertility of itself or by direct action, and that vegetable matter, in sufficient quantity and in conjunction, was essential to the beneficial operation of calcareous manures. The required organic matter may be supplied mainly in the growth of the land to be improved. But it *must* be supplied in some form, and in sufficient quantity; and, also, should be, in part, present in advance of the use of calcareous manures, to secure their best early effects.

* There is, however, one important case known to me, of at least partial exceptions to the general rule of failure of marling in South Carolina, in the very extensive and also profitable labors and improvements of Governor Hammond, on his estate bordering on the Savannah.

Planters of South Carolina: I have offered to you in plain and unvarnished language, and, possibly, it may be in ungracious and distasteful terms, the last advice and admonition that I can expect to utter to you or to any similar audience. My burden of years, and infirmities much greater than even suited to my age, admonish me that my labors must soon close. I would deem it a reward of more value to me than will be the short remainder of my life, if you and your fellow-laborers, even at this late time, (in reference to myself,) would heed my words and fully profit by them. It is but little that a private individual can do to warrant to a great commonwealth or community the beneficial results predicated upon stated premises and conditions; but, so perfect is my confidence in the general results I have predicted, that I would willingly hazard upon the issue all that I have in property, reputation, and even life itself. For illustration, and in mercantile or business language: If I possessed hundreds of millions of dollars, to that full amount, for a premium of 10 per cent., I would insure as much clear profit to South Carolina, to be gained by conforming to my directions, for saving and increasing the fertility of her soil. As, however, it is impossible for me to offer any such guarantee, and for me either to incur risk of loss or to derive pecuniary gain from the results, I can only offer my earnest verbal assurances of your available gain, as great and as sure to be obtained by your pursuing a proper course of improvement as will be the growing loss and eventual ruin of your country and humiliation of its people if the long existing system of exhausting culture is not abandoned. It is not merely my feeble voice and my questionable personal testimony, but also thousands of unquestionable facts, and the sure experience and realized profits of thousands of farmers, which offer to your acceptance the highest agricultural prosperity in exchange for present decline and approaching exhaustion of the remaining fertility of your land. Choose, and choose quickly! And remember, as my last warning, that your decision will be between your purchasing, at equal rates of price, either wealth and general prosperity, of value exceeding all present power of computation, or ruin, destitution, and the lowest degradation to which the country of a free and noble-minded people can possibly be subjected.

VII.

PRIZE ESSAY.

THE AGRICULTURAL VALUE OF PHOSPHATE OF LIME.

BY JOSEPH HARRIS, ROCHESTER, NEW YORK.

[From the Transactions of the New York State Agricultural Society.]

Phosphorus, an element never found in nature in an uncombined state, but usually manufactured from bones, is semi-transparent of nearly the consistence of wax; internally of a reddish or flesh color, but coated with a white film, arising from its partial decomposition. It so strongly attracts oxygen from the air as to become slowly decomposed at a very low temperature; and hence it is usually kept under water. When ignited, it gives off dense white fumes. This is phosphoric acid, and it is in form united with lime, iron, lead, copper, and other bases with which it is usually found. It enters into the composition of all plants and animals, and is found in all soils not absolutely sterile; the inorganic parts of the bones of all animals are composed principally of this acid united with lime, called phosphate of lime; and wheat, Indian corn, Timothy, and other Cereal grains contain from forty to fifty per cent. in their ashes. It will easily be seen that it is a substance of vast importance in an agricultural point of view; and when it is understood that no plant will grow on a soil destitute of it; that no soil, however fertile, contains but a comparatively small amount, and that in the bones and flesh of animals, and in the grains of wheat, Indian corn, and Timothy, it is annually exported from the soil in large quantities never to return, its real value and importance will be clearly perceived. The whole of the phosphate of lime which exists in the bones of man and animals must have been originally in the soil, and, being taken up by plants, was by them conveyed into the animal organism. Under the system of agriculture commonly adopted, phosphate of lime is continually being abstracted from the soil, and, unless an equivalent portion to that which is taken is liberated from the soil by annual decomposition, or is returned by the purchase of manure containing it, a gradual diminution of fertility must follow. Those engaged in the pursuit of agriculture cannot but derive some benefit from a knowledge of the chemical properties and agricultural uses of phosphate of lime.

As is usually the case, practice got the start of science in the use of bones as a manure, and, without knowing why, the farmer found them of great value to his soil. It is said they were first used on the natural grass dairy meadows of Cheshire, England, where, from the large amount

annually taken from the soil in cheese and the bones and flesh of animals, the soil had become exhausted of phosphoric acid; their effect was surprisingly beneficial. They were used with profit at a cost of from $20 to $60 per acre. Few turnips were then grown; but the value of this crop being acknowledged, great efforts were made to extend its culture, the land owners in many cases compelling the tenant farmer to grow a certain number of acres. Bones were found to be the best manure that could be applied to this crop, their beneficial effect lasting for many years. I have seen a crop of turnips three times as large on a portion of a field where bones had been applied 12 years previous as on another part of the same field where none had been used, though treated similarly in every other respect. It is often said that soil dressed with bones never forgot it when turnips were sown; but this opinion is formed from the lasting effects of roughly-broken bones, as first used at the rate of one hundred bushels per acre; it was soon found that if they were finely ground, a much smaller quantity would suffice, though the benefit would not be so lasting. The reason of this is found in the fact, that plants cannot take anything from the soil but in a state of solution. Now, bones in their natural state are insoluble in water, and have first to decompose, and be incorporated with the soil, before they can nourish plants; but, if finely ground, they are easily intimately mixed with the soil, where, being attacked by its acids, they readily decompose, and are more speedily rendered in a fit state for assimilation by the plants. Twenty bushels of dust will in this way be more beneficial, apparently, than 100 bushels of merely crushed bones.

The reason why boiled bones are supposed to be better than unboiled is the same; they have absorbed considerable water, and are, in consequence, more speedily decomposed in the soil, and taken up by the plants. Common experience proved the value of bones as a manure, but science had to explain the cause of their beneficial action. This science not only did, but, having done so, discovered a plan to decompose these bones before they were applied to the soil, thus concentrating the effect into one, which would have extended over twenty years, or producing a better effect for one year, with a twentieth part of the bones.

There are several phosphoric acid and lime compounds known to chemists; but the only two that concern us at present are the neutral phosphate of lime, often called the bone earth phosphate, because it forms the chief earthly ingredient of bones, and the bi-phosphate, or, as it is called in commerce, super-phosphate, or acid phosphate of lime.

Pure neutral phosphate of lime contains, in 100 pounds—

Phosphoric acid	48¼
Lime	51¾
	100

The bi-phosphate, or acid phosphate of lime, is composed of—

Phosphoric acid	71¼
Lime	28¾
	100

The neutral phosphate of lime is all but insoluble in water; but the bi-phosphate is readily soluble. Now, what science has discovered is the method of cheaply converting the insoluble phosphate into the soluble bi-phosphate; and, simple as it may seem, this discovery has benefited agriculture more than all others combined.

Phosphate of lime consists of two atoms of phosphoric acid and two of lime; and bi-phosphate has three atoms of phosphoric acid combined with one of lime. Now, to convert the one into the other, we have either to add phosphoric acid, or take away lime; the latter is the only way practical in a manufactory, though the former can be done in the laboratory. Phosphoric being what chemists term a weak acid, sulphuric acid will take away its lime, setting the phosphoric acid free. If but a small quantity of acid is applied, it will unite with a portion of the lime, forming sulphate of lime, and setting free its phosphoric acid, which will unite with the remaining phosphate of lime, forming the required soluble bi-phosphate. If sufficient acid is not added to convert the whole into bi-phosphate, a portion of the neutral phosphate will remain untouched. If more than is required to convert the whole into bi phosphate is applied, a portion of the phosphoric acid will be liberated, and remain uncombined, and by adding sufficient acid the whole may be set free, and the result of the mixture would be sulphate of lime and free phosphoric acid.

To exemplify this, let us suppose 100 pounds of the pure phosphate of lime taken; this would contain 48½ pounds phosphoric acid. Now, then, if 71½ of phosphoric acid make 100 of bi-phosphate of lime, 48½ will make 68. Therefore, the 100 pounds of pure phosphate of lime can be converted into 68 pounds of bi-phosphate of lime, and this is accomplished by abstracting 32 pounds of lime. The quantity of pure sulphuric acid required to effect this is easily calculated.

Sulphate of lime, or plaster, is composed of—

Lime	41¼
Sulphate acid	58¾
	100

So that 32 pounds of lime would require 45 pounds sulphuric acid to convert it into sulphate of lime. Therefore, to convert 100 pounds of neutral phosphate of lime into bi-phosphate would require 45 pounds of pure sulphuric acid. If we take away the 32 pounds of lime, we should have, as the result, 68 pounds bi-phosphate, and 77 pounds of sulphate of lime.

The composition of bones varies considerably, according to the age and kind of animals—less phosphate of lime, and more gelatine, being found in an older animal; but, on an average, 100 parts of raw bones may be estimated as containing—

Water	11 lbs
Phosphate of lime	45 "
Fat and gelatine	38 "
Carbonate of lime	4 "
Alkaline chlorides and sulphates	2 "
	100

It will be seen that, besides the phosphate of lime, bones contain thirty-eight per cent. of organic matter, so that, in judging of the results of experiments with fresh bones, it is necessary to take this into account, and not attribute all the benefit to the phosphate. To avoid any discrepancies of this kind, we will present the reader with a few results selected from experiments made at Rothamsted farm, Herts, England, by Mr. Lawes and Dr. Gilbert, in which calcined bones were used containing about ninety per cent. of phosphate of lime.

TABLE I.—TURNIP EXPERIMENTS.

Description of manure.	Bulk, per acre.				Leaf, per acre.			
	Tons.	*cwt*	*qrs.*	*lbs.*	*Tons.*	*cwt.*	*qrs.*	*lbs.*
Unmanured	0	13	2	24	0	14	1	4
12 cwt. sulphate lime, the refuse of tartaric acid manufacture	5	13	2	24	2	19	3	12
400 pounds calcined bone dust	10	4	0	6	3	12	3	12
400 pounds calcined bone dust and muriatic acid, equivalent to 268 pounds sulphuric acid (sp. gr. 1.71)	9	9	1	12	4	6	3	12
400 pounds calcined bone dust and 134 pounds sulphuric acid (sp gr. 17)	12	18	2	6	3	16	3	2
400 pounds calcined bone dust and 268 pounds sulphuric acid	13	11	0	0	4	14	1	4
400 pounds calcined bone dust, 268 pounds sulphuric acid, and 134 pounds common salt	14	10	0	4	6	11	0	10
400 pounds calcined bone dust and 400 pounds sulphuric acid	13	2	2	24	4	5	0	16

The most striking feature in the above selection is the great difference between the unmanured and the manured lots. It is seen that sulphate of lime or plaster increases the amount five tons per acre, though yielding a crop which, in common practice, would not be considered remunerative. But whenever phosphate of lime is used, the effect is greatly beneficial. The difference between the decomposed and undecomposed is not so striking as I should anticipate; but the fact of the bones having been burnt and in a state of minute subdivision, making them more readily soluble, would render them much more efficacious than bone-dust as generally applied. An increase of sulphuric acid from 134 pounds to 268 pounds, with 400 pounds of bones in each case, gives an increase of 12½ cwt. of bulk and 17½ cwt. of leaf; but an increase from 268 to 400 pounds of sulphuric acid, with the same amount of bones in either case, is attended with a diminution of 8½ cwt. of bulk, and 11 cwt. of leaf. This will indicate the amount of acid best to use, and shows, not only the necessity of having the whole phosphate decomposed, but that it is injurious to have phosphoric acid free by using an excess of sulphuric acid; but it is the former, rather than the latter, evil that farmers need be on their guard against in purchasing super-phosphate of lime. Mr. Lawes's experiments on turnips were commenced in 1843, and have been continued to the present time, during which many interesting and important facts relative to the turnip, and the position it occupies in English agriculture, have been brought to light, which it would be inconsistent with the ob-

ject of the present essay to discuss; but it may be mentioned, as amongst the most important conclusions, that, if in ordinary agriculture the turnip is supplied with available phosphate of lime, no other substance need be employed of a mineral or alkaline nature; that ammonia is not essential; but that carbon, in conjunction with phosphate, will give an increased crop over the phosphate alone.

The soil on which these experiments were made is a somewhat heavy loam, unsuitable for turnips, which delight in a light, sandy loam; so that the above weights per acre may be considered as much under the amount usually obtained on soils well adapted to their growth.

The following result was obtained by Mr. Pusey in the regular course of tillage; the bulbs *only* are given:

	Tons.	Cwt.
No manure, per acre	1	00
Five and a quarter bushels super-phosphate of lime, per acre..	16	12$\frac{3}{4}$

Great as this increase may appear, yet I think it may be taken as a correct estimate of the benefit usually derived from the application of super-phosphate of lime to the turnip crop. But it is as a manure for wheat that we should naturally look for the greatest benefit from super-phosphate, inasmuch as this grain contains such a large amount of phosphoric acid. Mr. Lawes's experiments on wheat, on a soil similar to the one on which the turnip-experiments were made, and which had been agriculturally exhausted by the growth and removal of four grain-crops, without any manure previous to the commencement of the experiments, are very conclusive on this point. That the first year gave the following result, which may be taken as an indication of the results of after-experiments: An acre, unmanured, gave 16$\frac{3}{4}$ bushels, and 1,120 pounds straw; with 700 pounds super-phosphate of lime, manufactured from calcined bone dust, 16$\frac{1}{4}$ bushels and 1,116 pounds of straw.

The following experiments, in the same year, (1844,) and on the same field, prove that the failure of the super-phosphate was not owing to a deficiency of other mineral manures or ash constituents:

TABLE II.—WHEAT EXPERIMENTS.

Description of manures.	Dressed grain per acre.		Total grain per acre.	Straw per acre.
	Bush.	*pks.*	*Pounds.*	*Pounds.*
1. Unmanured	16	0	923	1,120
2. 14 tons farm yard dung..........................	22	0	1,276	1,476
3. Ashes of 14 tons farm yard dung	16	0	880	1,104
4. Minimum produce of nine plots, with artificial mineral manures, viz., 350 pounds super-phosphate of lime and 364 pounds phosphate of potash	16	1	980	1,160
5. Maximum produce of nine plots, with artificial mineral manures, viz., 350 pounds super-phosphate of lime, 168 pounds phosphate of magnesia, 150 pounds phosphate of potash, and 112 pounds silicate of potash........................	17	3$\frac{1}{4}$	1,096	1,240
6. Mean of nine plots, with artificial mineral manures..............................	16	3$\frac{3}{4}$	4,009	1,155
7. Mean of three plots, with artificial mineral manures and 65 pounds sulphate of ammonia	21	0	1,275	1,423

This table affords pretty clear indications of the requirements of the wheat crop, mineral manures or ash constituents producing no good results, while the addition of sixty-five pounds sulphate of ammonia gives an increase of five bushels—nearly equal to that obtained by fourteen tons barn-yard manure. These experiments have been continued to the present time, and are now being carried on, with unabated zeal, at an annual cost of fifteen thousand dollars. The scrupulous accuracy and scientific abilities of the experimenters render their results worthy of the fullest confidence.

The following table exhibits some selected results, up to the year 1850, on the same plot of land each year:

TABLE III.—WHEAT EXPERIMENTS.

Harvest.	Description of manure.	Actual produce, per acre. Dressed grain, in bushels and pecks. Unmanured.	Dressed grain, in bushels and pecks. Manured.	Total grain, in pounds. Unmanured.	Total grain, in pounds. Manured.	Straw, in pounds. Unmanured.	Straw, in pounds. Manured.
		Bush. pks.	*Bush. pks.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
1844....	Super-phosphate of lime 560 pounds, and silicate of potash 220 pounds.....	16 0	16 3¾	923	1,008	1,120	1,112
1845....	Sulphate of ammonia 165 pounds, and muriate of ammonia 168 pounds, top-dressed at four times..............	23 0¼	31 3¼	1,444	1,980	2,712	4,266
1846....	Sulphate of ammonia 224 pounds..................	17 3¾	27 1¼	*1,207	1,850	1,513	1,455
1847....	Sulphate of ammonia 150 pounds, and muriate of ammonia 150 pounds......	16 3¼	25 3	1,123	1,702	1,902	2,874
1848....	Sulphate of ammonia 150 pounds, and muriate of ammonia 150 pounds......	14 3	19 1	952	1,334	1,712	2,926
1849....	Sulphate of ammonia 200 pounds, and muriate of ammonia 200 pounds......	19 1	32 2	1,227	2,141	1,614	2,964
1850....	Sulphate of ammonia 200 pounds, and muriate of ammonia 200 pounds......	15 3¼	26 3¼	1,000	4,721	1,719	1,949
	Total in seven years..................	123 0¾	108 2	7,876	11,736	12,292	17,546
	Mean per annum..................	17 2¾	25 3¼	1,125	1,670	1,756	2,507

It is seen that in 1844, with mineral manures and no ammonia, the increase of grain over the unmanured plot is less than one bushel, and no increase of straw; while for the next five consecutive years, when ammonia was supplied, and no minerals, there is an average increase of ten bushels per acre grain, and about half as much again straw. From these experiments we may safely draw the following conclusions: That the application of mineral manures alone to a soil exhausted by the growth of Cereals, is attended with no benefit to the wheat crop; that it does not enable the plant to obtain its nitrogen or carbon from the atmosphere, but that, in this exhausted soil, the application of ammonia alone produced good crops, enabling the plant to assimilate the minerals of the soil, and to obtain carbon from the atmosphere. That we could not long obtain such an increase by the sole application of ammonia, is pretty certain, for, however large an amount of minerals there may be in a soil, by annually growing large crops of wheat, and removing the entire produce, they must ultimately be exhausted; indeed, it is seen on the above table that on the fourth year (1848) of their supply, ammoniacal salts do not give their accustomed increase—thus showing that there was a deficiency of minerals.

A plot in the same field, manured with the same quantity of ammonia, and a good supply of super-phosphate of lime, potash, soda, and sulphate of magnesia, gave a yield of 26½ bushels, and 3,056 lbs. of straw.

The next year, however, there was as large a yield without as with minerals, the same amount of ammonia being used in each case; and in 1850, the increase of minerals and ammonia over ammonia alone was but two bushels. From this we conclude that the deficient yield in 1848 was not from exhaustion of minerals, in the strict meaning of the term, but from a deficient disintegration; in other words, that the minerals were present, but not in a state for assimilation by the plant, even with a sufficiency of ammonia in the soil.

The following selected results, from the same experiments, on the same plot of land each year, are interesting, and conform to the opinions already expressed. They show how intimately any increase of wheat is connected with a supply of ammonia in the soil, and also that the ammoniacal salts are all taken up the first year:

TABLE IV.—WHEAT EXPERIMENTS.

Harvest.	Description of manures.	Actual produce, per acre. Dressed grain. Unmanured.		Dressed grain. Manured.		Straw. Unmanured.	Straw. Manured.
		Bush.	pks.	Bush.	pks.	Pounds.	Pounds.
1844....	Sulphate of lime 560 pounds, and silicate of potash 220 pounds	16	0	16	3¾	1,120	1,112
1845....	Sulphate of ammonia 168 pounds, and muriate of ammonia 168 pounds	23	0¾	31	3¼	2,712	4,266
1846....	Top dressed at four times; no manure applied	17	3¾	17	2¼	1,513	1,455
1847....	Sulphate of ammonia 150 pounds, muriate of ammonia 150 pounds, pearl ash 300 pounds, soda ash 200 pounds, and sulphate of magnesia 100 pounds	16	3½	25	2¼	1,972	2,874
1848....	Calcined bone dust 200 pounds, sulphuric acid 150 pounds, and 150 pounds each sulphate and muriate of ammonia	14	3	25	0¼	1,712	2,926
1849....	Sulphate of ammonia 200 pounds, and muriate of ammonia 200 pounds	19	1	32	2¾	1,614	2,964
1850....	Pearl ash 300 pounds, soda ash 200 pounds, sulphate of magnesia 100 pounds, bone ash 200 pounds, and sulphuric acid 150 pounds	15	3¼	17	3¾	1,719	1,949
	Total	123	3¼	167	3	12,292	17,546
	Mean	17	2¾	23	3¾	1,756	2,506

Can any one, after carefully studying the above results, avoid concluding that ammonia is the one thing needful for the growth of wheat, in agricultural quantity? Whenever it is applied with or without minerals, there is an increase of wheat and straw; when it is not applied, though every kind of mineral be sown, there is scarcely any increase over the unmanured acre.

The following table gives the results of the application of 14 tons of barn-yard manure, each year, on the same acre of land, as compared with that of the continuously-unmanured acre:

TABLE V.—WHEAT EXPERIMENTS.

Harvest.	Dressed grain, in bushels and pecks. Unmanured.		Dressed grain, in bushels and pecks. Manured.		Total weight of grain in pounds. Unmanured.	Total weight of grain in pounds. Manured.	Straw, per acre, in pounds. Unmanured.	Straw, per acre, in pounds. Manured.
	Bush.	pks.	Bush.	pks.	Pounds.	Pounds.	Pounds.	Pounds.
1844......	16	0	22	0	923	1,267	1,120	1,476
1845......	23	0¾	32	0½	1,441	1,967	2,712	3,915
1846......	17	3¾	27	0¾	1,287	1,826	1,513	2,454
1847......	16	3½	29	3¾	1,123	1,981	1,902	3,628
1848......	14	3	25	2¾	952	1,705	1,712	3,041
1849......	19	1	30	3	1,227	2,053	1,614	3,005
1850......	15	3¼	28	2¼	1,000	1,861	1,719	3,245
Total...	123	3¾	196	1¼	7,873	12,660	12,292	20,764
Mean...	17	2¾	28	0¼	1,125	1,809	1,756	2,960

This amount of farm-yard manure contains a sufficient supply of minerals for a very large crop of wheat, besides a large amount of carbon and some nitrogen; yet the average increase, taking the last six years, is within one bushel per acre of that obtained by the use of ammoniacal salts alone, and may be considered as dependent on the ammonia supplied in the manure, irrespective of the other constituents. The 98 tons of farm-yard manure supplied in 7 years give a total of 73 bushels dressed grain and 8,472 pounds straw, or three fourths of a bushel of grain and 86 pounds of straw for every ton of manure supplied. I should like to give several more interesting results illustrating this subject, but must forbear, as I have already overtaxed the patience of the reader with "these pesty tables." I have the greatest confidence in the accuracy of these experiments, and in the applicability of them to British agriculture, where farmers never dream of obtaining profitable crops without manure, and where, from the system of culture practised, minerals relatively to other constituents will accumulate in the soil; but, in America, where farmers have in many instances exported all the hay, wheat, and corn for many years, with a produce not exceeding the yields of the unmanured acre in Mr. Lawes's experiments, it is but reasonable to suppose that many of the mineral elements, especially phosphoric acid, are deficient. In cases, too, where the crops have been increased by

means of ploughing in clover and other manures grown on the soil, thus supplying nitrogen without any minerals, the soil would so much the sooner be exhausted of the mineral constituents of the plants exported, as the plants usually grown here contain relatively to potash and soda, &c., most phosporic acid. Potatoes and Timothy are exceptions; and, where these crops have been cultivated to a great extent, it is possible the soil may be deficient of potash rather than phosphoric acid; and in rearing or even fattening cattle, much more phosphoric acid than potash and soda is exported, and the soil originally, in most cases, as proved by analysis, contains less phosphoric acid than any other mineral ingredient; it may be safely concluded that, if the soil is deficient of any mineral ingredient, it is phosphoric acid; and, as plants will not grow without it, and there has been none supplied, it would be impossible to exhaust the soil of potash and soda, &c.

Admitting, then, that the soil is deficient in phosphate of lime, what would be the effect of an application of this substance? We have seen that, where there was an excess of minerals and no ammonia in the soil, the average yield of wheat was 17 bushels per acre; ammonia sufficient to produce this quantity being derived from the atmosphere, and supplied to the plants by rain. The variation of from 15 to 23 bushels on the no-manure plot, during the several years, was caused by a less or greater quantity of rain falling during the growing season. The effect, therefore, of the application of phosphate of lime to a soil exhausted of it by the growth of Cereals, would be to raise the crop to that yield which would be obtained from a soil having sufficient minerals but no nitrogen in the soil. This would vary, according to the amount of rain, from 15 to 23 bushels, provided the soil be well cultivated and clean; and if this be considered a remunerative yield, a soil adapted by texture to the growth of wheat may, by supplying annually fifty pounds of phosphate of lime, and a few bushels of wood ashes per acre, be made to produce this amount annually forever, provided the soil be well cultivated.

But we conceive that such a yield will not pay the farmer, and it becomes necessary to adopt some means to increase it. Phosphate of lime, or any mineral manure we have seen, will not do this without a supply of ammonia in the soil; the question is, then, how to obtain this ammonia, and what benefit will be derived from its application. From the above experiments and a great many more we have not been able to give, Mr. Lawes concludes that five pounds of nitrogen are required to produce each extra bushel of grain, over and above the unaided produce of the soil. This, too, accords with the general experience of farmers in the habit of using guano, sulphate of ammonia, &c., in common practice; 300 pounds of good guano containing 17 per cent. nitrogen, giving an increase over the undressed acre of ten bushels.

It has been supposed that, as a bushel of wheat contained about one pound nitrogen, if that amount was supplied in the manure, it would be amply sufficient. But Mr. Lawes's experiments are so very conclusive on this point, that we are obliged to conclude that wheat is a nitrogen destroying plant, or that much more nitrogen is necessary for its growth than is contained in the plant when grown. As a corroboration of this point, we may mention that the experiments of Draper, Dauben, and De Saussure prove that nitrogen is actually given off by some plants during their growth. We may conclude, then, that five pounds of nitrogen are necessary for the growth of a bushel of wheat, and it is probable that other grains of the same order—such as Indian corn, barley, oats, Timothy, and rye, also—require more nitrogen for their growth than they contain when fully matured. Now, it is obvious that, when soil is tilled for the first time, and there is a large amount of nitrogen in it which has accumulated by the fall of leaves, &c., for ages, for a few years great crops will be obtained, provided the land is well tilled; but that these nitrogen destroying plants would very soon, relatively to other constituents, exhaust the soil of nitrogen, and the crop would be dependent on that supplied in the rain, or in applied manure. Soils are then, under ordinary cultivation, exhausted first of nitrogen and afterwards of phosphoric acid; but that after this stage there is no further exhaustion of any constituent; for no plant will grow without phosphoric acid. If phosphoric acid alone is supplied as manure, potash and soda would next be exhausted; but this is not the case; phosphoric acid alone has not, to any extent at least, been applied to the lands, and, therefore, if there is a deficient yield of wheat, &c., we must attribute it to a deficiency of ammonia. If the soils that have once grown Cereal grains now refuse to do so, it may be attributed to a deficiency of phosphoric acid; let this be supplied, and a crop of wheat from fifteen to twenty bushels may be depended on. On farms which have been devoted to dairying or grazing purposes, and from which fifty to sixty pounds of phosphate of lime have been removed in every ton of cheese exported, besides that which has formed the bones of the animals kept on the farm, the exhaustion would be principally phosphoric acid; and as many of the grasses and clover collect nitrogen from the atmosphere, which would, after serving important purposes in the animal functions, be returned to the soil in the liquid and solid excrements, the farm would, relatively to other ingredients, become rich in nitrogenous matter, and the application of phosphoric acid supplying an actual deficiency, would be attended with very beneficial results. On the other hand, if the exhaustion was caused by the growth of Cereal grains, nitrogen would be totally exhausted from the soil long before the exhaustion of phosphoric acid, and it would be necessary to supply this before a large crop of wheat could be obtained, though all the mineral elements were present.

It is very evident that the great problem to be solved by chemists and experimental farmers is the discovery of a cheap means of supplying ammonia. That they will succeed in solving it, there can be no reasonable doubt. In England and Scotland the turnip is the great source of nitrogen, and its culture is very rapidly extending; one-fourth of the farm has for several years past been devoted to this crop, and now, under free-trade laws and low prices, it is found profitable to increase this proportion, and cultivate one-third, and even two-fifths, of the entire farm with turnips—and this on account of its feeding and nitrogen collecting properties. I am aware there are some objections to the extensive growth of turnips in America; the hot, dry summers and severe winters render it difficult to grow them, and troublesome to keep them when grown. And I am in hopes that ere long, when the public mind is fully awake to the great importance of this subject, some plant of equal or superior nitrogen collective powers to the turnip will be discovered, suitable to the climate and the requirements of the case.

From what has been already said, it will be understood that super-

phosphate of lime has a magical effect on the growth of the turnip, increasing the crop, in one experiment given, sixteen fold. Its effect cannot be accounted for by the supposition of an exhaustion of phosphoric acid from the soil; for, on the same kinds of soils, in Mr. Lawes's experiments, seventeen bushels of wheat per acre were successively removed for seven years, without any manure; whereas, in the turnip experiments—turnips containing much less phosphoric acid than wheat—the plot unmanured gave but a few hundred bulbs per acre the third year, and afterwards were so small as not to be considered worth weighing, presenting a truly pitiable aspect by the side of those manured with super-phosphate of lime. They threw out roots of a great length in search of food, but the bulbs were no larger than the common turnip-radishes.

TABLE VI.—TURNIP EXPERIMENTS.

Years.	Acre continuously unmanured.				With super-phosphate alone, every year.				With super-phosphate of lime and mixed alkalies.			
	Tons.	Cwt.	Qrs.	Lbs.	Tons.	Cwt.	Qrs.	Lbs.	Tons.	Cwt.	Qrs.	Lbs.
1843	4	3	3	2	12	3	2	8	11	17	2	0
1844	2	4	1	0	7	14	3	0	5	13	2	0
1845	0	13	2	24	12	13	3	12	12	12	2	8
1846	....				1	18	0	0	3	10	1	20
1847	....				5	11	0	0	5	16	0	0
1848	....				10	1	0	8	9	14	2	0
1849	....				3	1	0	0	3	13	2	8
1850	....				11	9	0	0	9	7	1	12
Total	....				65	16	1	1	62	5	1	20
Mean	....				8	4	2	2	7	15	2	20

The above table shows the effect of super-phosphate of lime alone, and of super-phosphate of lime and mixed alkalies, applied each year on the turnip plant; the bulbs alone being given. The table speaks for itself, and proves the former assertion, that turnips in ordinary agriculture require no mineral manure, except phosphate of lime; and it also shows the great value of this manure for turnips, averaging, in eight successive years, $8\frac{1}{4}$ tons per acre, by its sole application on a soil not well adapted for turnip culture.

Now that large quantities of mineral phosphate of lime have lately been discovered in several places in the country, it becomes a matter of national importance as to whether this can be profitably used to increase the growth of Cereal grains or not.

Judging from the experiments of Mr. Lawes, and the practice of the best British farmers, I think that little immediate benefit will be derived from its direct application to the wheat or other Cereal crops; but if applied to turnips, or some similar plants, which collect nitrogen from the atmosphere, it will thus, by supplying the required nitrogen, be of immense indirect value to the wheat crop. It is, therefore, a matter of experiment how far turnip culture can be profitably adopted by our farmers; and, also, whether any other plant well suited to the climate, that will collect ammonia from the atmosphere, will be greatly benefited by the super-phosphate of lime. I cannot speak from experience as to the feasibility of growing turnips on a large scale in this climate, but am assured by several eminent farmers and gardeners that no real difficulty is in the way. P. Barry, esq., of Rochester, informs me that he has seen as fine crops of turnips grown here as he ever saw in the best turnip growing districts of England, Scotland, or Normandy—and that, too, with much less preparation than is found necessary to bestow on the turnip-fields of England.

It may not be uninteresting to say a few words on the preparation of the soil and general management of the turnip crop in the best British districts. Of an arable farm, one fourth is wheat, one-fourth barley and oats, one-fourth clover, and one-fourth turnips and potatoes. Wheat is usually sown after clover, at one ploughing, manured with farm-yard dung and ploughed under. After the wheat is cut, the stubble is dragged with a heavy harrow or cultivator, causing all annual weeds to germinate. It is then ploughed deep and well, and left in that state until spring, when, as early as the weather will permit, it is ploughed again, and left till after barley sowing is finished. It is then dragged and cultivated, destroying roots and other weeds, which are carried off. It is then ploughed again, and the same process of dragging, rolling, &c., repeated. It is then in a fine state for sowing. The land is thrown into ridges, by means of a double mould-board plough, about two feet apart. The seed should be sown as soon as ridged, while the soil is fresh and moist. About 400 pounds of super-phosphate of lime is sown to the acre, and 1 to 2 pounds of seed. A drill is used, which deposites the manure on the ridge and the seed on the manure; a light roller following slightly covers it.

One of the striking effects of super-phosphate of lime is, that it pushes the plant rapidly forward while in its young and tender state, when it is so liable to be injured by the fly, which, before super phosphate was used as a manure for the turnip crop, often utterly destroyed it. When in the rough leaf, the plants are singled out, by means of a common hoe, about eight inches apart. They are, about three weeks after, hoed over again, and a horse hoe is kept continually going between the rows. This keeps the land clean, and in a light pervious state, so well calculated to receive the full benefit of any ammonia in the atmosphere. The turnip crop completely (except on very heavy clays) supersedes the long or summer fallow. The great pains thus taken with the turnip, costing three times the labor of the wheat crop, are a sufficient proof of the high value placed upon it in the system of British agriculture.

The sources of phosphate of lime, and its manufacture into super-phosphate of lime, now claim our attention. In England, phosphate of lime is obtained from Saldanha Bay guano, "animal charcoal," or calcined bones, which have been used in the refining of sugar; and lastly and principally, from coprolites—a name given by Dr. Buckland to the fossilized excrements of the antediluvian animals. Professor Henslow,

who discovered these rounded water worn nodules in the crag formation, thought, from their peculiar form, and the frequency of sharks' teeth and other organic remains found in them, that they were the dung of a former generation of animals. He therefore called them coprolites, and, though this opinion is now admitted erroneous, yet they still retain the name.

The upper and lower green sand formation also contain nodules of phosphate of lime, which have not been used to any great extent, owing to the superior facilities of working the beds of the crag in Suffolk and Essex, where they are found in unlimited quantities. The mean composition of the Suffolk coprolites, from several analyses made in the Rothamsted laboratory, may be estimated at—

Bone phosphate of lime, with a little phosphate of iron	55
Carbonate of lime	25
Matter insoluble in H C I	20
	100

There is a mineral phosphate of lime, apatite, which has been known to exist in Estremadura, in Spain, for a long period. Dr. Daubeny and Captain Willington visited the locality a few years since, for the purpose of ascertaining whether it existed in sufficient quantities for agricultural purposes. They describe it as a vein many feet thick, extending over miles of country, but situated in a locality where it will have to be transported for a long distance upon the backs of mules. Some tons of this apatite were imported into England, but the price was necessarily much too high for commercial purposes.

It is a hard crystallized rock, of a yellowish-white or greenish color, and composed, according to Dr. Daubeny, of—

Silica	1.70
Peroxide of iron	3.15
Fluoride of calcium	14.00
Phosphate of lime	81.15
	100.00

Professor Way, in a small portion of this mineral, found 85½ per cent. of phosphate of lime. It resembles in many respects the phosphate of lime found at Crown Point, of which we shall speak further on. It contains no carbonate of lime; but the 14 per cent. of fluoride of calcium is a great objection, as by it the effective strength of the sulphuric acid is considerably reduced, 100 pounds fluoride of lime requiring 103 pounds real sulphuric acid to convert it into sulphate of lime. The escape, too, of the fluorine gas in such large quantities is very obnoxious, and renders the manufacture of apatite into super-phosphate of lime not only disagreeable, but difficult.

The process of manufacturing super-phosphate of lime in the principal factory in England is as follows: The stones (for such the coprolites are to all appearance) are first reduced to a powder about the fineness of corn-meal. This is accomplished by passing them through two cast-iron rollers about eighteen inches in diameter. The first rollers are placed above the second pair, which are set close together, reducing the stones to about the size of peas. They are then passed through millstones similar to those used to grind wheat, but driven with greater speed. The powder is then placed in a large iron vessel lined with lead, having within it a number of paddles revolving with great rapidity; water sufficient is added to convert it into a thick cream; sulphuric acid is now added, and the mixture agitated with the paddles, similarly to the process of churning, for about five minutes. The semi-fluid mass is then thrown out and placed in a heap; and such is the heat generated by the process, that in a few days it will become solid, and may be placed in bags. In this factory fifteen hundred tons are usually placed in a heap, which will remain hot for months; the heat materially aiding the decomposition of the phosphates. Bones alone do not make a solid manure when mixed with sulphuric acid; but if a portion of the mineral phosphate of lime is used with them, they form a very valuable and efficacious manure, which can be transported in bags and sown without admixture with ashes.

As before stated, the Spanish phosphate of lime (apatite) is too expensive to use for agricultural purposes. Yet Mr. Lawes obtained a quantity and made a few experiments with it; which, as this substance closely resembles the American phosphate of lime, it may be interesting to give:

TURNIP EXPERIMENTS.

Description of manure used per acre.

	Turnip bulbs. Tons.	Cwt.
No manure	2	4¼
Three cwt. finely-ground apatite	3	1
Two hundred pounds apatite, decomposed with sulphuric acid	6	15¾
Five cwt. super-phosphate of lime manufactured from calcined bones	7	14¾

It is seen that three hundred and thirty-six pounds of undecomposed apatite, though reduced to the finest powder, gave an increase of only sixteen and three quarters cwt. of turnip bulbs per acre; while two hundred pounds manufactured into super-phosphate of lime gave an increase over the unmanured acre of four tons and eleven and a half cwt., and more than double that of the undecomposed apatite. The acre dressed with super-phosphate of lime from calcined bones gives a slight increase over the decomposed apatite, but not in a corresponding ratio with the increased quantity applied.

From this we may conclude that mineral phosphate of lime, provided it contain the same amount of phosphoric acid and no deleterious substances, is just as good as that obtained from bones when both are made into super-phosphate of lime. If both are applied in their undecomposed state, the calcined bones appear to be slightly soluble, and to have a better effect than the ground apatite. The value of phosphate of lime in England in such substances as apatite, coprolites, &c., is twenty-four cents per ton for every one cent of bone-earth phosphate which they contain. Thus, if a substance contains eighty per cent. phosphate of

lime, it will be worth $19 20 per ton; if ninety, it will be worth $21 60 per ton in any British port in its natural state. If, however, it contains but a small per centage of phosphate of lime, and considerable carbonate or fluoride of lime, its value, calculated on the per-centage of phosphate of lime, will be considerably reduced, inasmuch as the substances have to be neutralized before the sulphuric acid will act upon the lime. The price of boiled bones is $21 per ton; or, calculating them to contain sixty per cent. of phosphate of lime, $7 per ton higher than they would be worth according to the above method of valuation; but it must be remembered they contain some organic matter which, especially the nitrogen, is very valuable. The wholesale price of super-phosphate of lime in London, manufactured from the Suffolk coprolites which have been described, is $20 per ton; that manufactured from calcined bones, Saldanha Bay guano, &c., is worth $33 per ton.

We must now consider, as being more interesting to our farmers, the value of the recent discovery of unlimited, almost pure, phosphate of lime in the United States, especially that of Crown Point, Essex county, New York, and that of the New Jersey Zinc Company. The former, we believe, was discovered by Professor Emmons, of Albany, and is supposed to be the richest vein of phosphate of lime in the world. Some selected specimens have been found to contain ninety per cent. of bone-earth phosphate. Several barrels have been sent to England for trial, where, provided it can be furnished cheap enough, it will be largely used. The samples sent there do not appear to have been well selected, and contained considerable quartz; which, as the facilities for working the mine increase, will be avoided. A large lump of it was broken up, and a fair specimen taken for analysis by Professor Way, with the following result:

Composition of the American Phosphate of Lime.

Bituminous matter and water expelled at red-heat	0.69
Substances insoluble in acid, chiefly quartz sand	16.79
Silica (soluble in acids)	9.65
Phosphoric acid, equal to 62.27 bone-earth phosphate	30.20
Lime	40.10
Peroxide of iron	6.47
Magnesia	1.08
Chloride of sodium	0.08
Soda	0.20
Potash	0.25
Sulphuric acid	trace.
Fluorine and loss in analysis	3.49
	100.00

This is a much superior article to the Suffolk coprolites, though I believe the above is not so good as the average of that obtained from the same source. It is not so hard, and requires but little labor to pulverize it; and hence it will be manufactured into super-phosphate of lime at a much less cost of labor and machinery than the coprolites now used in England. The absence, too, of carbonate of lime, of which twenty-five per cent. is found in the coprolites, is a very great advantage, requiring a much less quantity of sulphuric acid for its manufacture into super-phosphate of lime.

It would be useless to give the amount of sulphuric acid needed for the conversion of this article into super-phosphate of lime, deduced from the above analysis; for, though there can be no doubt that the figures represent the true composition of the sample analyzed, yet they considerably underrate the amount of phosphate of lime which a well selected quantity would contain; and it will be easy for any one to calculate the quantity of acid best to use (the amount of phosphate of lime and lime being known) from the date before given. But it must be borne in mind that, when speaking of sulphuric acid, I have referred to the pure anhydrous acid, and not to oil of vitriol, or the commercial sulphuric or brown acid. At the end of this paper will be found a table of Dr. Acre's, showing the amount of real sulphuric acid contained in oil of vitriol of various densities. The "chamber," or "brown acid," of the manufactures of Sp. Gr. 1.7 is the cheapest and most generally used article for the manfacture of super-phosphate of lime; one hundred pounds of this acid contain sixty-five pounds of real sulphuric acid; its wholesale price in London is eleven mills per pound; there being but little demand for this article at present; the price is much higher; but as the demand increases it will doubtless be manufactured on a large scale, at a much less cost; it is now sold by the car boy, in the principal cities, at 2½ to 3 cents per pound; it is not so dangerous to use as most people imagine, and, if ordinary care is exercised, nothing need happen worse than an occasional blotch of the clothes and a stain on the boots, &c.

It is not probable that the mineral phosphate will be manufactured by the farmers themselves; so that I need not dwell on it any longer. But bones are of great importance, and at the command, to some extent, of every farmer, who would find it much to his interest to convert them into manure for his soil, rather than let them lie bleaching in the sun in some out-of-the-way place, shedding their odor on the desert air. Bones, if finely ground, will do good if applied in their natural state; but their benefit is small and slow; and it is best to decompose them with sulphuric acid, especially as a manure for turnips, rutabagas, young trees, cabbage, beets, &c. To use acid economically the bones should always be finely ground; one hundred pounds of fresh bones contain—

Phosphate of lime	4.5
Carbonate of lime	4.0

Now, to convert these forty-five pounds phosphate into bi-phosphate of lime, it will be found from data previously given (page 308) that we have got to abstract 14½ pounds of lime by sulphuric acid, converting it into sulphate of lime. To do this, twenty pounds of real sulphuric acid would be required, or 31¾ pounds of brown or chamber acid, (Sp. Gr. 1.7;) but before the acid will act on the phosphate the carbonate of lime must be converted into a sulphate; to do this 3¼ pounds real acid will be neutralized, or five pounds of the brown acid, (Sp. Gr. 1.7.) We have, therefore, in the manufacture of super-phosphate of lime from bones, to put about twenty-four pounds of real sulphuric acid, or thirty-seven pounds of brown acid, (Sp. Gr. 1.7,) to one hundred pounds of the bone dust.

A good method for the farmer to make his own super-phosphate of lime, is to get a large tub, or end of a cask, place in it the quantity of bone dust that can be best worked at a time—say 60 pounds; sufficient water should then be added just to wet all the bones; let this be stirred till the dust is all wet, and then add the proper quantity of acid, 22 pounds, (Sp. Gr. 1.7.) When mixed, it can be thrown into a heap on the floor, and the process repeated. The operation should be done expeditiously, and the larger the heap the better, as the heat engendered during the process materially assists the acid in decomposing the phosphate.

Some farmers think the above method too tedious, and prefer placing the whole amount of dust in a large heap on a wooden floor; wet it with water and apply the acid in small quantities, repeatedly turning the heap and applying the acid till the proper quantity is used. This plan does not require so much labor, but the farmer insures a more equally mixed and better manufactured article. When properly manufactured it will be sufficiently dry to sow by hand without any absorbent substance, but if drilled, as it always should be when used as a manure for turnips, it is necessary to mix with it some dry materials—such as coal ashes, dry, leached ashes, saw-dust, peat, &c.; *but on no consideration let lime, wood-ashes, or any other caustic alkalies or alkaline earth be used*, for a reaction immediately takes place, and the bi phosphate is converted back again into the bone earth phosphate of lime, and all the labor has been in vain.

Super phosphate of lime, manufactured from fresh bones, is doubtless much the best article, if employed as a manure for wheat, corn, Timothy, &c., as, besides the phosphoric acid, it contains considerable nitrogen. Fresh bones contain 5 per cent. of nitrogen, which, at the present value of ammonia, in guano or sulphate of ammonia, would make bones worth, for this element alone, 50 cents per 100 pounds; and, according to the estimate of Mr. Lawes—that 5 pounds of ammonia will produce an extra bushel of wheat—we might expect a little more than a bushel by the application of 100 pounds of fresh bones. The super-phosphate manufactured from the apatite, or, as Professor Emmons named it, the eupyrchroite, would be a purely mineral manure, and would have no beneficial effect on wheat, unless the soil was agriculturally deficient of phosphoric acid, and in that case it would only raise the produce to the natural or normal produce of the soil—say 15 to 20 bushels of grain.

In relation to the discovery of the mineral phosphate in this country, Professor Johnston has said, "American farmers, in general, have not *the knowledge to appreciate the value of such a manuring substance as this, nor the ability to purchase it*, when manufactured into super-phosphate of lime; the discovery, therefore, will be a boon for the present to both countries. It will make more abundant and cheap the means of fertility, which our soils require, while, by supplying a new article of traffic, only salable in Great Britain, it will form a new bond of connexion between our kindred nations."

The English farmers are most loudly and justly complaining of high rents, high taxes, and *low prices in consequence of free trade;* and it is American competition that they must fear. They think that, with a good climate, admirable means of transportation, both natural and artificial, a rich, new soil, which can be had comparatively for nothing, the American farmers will inundate their market with cheap wheat, corn, beef, pork, butter, and cheese, and thus ruin them. Now, Professor Johnston, with the feelings of a philanthropist, wished to cheer the half-broken-hearted farmer in this his hour of need; and to do it, he has, unfortunately for the poor farmers, *deceived them*. He has represented this country as scarcely able to raise wheat sufficient for its own population, and that, while this population is increasing at an extraordinary rapidity, the wheat soils are gradually losing their fertility, and that farmers in the rich Genesee country are laying their land down to grass, finding it unprofitable to grow wheat at present prices.

The motive of the Professor is at once apparent, and all intelligent British farmers readily perceive it. This laudable motive induced him to assert that the discovery of large quantities of rich phosphate of lime would be of no benefit but to the British agriculturist; that the American farmer had neither the knowledge to appreciate, nor the money to purchase, such an article, &c. A careful reader would be led to conclude that Professor Johnston was mistaken; for he himself says that he found the American farmers very intelligent, and generally well acquainted with the geological formation of their soils, and the influence it had on their adaptation to certain crops, and, also, that they were earnestly seeking all the information that was to be obtained from science; that his lectures were listened to with great attention, and that the State of New York had ordered several thousand copies to be printed for gratuitous distribution. Does this show an indifference to agricultural science? Undoubtedly not. If the learned Professor taught any system of agriculture that could be profitably adopted by American farmers, their love of money, if nothing else, would insure its universal and instantaneous adoption. "It will pay them to use super-phosphate of lime as a manure for American soils, if American farmers have intelligence enough to sow it." If Professor Johnston really believed what he wrote, the American farmers, I venture to predict, will speedily undeceive him. It will be found that, while it is a valuable export, and a commodity which British soils require, it will soon be considered not only useful, but indispensable to American agriculture. Unfortunately for the British tenant farmer, overburdened, as he is, with rent, taxes, hedge-row timber, and game, which he must keep, but not eat, America will continue to keep down the English market at that price which the British farmer will find hard to sell at and pay a high rent.

If it will pay the British farmer to use the super-phosphate, why will it not pay the American? Hitherto the prices of grain and provisions have been much higher there than here; but now prices are nearly as high for wheat and meat in New as in Old England; while potatoes, and all kinds of roots, are double the price here that they are there. The answer to this inquiry brings us back to the former position, that root crops must be extensively cultivated. That it will be profitable to do so, there is no doubt. I have myself had fears that this climate was not favorable to their growth, but facts do not sustain them; and it is now pretty well established that great crops of rutabaga, or, as they are called in England, the Swedish turnip, can be easily raised in this county. In fact, some of the crops to which agricultural societies have awarded premiums this last fall were, according to the published statements, much heavier than any crop I ever saw grown in the best British turnip districts, under the most favorable condition of soil and manuring. Let

it be clearly understood that the great requirement of the wheat, barley, oat, Indian corn, and Timothy crops, is nitrogen, in an available form, *in the soil;* that rutabaga and other varieties of turnips will collect this nitrogen, in the form of ammonia and nitric acid, from the atmosphere; and that, when they are consumed by cattle and sheep, nearly all this nitrogen is returned to the soil, in an available form, for the ensuing wheat crops; and that these turnip crops are greatly, almost incredibly, benefited by the application of super-phosphate of lime, and farmers will begin to cultivate the turnip to a considerable extent, and a new era will commence in American agriculture.

I believe it will not pay to purchase guano, as a manure for wheat, at present prices; but it certainly will pay to use super-phosphate of lime on the turnip crop, and thus obtain the essentially important element of guano, ammonia, from the great storehouse into which the carbonate of ammonia, arising from the decomposition of animals and vegetables, is continually escaping and is brought back to the plants by every shower of rain.

A good crop of rutabagas, of 20 tons of bulbs and 8 tons of leaves, contains the following substances:

	Weight in pounds.	Water.	Dry matter.	Ash.	Nitrogen.	Phosphoric acid.	Potash.	Soda.	Chloride of sodium.	Sulphuric acid.	Lime.
Bulbs	40,000	36,000	4,000	280	80	22	123	5	19	28	86
Leaf	16,000	14,080	1,920	230	57	11	50	1½	13	27	26
Total...	56,000	50,080	5,920	510	137	33	173	6½	32	55	112

The consumption on the soil of such a crop of turnips would raise a crop of wheat of from 15 to 40 bushels per acre, calculating that 5 pounds of ammonia will produce an extra bushel of grain; and this result is obtained by growing turnips over and above their great value as a food for cattle.

Another valuable means of obtaining nitrogen from the atmosphere is by growing red clover. A crop that would make two tons of clover hay would contain 80 pounds of nitrogen, without reckoning that contained in the roots of the plants. Such a crop of clover ploughed under or consumed by stock, and all the manure carefully saved and applied to the soil, would increase the following wheat crop 16 bushels per acre. In England it is found unadvisable to grow red clover oftener than once in eight years, as if sown oftener the land gets "clover sick," and the crop is a complete failure. The soil of this country, especially of Western New York, is exceedingly well adapted for clover, and I have seen much larger crops here than are ever obtained in England by the use of the richest artificial means.

Super-phosphate of lime will be found a good manure for clover, especially on soils that are benefited by the application of plaster on the clover crop. Peas and vetches also collect their nitrogen from the atmosphere, of which they contain a large amount. For these crops super-

phosphate of lime is of no benefit. For beans, super-phosphate of lime, in connexion with a salt of potash, will be found a good manure. For mangel-wurzel, beets, carrots, and parsnips, super-phosphate of lime is a good auxiliary, and will, if applied in conjunction with barn-yard manure, yield immense crops.

For tobacco I believe super-phosphate of lime will be found very beneficial. The seed is first sown in beds, and the plants transplanted, when about four inches high, into the field. During the first stages of the growth, the plants are liable to be destroyed by insects; and hence any manure that would force them along rapidly out of their reach, would be valuable; this I think super-phosphate of lime will do. Then, again, the object of the grower is not to obtain a very large coarse crop, but a small one, perfectly elaborated, with a small per-centage of ash. From the effect of super-phosphate of lime on the chemical composition of the turnip, favoring, as it is known to do, great rapidity of growth and an early maturity, yielding a crop with a large amount of dry *organic* matter fully elaborated, I think this manure will be, of all others, the best to use for the tobacco plant. I have said that if in English farming the turnip crop was suplied with super-phosphate of lime, it would find sufficient alkalies and minerals in the soils; but I must not be understood to assert that if this manure is applied to the tobacco or cotton-plant, it will be unnecessary to apply any other minerals or alkalies. The case is a very different one in England; the turnips, which it will be seen contain a very large portion of potash, *are always consumed on the farm,* and thus the potash and other minerals are returned to the soil in the excrements of the animals consuming them. But tobacco is all exported from the plantation and consumed by a class of animals which return nothing to the soil; and as it contains a large amount of mineral matter, it is but reasonable to suppose that the soil will soon be exhausted of minerals if none are supplied as a manure. Of the cheapest method of supplying the deficiency, I cannot speak, but merely wish to call attention to the use of super-phosphate of lime, as a means of producing great rapidity of growth during the first stages of the plant and inducing early maturity. The super-phosphate of lime, at the rate of 5 or 6 cwt. per acre, should be sown on the beds as contiguous to the seeds as possible; and when the plants are transplanted, a small quantity—say a teaspoonful—should be placed immediately below the plant in the hill; the deliquescent nature of the super-phosphate attracts considerable moisture, and the plants will not be so liable to suffer from drought.

For potatoes this manure cannot be recommended. The application of artificial manures to various agricultural crops is a subject of great interest and importance. But it is one in which the farmer needs to exercise caution, as it is very easy to lose much money, even though their effect is beneficial. It is necessary to know what increase a given amount of manure of a certain price will produce; and the value of the produce being known, the farmer can calculate with certainty. For instance: I have detailed experiments in which sulphate and muriate of ammonia were used with a very beneficial effect on the wheat crop; yet sulphate and muriate of ammonia, at the present cost of these manures, and the price of wheat, cannot be employed without serious loss. If they should ever be sold at half their present price, or should wheat rise to double its present value, these manures might be used at a great

profit; so it is with guano, lime, plaster, super-phosphate of lime, or any other artificial manure. Their application may be very beneficial in a *scientific sense;* whether it would be so in an agricultural or economical one, depends on their cost, their effect, and the price of the produce.

At present we have but little data on which to make satisfactory calculations, and they can only be obtained by extensive systematic field experiments, conducted by scientific and practical men. Agricultural papers for the last few years, in America and Europe, have been filled with experiments with artificial manures, but, from want of a knowledge of their composition, the previous treatment of the soil, and other incidental circumstances, little positive knowledge can be obtained from them; and, though the experimenters are worthy of all credit, yet, had the money which these individual experiments cost been devoted to one experimental farm, whose experiments could be systematically carried out, the state of our agriculture would be very far advanced to what it is at present, and agricultural operations could be carried on with all the certainty that attends manufacturing processes. It has been supposed that a knowledge of the composition of plants, especially of their ashes, would enable the scientific agriculturist to apply the proper kind of manure, and that the crop would increase or diminish in exact proportion as these ash constituents were supplied or withheld. But this theory, however plausible it may appear, and though it has received the sanction of the highest scientific authorities, yet common experience, the infallible test in all the great practical arts, has pronounced this view erroneous. [?] Many readers of this essay who may have adopted these theories, will be surprised to see super-phosphate of lime recommended for root crops which contain so little phosphoric acid, and so much stress laid on the importance of ammonia for wheat, which is emphatically a carbonaceous grain, as also condemning it as a manure for beans and peas, which are eminently *nitrogenous*. All that can be said is that, however paradoxical they may appear, they are the conclusions of those who have spent years in a most laborious and expensive investigation of the requirements of agricultural plants, both in the field and the laboratory. They are also substantiated by the general practice of the best practical farmers.

Many agricultural writers in this country and in England have shown a warmth of feeling on this subject that is perfectly irreconcilable with a love of truth and the advancement of scientific agriculture. They seem to think that individuals had no right to make experiments, however carefully conducted, and certainly no right to publish their results when obtained, especially as they happened to run counter to these gentlemen's theories. All I have to say on the subject is, that experience will very soon decide which of the two systems is right; and, as a believer in the French, rather than in the German theory of artificial manures, I have no fears for the result.

It would have been satisfactory to have given some experiments with the mineral phosphate of lime, in its natural and manufactured state, made in this country; but, though it has been used by a great many different individuals, there are scarcely any experiments published which are at all conclusive on the subject.

B. P. Johnson, esq., has kindly furnished me with the following: Mr. B. B. Kirtland, of Cantonment farm, Greenbush, used the Crown Point mineral, manufactured into super-phosphate of lime, on Indian corn, at the rate of a table-spoonful to the hill; and, by way of comparison, on alternate rows plaster and ashes were sown; and on another portion fish manure was used. The result was, the rows which received the phosphate were the most vigorous, stood the drought much the best, and at harvest had the most good corn. He tried it on cabbages, cauliflowers, and melons, with the most marked result; applied it on grass, but with no perceptible effect. But it is proper, also, to mention that plaster and ashes applied at the same time, on another portion of the field, gave no visible results.

Professor Emmons has used it on Indian corn, melons, tomatoes, &c., with like effect. I have, myself, never seen it applied to Indian corn, but, judging from the effect it has on wheat, should think it is not to be expected to do much good, except on soils rich in nitrogenous matter and deficient in mineral substances—a condition in which soils that have long been cultivated with Cereal crops are hardly ever found.

But I shall be happy to alter my opinion if *experiments*, which I trust will be extensively made this summer, shall prove the contrary. In applying super-phosphate of lime, as a general rule, it is advisable to place it as near the seed as possible, as it does not injure the seed if mixed with it, and the rootlets of the young plant immediately find a palatable nourishment.

I cannot but look on the discovery of this rich phosphate of lime, and its value as a manure for our crops, as a subject of national importance, which will have a great influence in modifying some of the reprehensible features of our present system of culture, and establishing one in which the now immense export of the valuable fertilizers of the soil shall be reduced to that quantity which the different soils will bear, and retain their fertility.

DETAILS OF AN EXPERIMENT ON RAISING POTATOES, IN THE YEAR 1852.

By H. H. Eastman, of Marshall, Oneida county, N. Y.

[We give the very interesting and valuable experiments made by H. H. Eastman, of Marshall, Oneida county, New York, which have been undertaken in consequence of the premiums offered by the society. Mr. Eastman will continue his experiments next season, and we anticipate important results from the experiments which shall be made.]

The various experiments.	Different rows in each experiment, relatively.	Weight of seed.	Condition of seed when used.	With and without manure, and how applied.	Quantity of manure used.	Weight of produce.	Bushels p'r acre.	Remarks.
		Lbs. oz.				Lbs. oz.		
Different manure in the hill, and no manure.	No manure	6 0	Whole potato	No manure		61 12	166	Smooth, and good sizes.
	Hog manure	6 0	do	In the hill	Half-shovelful in each hill.	100 12	271	Some rough spots; good.
	Equal quantities of hog man're, ashes, lime, and gypsum.	6 0	do	do	Handful in each hill.	60 12	163	Smooth, and good sizes.
	Long, unfermented manure.	6 0	do	do	Two-thirds shovelful in each hill.	75 12	203	Quite rough; good sizes.
	Compost	6 0	do	do	Two-thirds shovelful in each hill.	77 12	209	Smooth; good sizes.
Fermented or rotted manure.	In the hill	6 0	One whole potato in hill.	do	Two-thirds shovelful.	78 12	211	Some rough spots.
	On the top of hill when planted.	6 0	One whole potato in hill.	Top of hill	Two-thirds shovelful.	68 0	183	Smooth.
Manure of fowls	In hill	6 0	One whole potato in hill.	In hill	Large handful to each hill.	85 4	229	Uniform in size, large, and fine.
	Top of hill at planting.	6 0	One whole potato in hill.	Top of hill	Large handful to each hill.	64 12	174	Small, and poor quality.
Ashes in hill and top of hill, after potatoes were up.	In hill	6 0	One whole potato	In hill	Handful to each hill.	59 3	159	
	Top of hill	6 0	do	Top of hill when up.	Handful to each hill.	54 3	146	
Lime in hill and top of hill, after potatoes were up.	In hill	6 0	do	In hill	Half-handful to each hill.	52 8	141	
	Top of hill	6 0	do	Top of hill when up.	Half-handful to each hill.	63 8	144	
Gypsum in hill and top of hill, after potatoes were up.	In hill	6 0	One whole in hill	In hill	Tablespoonful in each hill.	60 8	162	
	After up	6 0	do	Top of hill when up.	Tablespoonful in each hill.	58 0	156	
Early, medium, and late planting; soil vely loam.	Planted 18th May	6 0	One whole potato in each hill.	No manure		53 0	142	Large, uniform in size, and good.
	Planted 23d May	6 0	One whole potato in each hill.	do		49 0	131	Smaller, uniform, and fair.
	Planted 8th June	6 0	One whole potato in each hill.	do		37 8	100	Quite small and unmarketable; unfit for the table.
Large, medium, and small potatoes for seed.	Large	12 4	One whole in hill	do		80 0	215	Large, uniform in size; good quality.
	Medium	6 0	do	do		50 8	135	Smaller, uniform in size, and good.
	Small	3 7	do	do		43 8	117	Very small, inferior, and unmarketable.
	Small	6 14	Two whole in hill	do		51 0	138	Very small and unmarketable.
	Small	9 0	Four whole in hill	do		63 0	167	Very small and unmarketable.
Large potatoes cut and uncut, for seed.	Large	10 6	One whole in each hill.	do		71 8	192	Large, uniform in size; good.
	Large, halved	10 6	Two halves in each hill.	do		81 0	217	Little smaller, but good and marketable.
	Large, halved	5 3	One half in each hill.	do		52 0	139	Good size, good quality, and marketable.
	Large, quartered	9 0	Four quarters in each hill.	do		58 0	156	Smaller and much inferior.
Sulphur and no sulphur.	Sulphur after potatoes were up.	6 0	One in each hill	After up	Teaspoonful to each hill.	44 0	116	Poor quality.
	No sulphur	6 0	do			52 3	140	Fair quality.
Saltpetre and no saltpetre.	Saltpetre after potatoes were up.	6 0	One whole in each hill.	After up	Teaspoonful to each hill.	52 0	139	Fair quality.
	No saltpetre	6 0	One whole in each hill.			53 8	143	Fair quality.

DETAILS OF AN EXPERIMENT ON RAISING POTATOES IN THE YEAR 1852—Continued.

The various experiments.	Different rows in each experiment, relatively.	Weight of seed.	Condition of seed when used.	With and without manure, and how applied.	Quantity of manure used.	Weight of produce.	Bushels per acre.	Remarks.
		Lbs. oz.				Lbs. oz.		
Gypsum............	Top of the hill after up.	6 0	One whole potato in each hill.	Top of hill after potatoes are up.	One tablespoonful to each hill.	58 0	156	Uniform in size, and good quality.
	No gypsum.......	6 0	One whole potato in each hill.	....	....	48 0	130	Smaller in size, and quality not so good.
Early, medium, and late planting; soil mucky.	Planted 18th May..	6 0	Whole potato in each hill.	....	....	74 0	201	Large, and good quality.
	Planted 28th May..	6 0	Whole potato in each hill.	....	....	67 0	182	Smaller, and poor quality.
	Planted 10th June..	6 0	Whole potato in each hill.	....	....	56 0	147	Small and unmarketable.
Compost and fresh or unfermented manure in the hill, and spread broadcast upon the surface.	Compost in the hill; 5 rows, 5 hills in the row, three feet apart, forming a square.	6 0	One whole potato in each hill.	Compost or rotten manure in the hill.	Two-thirds shovelful in each hill.	73 0	200	Potatoes good size; exterior rough and worm-eaten.
	Compost spread broadcast on the surface; 5 rows, 5 hills in the row, square.	6 0	One whole potato in each hill.	Compost or rotten manure, spread broadcast on the surface.	An equal quantity with that in the hill.	59 12	159	Good size, smooth, and good quality.
	Long or unfermented manure in hill; 5 rows, 5 hills in the row, forming a square.	6 0	One whole potato in each hill.	Unfermented manure in hill.	Two-thirds shovelful in each hill.	83 8	224	Good, fair size, rough exterior, and some worm-eaten.
	Long or unfermented manure spread broadcast on the surface; 5 rows, 5 hills in each row, forming a square.	6 0	One whole potato in each hill.	Unfermented manure, spread broadcast upon the surface.	An equal quantity with that in the hill.	91 4	245	Large, fine, uniform in size, and good quality.

The ground upon which the foregoing experiment was tried was greensward ploughed early in the spring, nine inches deep; soil gravelly loam, except as otherwise stated. Planted 18th of May, except as otherwise stated. Hoed twice—first, 18th of June; second, about two weeks after. The cultivation was intended to be as nearly alike as possible. Taken from the ground as soon as the vines were dead, which was not till killed by frost. All the rows, except as otherwise stated, consisted of thirty hills each, three feet apart each way. All the potatoes were free from the rot. The kind of potato planted was the red variety, which here goes by the name of "Irish Lunkers."—*Journal of the New York State Agricultural Society.*

VIII.

COMMERCIAL AND OTHER STATISTICS.

STATE DEBTS AND RESOURCES.

States	Absolute debt.	Contingent debt.	Total debt.	Annual interest on absolute debt.	Amount of school fund.	Other productive property.	Other property not now productive.	Ordinary annual expenditure exclusive of debts and schools.
Maine	$600,000	....	$600,000	$36,000	$350,000	$700,000	....	$159,000
New Hampshire	76,000	....	75,000	4,000	....	....	....	80,000
Vermont	....	....	....	....	....	....	....	100,000
Massachusetts	1,341,000	$5,049,000	6,391,000	63,000	955,000	7,821,000	$1,607,000	500,000
Rhode Island	....	382,000	382,000	....	56,000	....	....	50,000
Connecticut	33,000	58,000	91,000	1,000	2,045,000	406,000	....	115,000
New York	21,690,000	933,000	22,623,000	1,230,000	6,612,000	35,115,000	....	750,000
New Jersey	71,000	....	71,000	4,000	373,000	279,000	764,000	90,000
Pennsylvania	40,114,000	....	40,114,000	2,014,000	....	31,639,000	321,000	350,000
Delaware	....	....	....	....	225,000	190,000	....	11,000
Maryland	10,796,000	4,463,000	15,260,000	650,000	148,000	11,212,000	16,319,000	170,000
Virginia	13,654,000	3,901,000	17,575,000	812,000	1,132,000	7,060,000	6,052,000	600,000
North Carolina	....	977,000	977,000	....	....	....	....	75,000
South Carolina	2,093,000	1,051,000	3,144,000	110,000	....	5,000,000	....	115,000
Georgia	1,828,000	....	1,828,000	110,000	262,000	10,000	15,000	131,000
Florida	....	....	....	....	....	....	....	45,000
Alabama	5,564,000	1,087,000	6,742,000	418,000	1,075,000	700,000	....	100,000
Mississippi	3,400,000	8,600,000	7,271,000	136,000	....	....	2,000,000	130,000
Louisiana	915,000	10,577,000	11,492,000	70,000	....	....	2,416,000	515,000
Texas	12,436,000	....	12,436,000	....	....	....	....	100,000
Arkansas	1,506,000	....	1,506,000	90,000	....	....	....	35,000
Tennessee	3,352,000	....	3,352,000	189,000	1,347,000	4,837,000	1,101,000	165,000
Kentucky	5,726,000	....	5,726,000	343,000	1,400,000	6,000,000	....	250,000
Ohio	17,339,000	....	17,339,000	1,024,000	1,754,000	18,000,000	....	200,000
Michigan	2,529,000	....	2,529,000	150,000	500,000	628,000	....	125,000
Indiana	6,907,000	....	6,907,000	300,000	4,644,000	....	....	80,000
Illinois	16,627,000	....	16,627,000	....	790,000	5,000,000	....	125,000
Missouri	933,000	....	922,000	65,000	575,000	382,000	....	110,000
Iowa	79,000	....	79,000	5,000	132,000	....	....	25,000
Wisconsin	....	....	....	....	765,000	....	....	20,000
California, 1852	485,000	....	485,000	....	....	....	....	500,000
Total	169,076,000	33,481,000	202,557,000	7,796,000	25,170,000	134,982,000	30,598,000	5,812,000
Total near Jan. 1, 1851	170,535,000	31,006,000	201,541,000	7,555,000	20,456,000	134,936,000	29,855,000	5,812,000
Total near Jan., 1850	169,549,000	68,756,000	209,305,000	7,677,000	21,542,000	125,369,000	27,584,000	5,673,000
Total near Jan., 1849	170,749,000	40,502,000	211,252,000	7,884,000	21,420,000	118,508,000	28,236,000	5,258,000
Total near Jan., 1848	169,776,000	35,932,000	205,708,000	8,521,000	20,338,000	111,638,000	31,498,000	5,062,000
Total near Jan., 1847	165,129,000	51,781,000	216,911,000	9,072,000	17,631,000	108,643,000	30,660,000	5,435,000
Total near Jan., 1846	179,635,000	44,388,000	224,023,000	9,930,000	16,608,000	110,306,000	23,232,000	5,455,000

ANNUAL STATEMENT OF THE UNITED STATES MINT.

Total coinage for 1852.

GOLD.

2,053,026	double-eagles	$41,060,520 00
263,106	eagles	2,631,060 00
573,901	half-eagles	2,869,505 00
1,159,381	quarter-eagles	2,899,202 50
2,045,351	gold dollars	2,045,351 00
6,094,765	pieces	51,505,638 50

SILVER.

1,100	dollars	1,100 00
77,130	half-dollars	38,565 00
177,060	quarter-dollars	44,265 00
1,535,500	dimes	153,550 00
1,000,500	half-dimes	50,025 00
18,663,500	three-cent pieces	559,905 00
27,549,555	pieces	52,352,948 50

COPPER.

5,162,094	cents	51,620 94
32,711,649	pieces	52,404,569 44

Coinage for December, 1852.

GOLD.

265,816	double eagles	$5,316,320 00
11,245	eagles	112,550 00
22,287	half-eagles	111,435 00
38,660	quarter-eagles	96,650 00
133,850	gold dollars	133,850 00
471,858	pieces	5,770,705 00

SILVER.

4,590	half-dollars	2,295 00
16,660	quarter-dollars	4,165 00
286,500	dimes	28,650 00
241,500	half-dimes	12,075 00
3,553,900	three-cent pieces	106,617 00
4,575,008	pieces	5,924,507 00

COPPER.

886,341	cents	$8,863 41
5,461,349	pieces	5,933,370 41

Gold bullion deposited—	
From California	$3,265,000 00
From other sources	65,000 00
	3,330,000 00
Silver bullion deposited	19,500 00

Gold bullion deposited.

Months.	1851.	1852.
January	$5,071,669	$4,161,688
February	3,004,970	3,010,222
March	2,880,271	3,892,156
April	2,878,353	3,091,037
May	3,269,491	4,335,578
June	3,637,560	6,689,474
July	3,127,517	4,193,880
August	4,135,312	2,671,563
September	4,046,799	4,253,687
October	4,743,584	4,140,069
November	5,492,454	7,279,941
December	5,561,425	3,330,000
	47,929,405	51,049,295

E. C. DALE, *Treasurer*

LAKE IMPORTS FOR 1852.

[From the Buffalo Commercial Advertiser.]

The following table will show the imports at the port of Buffalo by he lake for the season of 1852, and, also, for the seasons of 1850 and 1851. It will be seen that there has been a handsome increase of most articles, some being nearly, or quite, double former seasons. The value of imports this season over last exceeds $13,000,000.

		1850.	1851.	1852.
Flour - -	bbls. -	1,096,183	1,261,301	1,299,513
Pork - - -	- -	40,005	33,261	60,669
Beef - - -	- -	81,301	70,570	76,679
Whiskey - -	- -	30,713	65,232	79,306
Corn-meal -	- -	9,990	2,287	5,099
Seed - -	- -	11,830	11,146	31,559
Eggs - -	- -	5,614	12,818	7,686
Fish - -	- -	9,994	6,367	6,814
Oil - -	- -	5,045	6,718	7,577
Cranberries	- -	918	1,500	1,176
Wine -	casks.	17,339	13,721	14,522
Wheat -	bushels.	3,608,261	4,260,004	5,549,778
Corn - -	- -	2,521,149	6,080,330	5,136,746
Oats - -	- -	340,462	1,149,783	2,596,231
Rye - -	- -	42	19,435	112,271
Barley - -	- -	3,237	166,188	497,913
Butter - -	lbs. -	5,365,708	2,354,277	3,989,917
Lard - -	- -	3,936,500	4,961,210	7,164,672
Tallow - -	- -	1,943,600	728,100	104,686
Bacon - -	- -	7,396,604	6,541,400	8,796,590
Wool - -	bales. -	51,604	61,823	45,172
Hemp - -	- -	1,066	2,139	3,598
Cotton - -	- -	472	310	77
Flax - -	- -	112	375	789
Broom-corn -	- -	7,840	5,402	5,420
Leather - -	rolls. -	7,795	8,628	7,155
Hides - -	No. -	73,358	50,866	95,452
Copper - -	tons. -	54	655	439
Iron - -	- -	3,038	2,542	4,848
Coal - -	- -	11,436	17,281	34,665
Lead - -	pigs. -	18,102	26,983	31,916
Tobacco - -	hhds. -	524	1,707	6,620
Lumber - -	feet. -	47,416,744	84,068,589	72,337,255
Staves - -	No. -	18,652,890	10,696,006	12,998,614
Live hogs - -	- -	- - -	97,697	111,223
Sheep - -	- -	- - -	18,906	16,590
Cattle - -	- -	- - -	8,594	15,926
Horses - -	- -	- - -	2,761	1,643
Buffalo robes -	bales. -	- - -	3,246	80

Imports, and value thereof.

The following table will show the quantity and value of the principal articles received by lake, at this port, during the season of 1852:

Articles.		Quantity.	Value.
Flour - - - -	barrels	1,299,513	$5,847,808
Pork - - - -	- -	60,669	1,031,373
Beef - - - -	- -	76,679	766,790
Whiskey - - -	- -	79,306	793,030
Seed - - - -	- -	31,559	315,590
Eggs - - - -	- -	7,686	76,860
Fish - - - -	- -	6,814	54,412
Ashes - - - -	- -	14,522	363,050
Cranberries - - -	- -	1,176	11,760
Oil - - - -	- -	7,577	227,310
Meal - - - -	- -	5,099	15,297
Hides - - - -	- -	95,452	262,392
Leather - - -	rolls	7,055	178,875
Broom-corn - - -	bales	5,420	65,040
Copper - - -	tons	439	21,600
Buffalo robes - -	bales	80	4,000
Lead - - - -	pigs	31,916	119,205
Wheat - - - -	bushels	5,549,778	4,994,800
Corn - - - -	- -	5,136,231	3,082,047
Oats - - - -	- -	2,596,231	1,141,341
Barley - - - -	- -	497,913	298,747
Rye - - - -	- -	112,271	78,589
Butter - - -	pounds	3,989,917	718,184
Lard - - - -	- -	7,164,672	716,467
Tallow - - - -	- -	1,014,686	101,468
Bacon - - - -	- -	9,796,590	881,694
Lumber - - -	feet	72,337,255	8,680,470
Staves - - - -	- -	12,998,614	3,899,584
Wool - - - -	bales	45,172	3,342,728
Hemp - - - -	- -	3,598	71,960
Flax - - - -	- -	789	11,835
Cattle - - - -	- -	15,926	796,300
Sheep - - - -	- -	16,590	41,375
Horses - - - -	- -	1,643	164,300
Live hogs - - -	- -	111,223	1,112,230
Dressed hogs - -	- -	17,074	280,930
Pelts - - - -	bales	6,213	135,325
Furs - - - -	- -	1,535	231,785
Cotton - - -	tons	77	2,210
Coal - - - -	- -	34,665	138,666
Iron - - - -	- -	4,848	165,130

Imports, and value thereof—Continued.

Articles.		Quantity.	Value.
Tobacco - -	hogsheads	6,620	$464,060
Tobacco - -	- boxes	7,725	193,875
Sundries - -	- -	- - -	3,000,000
Total value	- -	- - -	45,265,922
Total value, 1851	- -	- - -	31,889,951
Increase - -	- -	- - -	13,375,971

LEHIGH COAL TRADE FOR 1852.

The supply of coal sent to market by the Lehigh region was derived from the following sources:

	Tons.	Cwt.
Lehigh Coal & Navigation Company - - - - -	429,786	06
Room Run Mines - - - - - - - -	80,481	05
Beaver Meadow - - - - - - - -	46,280	06
Spring Mountain Coal - - - - - - - -	139,627	02
Colerain Coal - - - - - - - -	37,781	07
East Sugar Loaf Company - - - - - - -	12,566	03
Cranberry Coal Company - - - - - - -	48,920	03
Hazelton Coal Company - - - - - - -	130,627	11
Diamond Coal Company - - - - - - -	41,763	08
Buck Mountain Coal - - - - - - -	104,202	02
Wilkesbarre Coal Company - - - - - - -	41,989	19
Total - - - - - - - - - - -	1,114,025	12

TRADE OF NEW ORLEANS.

VALUE OF PRODUCE OF THE INTERIOR.

A table showing the receipts of the principal articles from the interior during the year ending August 31, 1852, *with their estimated average and total value.*

Articles.	Amount.	Average.	Value.
Apples........barrels..	20,356	$3 00	$61,068
Bacon, assorted........hhds. and casks.	46,734	75 00	3,505,050
Bacon, assorted........boxes..	3,626	35 00	126,910
Bacon, hams........hhds. and tierces.	38,488	70 00	2,694,160
Bacon, in bulk........pounds..	281,280	8	22,502
Bagging........pieces..	60,044	13 00	780,572
Bale rope........coils..	90,272	7 50	677,040
Beans........barrels..	6,598	10 00	65,980
Butter........kegs and firkins.	44,786	8 00	358,288
Butter........barrels..	1,778	30 00	53,340
Beeswax........barrels..	171	45 00	7,695
Beef........barrels..	41,227	12 00	494,724
Beef........tierces..	11,523	15 00	172,845
Beef, dried........pounds..	26,100	8	2,088
Buffalo robes........packs..	1,300	75 00	97,500
Cotton........bales..	1,429,183	34 00	48,592,222
Corn meal........barrels..	2,514	3 00	7,542
Corn, in ear........barrels..	163,008	70 00	114,105
Corn, shelled........sacks..	1,397,132	1 20	1,676,558
Cheese........boxes..	72,441	3 50	253,543
Candles........boxes..	53,936	6 00	323,616
Cider........barrels..	300	3 00	900
Coal, western........barrels..	850,000	50 00	425,000
Dried apples and peaches........	804	5 00	4,020
Feathers........bags..	2,065	35 00	72,275
Flaxseed........tierces..	519	10 00	5,190
Flour........barrels..	927,212	4 00	3,708,848
Furs........hhds., bundles, and boxes.	2,136	....	1,000,000
Hemp........bales..	17,149	15 00	257,235
Hides........	123,687	2 00	247,374
Hay........bales..	53,434	3 00	160,302
Iron, pig........tons..	62	30 00	1,860
Lard........barrels and tierces.	125,496	25 00	3,137,400
Lard........kegs..	157,689	5 00	788,445
Leather........bundles..	7,572	25 00	189,300
Lime, western........barrels..	42,305	1 25	52,881
Lead........pigs..	267,564	3 20	856,204
Lead, bar........kegs and boxes.	1,138	20 00	22,760
Lead, white........kegs..	1,368	3 00	4,104
Molasses (estimated crop)........gallons..	18,300,000	22	4,026,000
Oats........barrels and sacks.	463,273	75	347,454
Onions........barrels..	17,184	2 00	34,368
Oil, linseed........barrels..	758	26 00	19,708
Oil, castor........barrels..	4,291	28 00	120,148
Oil, lard........barrels..	14,114	28 00	395,192
Potatoes........barrels..	228,095	2 00	456,190
Pork........tierces and barrels..	276,606	16 00	4,425,696
Pork........boxes..	303	35 00	10,605
Pork........hhds..	2,478	80 00	198,240
Pork, in bulk........pounds..	8,800,000	7	616,000
Porter and ale........barrels..	406	10 00	4,060
Packing yarn........reels..	2,093	7 00	14,651
Skins, deer........packs..	998	25 00	24,950
Skins, bear........packs..	16	15 00	240

TRADE OF NEW ORLEANS—Continued.

Articles.	Amount.	Average.	Value.
Shot....kegs..	2,704	$25 00	$67,600
Soap....boxes..	5,308	3 00	15,924
Staves....M...	7,319	38 00	278,122
Sugar (estimated crop)....hhds..	236,547	50 00	11,827,350
Spanish moss....bales..	4,372	8 00	34,976
Tallow....barrels..	1,307	20 00	26,140
Tobacco, leaf....hhds..	75,816	75 00	5,686,200
Tobacco, strips....hhds..	11,741	125 00	1,467,625
Tobacco, stems....hhds..	2,118	20 00	42,360
Tobacco, chewing....kegs and boxes..	4,779	20 00	95,580
Twine....bundles and boxes.	2,341	8 00	18,728
Vinegar....barrels..	92	6 00	552
Whiskey....barrels..	146,352	7 50	1,097,640
Window glass....boxes..	19,251	2 50	48,127
Wheat....barrels and sacks..	64,918	2 00	129,836
Other various articles, estimated at....	....	....	5,500,000
Total value....	....	....	108,051,708
Total in 1850–'51....	....	....	106,924,083
Total in 1849–'50....	....	....	96,897,873
Total in 1848–'49....	....	....	81,989,692

Exports of Sugar and Molasses from New Orleans for the year ending 31st August, 1852.

Whither exported.	Sugar.		Molasses.	
	Hhds.	Barrels.	Hhds.	Barrels.
New York....	18,225	134	130	26,703
Philadelphia....	6,489	946	93	6,384
Charleston, S. C....	3,524	1,685	....	9,519
Savannah....	729	99	....	2,873
Providence and Bristol, R. I....	....	....	319	143
Boston....	611	21	....	1,409
Baltimore....	6,400	38	....	11,081
Norfolk, Richmond, and Petersburg, Va....	4,585	338	41	5,323
Alexandria, Va....	1,156	....	....	2,127
Mobile....	5,327	....	....	16,187
Appalachicola and Pensacola....	1,399	416	....	7,207
Other ports....	2,348	2,857	....	5,151
Total....	50,793	6,534	583	94,107

Monthly arrivals of ships, barks, brigs, schooners, and steamboats at New Orleans from September 1, 1851, *to August* 31, 1852.

Months.	Ships.	Barks.	Brigs.	Schooners.	Steamships.	Total.	Steamboats.
September....	31	21	12	43	14	121	140
October....	74	32	26	51	18	201	186
November....	107	26	19	44	14	210	194
December....	105	66	41	77	14	303	293
January....	69	39	29	55	13	205	297
February....	95	33	30	70	18	246	285
March....	74	29	30	64	20	217	365
April....	59	27	24	76	24	210	290
May....	92	32	26	60	17	227	242
June....	59	30	21	55	24	189	238
July....	20	21	17	41	19	118	127
August....	22	15	12	37	18	104	121
Total....	807	371	287	673	213	2,351	2,778

COMMERCE OF ST. LOUIS.

Statement of domestic produce and manufactures shipped from the port of St. Louis, destined to New Orleans, Natchez, Vicksburg, Memphis, Nashville, Mills's Point, Helena, and other places on the interior waters of the United States, in the year ending June 30, 1851.

Flour....	648,520 barrels.	Lead....	472,438 pigs.
Flour....	2,156 sacks.	Lead....	78,600 lb. bars.
Wheat....	112,600 sacks.	Tobacco....	9,210 hhds.
Oats....	415,624 sacks.	Tobacco....	5,011 boxes.
Barley....	17,487 sacks.	Refined sugars....	21,892 barrels.
Pork....	108 hhds.	Sugars....	21,405 hhds.
Pork....	5,012 tierces.	Sugars....	11,548 barrels.
Pork....	122,948 barrels.	Molasses....	40,510 barrels.
Lard....	14,290 tierces.	Whiskey....	29,916 barrels.
Lard....	47,450 barrels.	Hides....	38,490
Lard....	19,730 kegs.	Nails....	38,776 kegs.
Lard....	421 tons.	Glass....	6,418 boxes.
Beef....	5,111 tierces.	Salt....	16,753 barrels.
Beef....	4,538 barrels.	Cotton yarn....	6,180 bags.
Bacon....	24,432 casks.	Wrought-iron manufactures.	15,345 tons.
Bacon....	6,986 tierces.	Castings....	30,840 tons.
Hemp....	57,160 bales.		

IMPORTS INTO THE PORT OF NEW YORK, 1851-'52.

Imports.		January 1 to August 31.	
		1852.	1851.
Brandy	½ pipes	10,843	10,716
Brandy	¼ casks and barrels	25,449	24,660
Coal	tons	49,450	37,745
Cochineal	ceroons	1,107	1,521
Cocoa	bags	4,725	7,719
Coffee	packages	445,989	392,210
Cotton	bales	397,856	313,890
Duck	bales	300	570
Duck	pieces	11,913	6,953
Earthenware	packages	25,604	28,119
Figs	drums, &c	14,314	56,024
Gin	pipes	3,162	3,255
Hemp	bales	47,063	42,563
Hemp	tons	268	774
Hides	bales	1,069	919
Hides	no	773,104	866,333
Iron (bar)	tons	26,096	37,952
Iron (pig)	tons	46,390	38,598
Iron (sheet, &c.)	bdls	372,910	479,429
Indigo	cases	1,258	1,614
Indigo	ceroons	881	656
Lead	pigs	268,743	328,264
Molasses	hogsheads	63,264	76,263
Molasses	tierces	4,916	5,086
Molasses	barrels	31,940	36,633
Olive oil	casks	747	1,336
Olive oil	boxes and baskets	36,820	19,997
Pepper	bags	23,414	2,884
Pimento	bags	10,950	6,027
Rags	bales	26,869	24,689
Raisins	casks	1,894	8,938
Raisins	boxes and frails	105,711	148,738
Raisins	drums	....	960
Rice	tierces	28,910	28,859
Rum	puncheons	1,183	996
Salt	bushels	1,315,407	1,246,579
Saltpetre	bags	28,021	13,244
Sugar	hogsheads	157,886	133,082
Sugar	tierces	3,380	1,448
Sugar	barrels	34,627	31,379
Sugar	boxes	163,157	168,038
Sugar	bags	59,890	141,277
Spelter	plates	54,493	82,618
Tin (Banca, &c.)	slabs	25,393	13,266
Tin (plates)	boxes	226,152	230,362
Tobacco	hogsheads	10,603	9,454
Tobacco	bales and ceroons	24,550	15,434
Wines	butts and pipes	1,064	963
Wines	hhds. and ½ pipes	13,631	11,767
Wines	¼ casks	28,884	37,323
Wines	barrels	6,607	7,118
Wines	boxes	44,172	53,760
Wool	bales	11,757	37,153

THE FISHERIES.

The following table exhibits the United States tonnage employed in the fisheries, and the import and export of fish into and from the United States, for a series of years. The table shows the importance of the interests at stake upon the decision of the fish controversy. It is the mackerel fishermen who are more particularly interested in the recent policy of the British government:

Years.	Tonnage.			Imports.		Exports.	
	Cod.	Mackerel.	Total.	Dried.	Pickled.	Dried.	Pickled.
	Tons.	*Tons.*	*Tons.*	*Cwt.*	*Pounds.*	*Cwt.*	*Pounds.*
1840	60,035	28,629	104,304	4,061	25,493	211,425	42,274
1841	66,551	11,321	77,873	2,422	18,012	252,190	36,508
1842	54,804	16,096	70,900	1,265	14,678	256,083	40,846
1843	61,224	11,775	73,000	2,640	12,334	174,220	20,198
1844	85,224	16,170	101,395	360	43,542	271,610	43,500
1845	69,825	21,413	91,238	1,297	30,506	211,425	42,374
1846	72,516	36,453	108,978	865	31,402	277,401	56,331
1847	70,177	31,451	101,628	8,274	91,113	258,870	30,976
1848	82,651	43,558	126,210	51,826	122,594	206,549	22,445
1849	73,882	42,992	116,874	22,520	138,508	197,457	25,570
1850	93,886	58,112	151,918	25,115	108,380	168,600	19,330
1851	95,615	50,539	146,154	14,765	145,368	151,088	21,214

THE MARINE OF THE WORLD.

Number of vessels and tonnage belonging to the following countries, 1852.

Countries.	Tons.	Vessels.
Great Britain	4,144,115	34,090
France	595,344	13,679
Norway	337,058	3,064
Russia	....	750
Greece	150,000	4,000
Naples	100,000	....
Hamburg	82,053	286
Belgium	22,770	161
Cape of Good Hope	4,080	34
United States	3,535,451	....
Netherlands	396,924	1,793
Austria	178,000	....
Denmark and Duchies	168,978	4,710
Papal States	133,402	1,520
Canada	68,553	683
Ceylon	30,828	609
Mauritius	10,020	125
Tuscany	27,598	773
Prussia	133,658	977
Total	10,118,841	67,184

The shipping and tonnage entered inwards, and cleared outwards, from the following countries:

Countries.	Entered.		Cleared.	
	Tons.	Vessels.	Tons.	Vessels.
Great Britain	6,113,696	31,249	5,906,978	29,011
France	1,887,291	15,263	1,430,085	13,868
Netherlands	1,099,771	6,959	1,136,864	7,017
Hamburg	730,596	4,094	729,186	4,114
Canada	628,399	1,699	636,407	1,732
Spain	579,475	5,206	470,973	4,622
India	406,479	868	522,056	1,128
Prussia	813,096	4,690	823,456	4,635
United States	4,328,639	21,643	4,361,002	21,805
Russia	1,323,080	6,401	1,177,994	6,197
Norway	772,885	7,969	806,766	8,160
Sardinia	700,000	6,000	700,000	6,000
Austria	547,228	....	562,722	....
Sweden	540,902	6,707	562,394	6,347
Belgium	356,367	2,424	349,638	2,368
Egypt	409,156	2,019	432,696	1,707
China	169,155	531	163,717	528
Other countries	1,927,505	15,915	1,965,867	17,163
Total	23,333,620	139,638	22,738,801	136,402

EXPORTS OF BREAD-STUFFS AND PROVISIONS FROM NEW YORK.

The exports from New York of flour, wheat, corn, beef, pork, and lard, from 1st January to 31st December, 1852 and 1851, were as follows:

		1852.	1851.
Flour	barrels	1,304,226	1,269,619
Wheat	bushels	3,331,948	1,467,514
Corn		763,612	1,678,034
Rye		249,083	13,160
Beef	barrels	55,799	44,277
Pork		39,751	45,887
Lard	kegs	98,282	121,379
Cheese	100 lbs.	16,880	81,260
Butter		7,135	19,340

CHICAGO EXPORTS.

The Chicago *Democrat* has a very full statement of the business of that city for the past season. We gather from it the following figures, showing the amount of the articles specified sent east by lake and railroad:

		1851.	1852.
Wheat	bushels	436,808	399,410
Corn		3,221,317	2,329,649
Oats		767,089	1,598,164
Barley		8,537	136,817
Beef	barrels	49,306	46,728
Beef	tierces	2,829	....
Pork	barrels	19,188	16,063
Flour		71,723	38,100

Of the following articles the comparison with last year is not given:

Butter	kegs	3,180
Hides	No	20,008
High wines		4,023
Lead	tons	366
Lead	pigs	5,737
Lard	barrels	1,460
Reapers	No	221
Salt	barrels	2,526
Skins	bales	277
Shoulders	tons	48
Wool	bales	933

STATEMENT OF BRIGHTON MARKET.

1852.

54,560 beef cattle; sales estimated at		$2,127,840
29,615 steers	do	494,760
252,595 sheep	do	694,595
86,359 swine	do	694,450
		3,921,645

1851.

53,020 beef cattle, 23,810 steers, 193,880 sheep, 50,830 swine.	Estimated sales	3,502,390

1850.

42,830 beef cattle, 27,820 steers, 45,170 sheep, 78,330 swine.	Estimated sales	2,989,902

NEW YORK CATTLE TRADE.

Comparative statement of beef cattle sold in the New York market during the years 1851 *and* 1852.

Months.	1852.			1851.		
	Beeves.	Cows and calves.	Sheep and lambs.	Beeves.	Cows and calves.	Sheep and lambs.
January	5,500	420	18,000	6,550	341	26,250
February	6,200	495	24,800	6,600	260	25,650
March	9,125	613	23,500	5,875	485	21,950
April	4,800	750	11,700	5,800	410	10,000
May	10,200	505	16,500	6,850	570	15,100
June	9,250	350	21,400	6,590	600	1,300
July	9,950	520	34,000	7,800	530	16,000
August	9,500	525	55,000	11,000	515	30,650
September	8,100	320	24,200	9,000	425	29,600
October	12,400	430	40,500	8,669	490	23,600
November	11,300	295	39,590	9,050	375	25,600
December	9,000	435	27,000	6,800	453	27,600
Total	105,225	5,688	323,000	88,994	5,406	264,200

These figures show, at a glance, the immense increase in the consumption of cattle in this city. The difference in favor of 1852 is as follows:

Increase over 1851.—Beeves, 16,231; cows and calves, 282; sheep and lambs, 58,900.

If we adopt $39 as an average price for beef cattle on the hoof, we arrive at a tolerably reliable estimate of the probable value of the most lucrative branch of the immense and growing trade. According to this showing, then, the sales of the year closing realized *four million ninety-eight thousand five hundred and fifty dollars,* which is an increase of $313,011 over the sales of 1851. There is an equally substantial increase seen in the sales and value of the other descriptions of cattle, as evidenced by the comparison below:

BEEVES.

Year.	Number sold.	Prices.	Increase for 1852.
1852....	105,225; average, $39 00..........	$4,103,975 00	....
1851....	88,994; average, 39 00..........	2,470,961 00	....
			$633,016 00

COWS AND CALVES.

Year.	Number sold.	Prices.	Increase for 1852.
1852....	5,688; average, $35 00..........	$196,080 00	....
1851....	5,406; average, 35 00..........	170,343 00	....
			$28,747 00

SHEEP AND LAMBS.

Year.	Number sold.	Prices.	Increase for 1852.
1852....	323,000; average, $4 50..........	$1,547,730 00	....
1851....	264,200; average, 3 23..........	860,350 00	....
	59,200		$937,080 00
	Excess in favor of 1852..........	....	1,876,622 00

According to these figures, the total value of the cattle trade for the year is as follows:

Beeves - - - - - -	$4,103,972 00
Cows and calves - - - - - -	199,080 00
Sheep and lambs - - - - - -	1,477,730 00
Total - - - - -	5,780,782 00

If we include the sales of which, as above stated, no reliable estimate can be procured, it is probable that the value of the year's business would swell to *six millions of dollars.*

There is one branch of the cattle trade of this city not here taken into account—the traffic in hogs—in which there is a large amount of capital annually invested; but the places of sale are so numerous, and the statistics of trade so imperfect and unreliable, that we have not taken it into regular account. Many thousands are sold weekly, the supplies coming chiefly from New Jersey, Western New York, and Ohio.—*Courier and Enquirer.*

Statement of all the property which came to the Hudson river on the canals in the years 1851 and 1852, with the quantity and estimated value of each article in Albany and Troy.

Articles.	1851.		1852.	
	Quantity.	Value.	Quantity.	Value.
THE FOREST.				
Fur and peltry ....pounds...	484,000	$605,200	264,652	$344,048
Product of wood.				
Boards and scantling......feet......	427,038,600	7,213,226	542,428,787	9,393,361
Shingles..................M........	47,900	203,971	62,285	217,999
Timber..................cubic feet.	4,237,750	505,251	4,003,913	681,376
Staves ....pounds...	155,304,000	737,686	145,503,656	683,790
Wood ....cords....	8,726	53,591	17,446	87,233
Ashes (pot and pearl).....barrels...	29,084	841,731	37,220	1,079,851
AGRICULTURE.				
Product of animals.				
Pork.....................barrels..	45,019	663,898	72,704	1,267,292
Beef.....................barrels..	76,344	468,054	89,215	1,034,113
Bacon....................pounds..	10,904,000	986,956	9,754,790	916,950
Cheese ....pounds..	25,602,000	1,663,606	16,367,404	1,310,351
Butter...................pounds..	9,568,000	1,338,997	7,902,715	1,463,532
Lard.....................pounds..	10,814,000	973,324	....	....
Lard oil.................gallons..	240,800	168,537	....	....
Wool.....................pounds..	10,518,000	4,101,415	7,645,302	3,210,899
Hides....................pounds.	572,000	68,434	763,511	105,297
Tallow.................. ...pounds..	244,000	16,976	....	....
Lard, tallow, and lard oil..pounds.	....	....	10,672,731	1,173,712
Vegetable food.				
Flour....................barrels..	3,358,463	13,436,542	3,464,108	15,685,965
Wheat....................bushels.	3,163,666	3,051,110	6,754,946	6,878,291
Rye......................bushels.	288,679	186,986	279,314	223,451
Corn.....................bushels.	7,915,464	4,427,175	5,411,643	3,626,535
Corn meal................barrels..	7,065	20,172	14,174	39,688
Barley ....bushels.	1,809,417	1,429,332	2,280,485	1,664,754
Oats.....................bushels.	3,594,313	1,348,019	4,857,487	2,136,290
Bran and ship stuffs.......pounds.	44,036,000	352,285	59,727,165	542,644
Peas and beans............bushels.	127,500	141,698	122,489	149,996
Potatoes.................bushels.	599,950	341,531	779,871	441,300
Dried fruit..............pounds.	1,424,000	114,108	190,604	15,241
All other agricultural products.				
Cotton...................pounds.	220,000	23,994	148,618	16,254
Unmanufactured tobacco....pounds.	3,702,000	813,712	12,216,228	2,687,570
Hemp ....pounds.	1,160,000	75,469	1,403,122	91,203
Clover and grass seed......pounds.	534,000	39,876	2,150,075	161,275
Flax seed.................pounds.	122,000	2,426	2,125,809	42,517
Hops.....................pounds.	552,000	146,287	417,131	124,769

STATEMENT—Continued.

Articles.	1851.		1852.	
	Quantity.	Value.	Quantity.	Value.
MANUFACTURES.				
Domestic spirits...........gallons.	2,787,600	$627,406	4,617,658	$1,040,355
Beer........................barrels.	56	315	....	....
Oil, meal, and cake.........pounds.	6,810,000	85,150	9,256,769	120,264
Starch......................pounds.	2,560,000	135,732	....	....
Leather.....................pounds.	8,204,000	1,230,384	6,877,815	1,100,644
Furniture...................pounds.	1,046,000	104,385	1,263,466	126,346
Agricultural implements....pounds.	320,000	15,842	....	....
Bar and pig lead............pounds.	36,000	820	11,155	563
Pig iron....................pounds.	5,916,000	59,158	5,213,514	54,836
Castings....................pounds.	2,448,000	73,438	3,056,428	108,887
Machines and parts thereof..pounds.	148,000	14,931	....	....
Bloom and bar iron..........pounds.	33,350,000	666,993	14,854,547	235,477
Iron ware...................pounds.	4,000	111	....	....
Domestic woollens...........pounds.	824,000	725,419	187,653	176,270
Domestic cottons............pounds.	2,248,000	539,312	1,342,122	348,951
Domestic salt...............pounds.	12,816,000	56,387	9,265,929	41,697
Foreign salt................pounds.	....	....	3,000	14
MERCHANDISE.................pounds.	9,160,000	329,423	21,213,199	3,749,824
OTHER ARTICLES.				
Live cattle, hogs and sheep.pounds.	868,000	26,100	150,119	4,504
Stone, lime, and clay.......pounds.	86,286,000	122,000	113,497,267	156,569
Gypsum......................pounds.	3,242,000	6,475	11,270,138	22,541
Eggs........................pounds.	3,676,000	220,652	....	....
Mineral coal................pounds.	26,110,000	58,753	14,820,600	37,052
Fish........................pounds.	170,000	7,101	....	....
Copper ore..................pounds.	418,000	62,667	54,697	8,204
Sundries....................pounds.	110,392,000	2,202,985	105,727,204	2,060,557

RECAPITULATION.

	1851.		1852.	
	Tons.	Value.	Tons.	Value.
Forest......................	913,268	$10,160,656	1,064,677	$12,487,658
Agriculture.................	891,420	36,394,913	989,268	45,009,889
Manufactures................	52,302	1,335,783	47,512	3,356,304
Merchandise.................	4,580	329,423	10,605	3,749,824
Other articles..............	115,581	706,733	122,760	2,289,427
	1,977,151	53,927,508	2,234,822	66,893,102

The number of tons going *from* tide-water in 1852 was as follows, viz:

Cleared at—	Merchandise.	Furniture.	Other articles.	Total tons.	Value.
	Tons.	Tons.	Tons.		
New York....................	131,877	15	9,702	141,594	$46,966,227
Albany......................	123,407	242	49,889	173,538	31,281,301
West Troy...................	140,305	175	64,542	205,022	40,521,355
Schenectady.................	498	207	668	1,373	127,561
Total 1852..................	396,087	639	124,801	521,527	118,896,444
Total 1851..................	349,230	1,465	124,640	475,335	89,217,789
Increase....................	46,887	....	161	46,192	29,678,655
Decrease....................	....	826	....	....	....

Aggregate statement of the tonnage and value of the property which came to and went from the Hudson river on the canals in the years 1851 and 1852.

Years.	Tons.	Value.
1852........................	2,756,349	$185,789,546 00
1851........................	2,452,486	143,145,297 00
Increase....................	303,863	42,644,249 00

TRADE OF CINCINNATI.

We are indebted to the Cincinnati Price Current for the following statistics:

IMPORTS INTO CINCINNATI.

Commencing September 1, 1852, *and the same time in* 1851.

Articles.	Past week.	Totals.	Last year.
Apples, green.........barrels....	332	11,081	27,467
Beef..........	15	513	1,146
Beef..........tierces....	....	219	1,060
Bagging..........pieces....	....	4	....
Barley..........	1,646	90,193	115,82
Beans..........	685	17,771	4,932
Butter..........barrels ..	812	6,265	3,443
Butter..........firkins and kegs..	353	9,066	8,288
Blooms..........tons......	....	1,434	674
Bran, &c..........sacks.....	872	33,994	57,336
Candles..........boxes.....	....	49	70
Corn..........bushels....	6,838	228,305	263,290
Cornmeal..........	40	6,798	2,556
Cider..........barrels....	19	761	828
Cheese..........casks......	3	52	27
Cheese..........boxes	4,809	139,805	164,764
Cotton..........bales......	423	5,652	3,920
Coffee..........sacks......	1,039	48,065	29,015
Codfish..........drums.....	7	556	88
Cooperage..........pieces	6,027	97,383	76,212
Eggs..........boxes and barrels..	205	2,584	439
Flour..........barrels....	9,903	197,653	177,707
Feathers..........sacks......	54	4,771	2,322
Fish, sund..........barrels....	301	5,386	7,066
Fish..........kegs and kits..	139	1,432	384
Fruit, dried..........bushels ...	802	12,907	8,405
Grease..........barrels....	5	643	345
Glass..........boxes.....	1,018	19,404	22,229
Glassware..........packages...	1,013	14,963	13,350
Hemp..........bundles and bales..	115	6,243	4,392
Hides, loose..........	769	13,121	9,713
Hides, green..........pounds.. ...	1,300	17,695	51,620
Hay..........bales	98	1,099	2,524
Herring..........boxes.. ...	....	7,357	1,985
Hogs..........heads.....	9,964	192,281	106,662
Hops..........bales	126	1,756	1,173
Iron and steel..........pieces.....	2,553	110,172	55,131
Do..........bundles....	1,279	30,045	15,937
Do..........tons......	137	2,197	4,023
Lead..........pigs......	....	19,691	20,075
Lard..........barrels....	2,408	16,979	7,557
Do..........kegs......	2,706	6,915	4,964
Leather..........bundles....	286	7,470	3,574
Lemons..........boxes.....	....	1,561	311
Lime..........barrels....	125	24,594	22,071
Liquors..........hhds. and pipes..	36	1,636	407
Merchandise and sundries..........packages...	18,400	358,923	40,805
Do..........tons	....	410	1,091
Molasses..........barrels....	7,211	29,704	18,494
Malt..........bushels ...	....	20,866	13,642
Nails..........kegs	,031	41,147	18,308
Oil..........barrels....	178	3,201	2,267
Oranges..........boxes and barrels..	119	342	340

TRADE OF CINCINNATI—Continued.

Articles.	Past week.	Totals.	Last year.
Oakum..........bales	....	1,959	473
Oats..........bushels...	6,226	84,644	47,545
Oil cake..........pounds...	....	14,000	6,000
Pork and bacon..........hhds......	386	6,734	2,408
Do..........tierces	....	571	35
Do..........barrels....	1,293	14,537	5,025
Pork, in bulk..........pounds....	624,005	4,281,392	1,386,216
Potatoes..........barrels....	425	6,884	5,959
Pig metal..........tons......	137	9,267	4,517
Pimento and pepper..........bags......	68	2,518	223
Rye..........bushels....	74	11,769	17,017
Rozin, &c..........barrels....	124	5,225	3,490
Raisins..........boxes.....	770	13,266	13,238
Rope, twine, &c..........	6	2,179	249
Rice..........tierces	88	949	172
Sugar..........hhds......	1,333	9,234	4,637
Do..........barrels....	14	6,899	4,283
Do..........boxes.....	25	975	1,090
Seed, flax..........barrels....	458	24,828	17,970
Do. grass..........	834	6,290	2,071
Do. hemp..........	....	34	25
Salt..........sacks.....	5,500	43,782	11,410
Do..........barrels....	2,347	35,005	21,263
Shot..........kegs......	....	703	683
Tea..........packages...	588	11,183	4,049
Tobacco..........hhds......	15	2,861	1,514
Do..........bales	12	1,034	447
Do..........boxes and kegs..	895	20,329	8,712
Tallow..........barrels....	138	2,375	1,068
Wines..........barrels and ¼ casks..	237	3,412	456
Do..........baskets and boxes...	534	3,187	1,377
Wheat..........bushels ...	2,224	169,214	169,754
Wool..........bales.....	38	2,305	672
Whiskey..........barrels....	5,284	94,563	88,147
Cotton yarn..........packages...	148	2,097	2,182
Do..........bales.. ...	....	29,140	28,356

EXPORTS FROM CINCINNATI.

Commencing September 1, 1852, *and same time in* 1851.

Articles.	Past week.	Totals.	Last year.
Apples, green..........barrels....	239	3,283	5,908
Alcohol..........	73	3,414	2,306
Beef..........	1,187	14,178	9,112
Do..........tierces	664	8,678	2,135
Beans..........barrels....	122	2,340	1,298
Brooms..........dozen.....	105	4,267	1,683
Butter..........barrels....	166	1,666	802
Do..........firkins and kegs..	765	17,784	10,582
Bran, &c..........sacks.....	781	6,191	....
Bagging..........pieces.....	128	4,457	3,953
Corn..........sacks.....	....	20,486	16,251
Corn meal..........barrels....	....	108	162

TRADE OF CINCINNATI—Continued.

Articles.		Past week.	Totals.	Last year.
Cheese	casks	....	8	8
Do	boxes	2,144	84,581	68,394
Candles	boxes	4,805	45,520	33,477
Cattle	heads	....	294	....
Cotton	bales	100	3,066	2,136
Coffee	sacks	652	24,094	12,148
Cooperage	pieces	2,432	68,838	25,138
Eggs	barrels	215	1,698	759
Flour	barrels	14,631	164,941	103,352
Feathers	sacks	241	4,565	2,429
Fruit, dried	bushels	475	2,436	173
Grease	barrels	120	1,956	1,054
Grass seed	barrels	74	2,124	849
Horses	heads	7	623	95
Hay	bales	50	237	117
Hemp	bales	18	1,307	476
Hides	pounds	....	5,253	19,924
Do	No	117	11,478	4,789
Iron	pieces	4,047	75,529	35,907
Do	bundles	1,120	19,079	9,808
Do	tons	98	4,572	2,532
Lard	barrels	5,896	22,872	12,767
Do	kegs	13,381	53,667	32,311
Lard oils	barrels	861	8,689	6,395
Linseed oil	barrels	46	3,267	2,408
Molasses	barrels	1,617	15,502	8,962
Oil cake	tons	260	1,843	377
Oats	sacks	60	1,609	1,058
Potatoes	barrels	499	7,255	6,021
Pork and bacon	hhds	1,095	9,201	5,722
Do	tierces	1,236	4,666	2,750
Do	barrels	13,142	62,373	33,291
Pork	boxes	....	92	410
Do. in bulk	pounds	69,600	382,037	804,785
Rope, &c	packages	348	5,703	1,860
Soap	boxes	434	12,132	8,771
Sheep	heads	....	60	....
Sugar	hhds	726	7,412	3,712
Salt	barrels	719	18,714	11,274
Do	sacks	917	19,819	8,316
Seed, flax	barrels	27	1,952	547
Sundry merchandise	packages	11,500	377,428	93,202
Do. merchandise	tons	50	3,344	2,449
Do. liquors	barrels	1,851	22,194	10,127
Do. manufactures	pieces	1,260	38,084	....
Do. produce	packages	660	12,406	24,253
Starch	boxes	668	7,512	5,171
Tallow		171	2,405	2,108
Tobacco	kegs and boxes	406	14,088	7,088
Do	hhds	5	2,603	1,161
Do	bales	....	173	37
Vinegar	barrels	106	3,142	1,207
Whiskey	barrels	3,554	90,818	71,305
Wool	bales	132	4,886	1,017
Do	pounds	....	1,511	....
White lead	kegs	154	25,662	17,092
Pieces castings		447	22,588	4,464
Do	tons	27	677	453

IX.

THE COTTON TRADE.

BY C. F. M'CAY, UNIVERSITY OF GEORGIA.

The course of the cotton trade during the past year has been steady and uniform. The season opened in September and October at rates a trifle higher than were realized in December; but, from January forwards, the market slowly advanced until it is now a little higher than it was a year ago. The price at Liverpool of fair cotton, on the 1st of September, 1851, was $5\frac{1}{2}d.$; in October it was $5\frac{1}{4}d.$; in January, $5d.$; in March, $5\frac{1}{8}d.$; in May, $5\frac{1}{4}d.$; in July, $5\frac{3}{4}d.$; and $6d.$ in September, 1852. The increased estimates of the crop depressed the price early in the season; but the immense consumption in every part of the world—in the United States, in England, and on the Continent—encouraged the sellers to demand higher rates; and these have been maintained in spite of the promise of another large crop for the ensuing year. The rates now current are not high; but they are above the average. For the thirteen years from 1840 to 1852, the whole American exports, (see Table I, at the end of this article,) amounting to nearly ten thousand millions of pounds, have been sold at an average price of eight and a half cents. The price of good middling, at Charleston, is now, October 29th, nine and a half cents. Instead of declining below the usual rates, the market has advanced, after receiving the largest crop ever produced, and with the prospect of another fully as large. What has maintained these prices? Are the causes temporary or permanent? Will they continue for the present year? Or is their effect already past? In attempting an answer to these questions it may be remarked:

1st. That the advance is not due to the fact that lower rates are not remunerative. From 1840 to 1844, when the average (see Table I) was only eight cents, the stocks were constantly increasing. The production outrun the consumption. This led to lower prices, which discouraged planting, and at the same time increased the demand of the manufacturers. From 1845 to 1849 the average price (see Table I) was only seven and a half cents. The surplus stocks then became small and prices advanced. Thus it appeared that an average of eight cents, from year to year, stimulated production so that the supply exceeded the demand, while seven and a half cents produced an opposite effect. The present rates, therefore, are more than sufficient to pay the planter a proper profit on his investment. And the general advance on land and negroes, throughout the Southern States, confirms the conclusion

thus indicated by the rise and the decline of the stocks lying over from year to year. The present prices will not only pay the cost of production, but allow a handsome profit to the producer. But—

2d. The price has been kept up during the past year, in part, by a high rate of exchange. A rise of one per cent. in exchange is nearly equal to one eighth of a cent in the price of cotton. The advance in exchange has been about two per cent. over the rates which were current before the discovery of California gold. We were then both exporters and importers of the precious metals. When we were sending them abroad the price of exchange was the real par, *plus* the freight, insurance, and other expenses of exportation. When we were receiving them the price was the real par, less these expenses. The highest rates were 111 or 112; the lowest, 104 or 105; the average was about 108 for sixty-day bills. For the past two or three years we have always been exporters of gold, and the range of exchange has been from 108 to 112, at New York, seldom going down to 108 or rising to 112—the average being about 110. This rise in exchange, on account of our owning the gold mines of California, is a permanent cause; exchange will be, hereafter, the real par, *plus* the cost of exporting specie, and not the real par sometimes increased, but sometimes decreased, by the cost of exportation. This is equivalent to an advance of one-fourth of a cent in every pound of cotton, and, for the year past, it produced to the South not less than three millions of dollars. This, though a true cause for an advance in the price of cotton, is not sufficient to account for the whole rise. Another cause may probably be—

3d. The increased supply of the precious metals, which, by expanding the currency, tends to raise the money-price of all other articles of merchandise. The large additions of gold to the currency of the world must, by inevitable necessity, produce an effect of this kind. No arithmetic can calculate its exact amount in a short period of time; but that it is producing, and must produce, hereafter, a slow, continued rise in all kinds of property, no one can possibly doubt. Its first effect is to raise the price of silver; but it is impossible, while the present laws regulating the comparative value of silver and gold at the mints of the world continue unchanged, to raise the premium on silver beyond a very small amount. The effect of a slight advance is to push aside the silver and to introduce gold in its stead. Thus, in our own domestic currency, silver is passing out of general circulation, and the vaults of the banks are filling with gold in its place. In France the coinage of gold has of late increased very largely: and so in other countries where both metals are a legal tender. This expansion of the metallic currency gives the banks an opportunity to increase their circulation, and thus the whole monetary medium, by which all the exchanges of commerce are made, becoming enlarged, the price of all other articles cannot fail to advance. It is impossible to say how large an influence this may have had in the recent high prices of cotton. It is not probably large, but that it is real no one can doubt.

4th. Another cause which has helped to sustain prices—and probably this is more potent than all the others together—is the successful despotism of Louis Napoleon in France, and of the crowned heads on the Continent of Europe. The order that has reigned in Paris and throughout France has given confidence to the merchant and the manufacturer,

encouraged labor and industry, given security to property, and stimulated production and consumption in every department of business. Similar causes have been operating in the German and Italian States. The triumph of law and order over the revolutionists of 1848 was not complete until the present year. The iron heel of arbitrary power had crushed the external manifestations of resistance, but the murmurs of discontent were still audible, and the hopes of liberty were not yet extinguished. The present year has witnessed the end of all these things. Lombardy and Hungary kiss the rod of the oppressor. French soldiers preserve quiet at Rome. The patriots of Naples and Sicily are in prison or in exile. An Austrian army has quelled the disturbances in Baden, Hamburg, Schleswig-Holstein. Revolution, anarchy, socialism, red-republicanism, exist no more. Men have turned their attention to trade, to labor, to the pursuits of peace. Instead of political agitation, the people are employing themselves in new enterprises of industry, of commerce and manufactures. The consumption of cotton in France, has, in consequence, outrun any former year. Though stationary for many years past, the demand has suddenly awakened to new life; and so, also, in all the disturbed parts of Europe.

5th. The low price of grain in England, the successful working of free trade, and the prosperity in every department of manufactures, have stimulated the home demand in Great Britain to an extraordinary extent. The exports of cotton fabrics have been encouraged by the peace and prosperity of every part of the world. The overthrow of Rosas has opened the La Plata and its tributaries to British commerce. The outbreak in Caffraria is unimportant. The war in Burmah, being out of India proper, has no influence on trade. The rebellion in China does not disturb the exchanges at the free ports. So that universal peace may be said to prevail.

6th. In the United States the onward march of the cotton manufacture has again been resumed. The tariff of 1846, and the high price of the raw material, had checked the demand for the past three years; but the progress of our country in population, wealth, and enterprise, has surmounted these obstacles, and our course has again been forward.

Of these several causes, now enumerated to explain the fair price of cotton for the past year in the face of the abundant supply, there is not one which is not likely to operate for the coming year. We may, therefore, in considering the supply and demand for 1853, anticipate full average prices. They cannot be high, for the supply will be too large to permit any check in consumption. They cannot fall even to the average, for the stocks are low, and any further decline would stimulate the demand even beyond its present extraordinary amount.

The supply from the United States will probably exceed the large crop of 1852. The increased number of hands, the large breadth of land planted in cotton under the stimulus of good prices, the favorable character of the season, the fine weather for gathering the crop after the 1st of October, and the lateness of the frost, will tell strongly in favor of a large production. We have, indeed, had two severe storms, and with one of them a flood, but their injury has not been serious. The rot, also, has prevailed to an uncommon extent. The boll-worm has been very general, and in some places severe. The caterpillar has done some harm; but, beyond eating the leaves from the stalk, its ravages have been

local and unimportant. These causes have not produced as much injury as was suffered last year. This is especially true in the Atlantic States. The excessive drought inflicted then more damage than all the opposing causes of the present season. The receipts at Charleston and Savannah will therefore exceed those of last year; they will also be increased by the extension of the Georgia railroad further to the west. Instead of 800,000 bales received last year, 900,000 may confidently be anticipated for 1853. In Florida the storm of October 9 did such serious injury that we may expect a falling off in the receipts at Appalachicola and St. Mark's. More of this cotton will go to Savannah than usual; and the loss from the caterpillar and boll-worm has been considerable. But the increased planting will go far to balance these deficiencies, and only a slight decline may be looked for. From Alabama the receipts will be larger than last year. There was then too little rain; now there has been too much. The river lands produced finely last season; now it is the sandy uplands that are white with abundance. Only a small increase, however, may be anticipated. From the various districts that send their cotton to New Orleans the reports are contradictory. The Red river lands are doing very well; the parishes of Louisiana have been injured by the worm; the bottoms of the Mississippi have been too wet; the frost has kept off to a very late period in Tennessee; the planting has been large; the season for gathering long; and nearly the same amount will probably be received as for the past year. From Texas the reports have been very favorable; and an increase of twenty-five per cent may be looked for with confidence. The whole crop of American cotton for 1853 may be estimated (see Table II) at 3,100,000 bales.

The exports from the East Indies have fallen off largely the last year on account of the moderate prices. This has been the uniform effect of a declining market, and we may look with confidence for the same result hereafter. There is in India an immense production of cotton for domestic use; it has been stated to be as large as the crop in the United States; but no satisfactory statistics have ever been collected to show its actual amount; it is, however, very large, and a high price in Europe attracts a large portion for foreign export. It may then be brought further from the interior, and pay a larger charge for freight. On the contrary, when the European rates decline, the inferior character of the cotton, the heavy expense for freight and insurance for the long voyage, leave but a small balance for the first cost of production, and the carriage from the interior to the seaport. The circle around the marts of export is thus narrowed, and the amount sent off decreases. Thus the high prices of 1850 and 1851 raised the English imports to 308,000 and 329,000 bales, against 182,000 in 1849. The moderate prices of the present year have caused the imports at Liverpool to fall off near 100,000 bales, (see Table III.) The low rates current in December and January last diverted much of the East India cotton intended for export to China; and the European receipts have been small. No increase in these can be expected for 1853, since prices promise to be moderate, as they have been for the last season.

The imports into England from Egypt have increased largely for the past year. The largest amount ever before received was 82,000 bales in 1845; the average for the last three years has been 73,000. But for 1852 the receipts at Liverpool alone on the 8th of October had reached

142,000 bales. Less than usual has been carried to France; and so large an amount for England cannot be anticipated for the coming year, especially as the stocks in Liverpool of Egyptian cotton have advanced 50,000 bales. From Brazil and other places the Liverpool receipts have increased slightly over last year—namely, from 90,000 to 108,000 bales; they are, however, less than for the two preceding years. The average from Egypt and Brazil for the last four years has been about 250,000 bales, (Table IV,) and this amount may be looked for in 1853.

The total supply from all these places for 1853 may be estimated (Table V) at 3,550,000, or about the same as last year. This is 685,000 bales larger than for 1851, and 500,000 larger than for 1849. But as the increased demand has taken off the whole of the larger production of 1852 at moderate prices, leaving the stocks now smaller than they have been for many years past, (Table VI,) there is nothing in this large supply calculated to depress prices.

In considering the consumption, we notice everywhere a large increase not only over last year, but over every former year. The amount consumed in Great Britain in 1851 was 1,663,000 bales, while the largest figures for any previous year were 1,590,000 bales. The deliveries to the trade this year at Liverpool, (see Table VII,) where 95 per cent. of all the English sales are made, exceed those of last year more than 8,000 bags per week; as the factories are now well supplied, this excess will scarcely continue until the 31st of December. But the great regularity in the deliveries forbids any material decline. If the future purchases of the trade should not exceed those of the same period for last year, the consumption of Great Britain would reach 1,992,000 bales for 1852; nor can we anticipate any less for 1853. The abundance of money, the favorable harvest, the great demand for labor, the high wages in all branches of manufactures, the advance in iron, the prosperity of the shipping interest, the large influx of Australian gold, the universal prevalence of peace in every part of the civilized world, the new machinery erected during the last year, the moderate rates which the raw material promises to bear, the low stocks of goods in the hands of the manufacturers, the large decline in the import of wool, and its consequent anvance in price, and the general prosperity, both in the domestic and the export trade, authorize the expectation of a still larger consumption for 1853. There is not a single drawback to this anticipation except the chapter of accidents; but it may be safest, as the increase for the last year has been so unprecedented, to look forward to a demand only as large as for the present year.

The consumption in France has increased as rapidly as in England. Our exports thither have been 120,000 bales larger than last year, and they have caused no accumulation of stocks either at Havre or at Marseilles. The deliveries at Havre alone have increased (see Table VIII) more than 80,000 bales, and the amount of American cotton for the whole of France will probably exceed 400,000 bales, against 310,000 for 1851. As large a demand for 1853 may be confidently anticipated.

On the Continent of Europe the consumption has been steadily increasing. Its progress is occasionally checked by high prices, but these are only temporary disturbances in its onward march. In Russia the imports for the three years from 1841 to 1843 were 337,000 cwt.; from 1844 to 1846, they were 584,000; and from 1847 to 1849, they were 1,065,000.

In the German Zollverein the protective duties they imposed have given ample encouragement to the home manufacture of cotton goods. The English and American exports of raw cotton to these and other Continental States have averaged (see Table IX) 417,000 bales in 1847 and 1848; 522,000 in 1849 and 1850; and 582,000 in 1851 and 1852. For the incoming year they will almost certainly reach 600,000 bales, which is a trifle less than the amount for the present season.

The consumption of the United States has made a most sudden and rapid advance during the past year. For the three preceding years we had gone backwards. The high price of the raw material, and the imports of cotton goods at low duties from abroad, had given a check to our increasing demand, such as we never before had experienced. Hitherto our progress had been uniformly onward. The rapid increase in our own population and wealth forbids any retrograde movement in the regular operations of business. Just as our railroads, our shipping, our crop of cotton, or of wheat, or of corn, make steady and invariable progress from year to year, so must our cotton manufactures. There will be at times a backward step in this movement, but it is temporary and brief. It is like the oscillation of a pendulum on a moving surface, the weight swings backwards and forwards, but the onward motion of the point of support makes it certain that the forward oscillations will more than compensate for the backward movements. The present prosperity of the country authorizes us to expect an advance even on the large consumption of the past season. The amount for 1852 has reached (see Table X) 603,000 bales, and 625,000 may be anticipated for the coming year.

The whole demand for 1853 will then be estimated at 3,625,000 bales, (Table XI,) which is 75,000 more than the anticipated supply, (Table V.) Now, as the stocks on hand (Table VI) are at present very low, lower than they have been for years past, especially if the time for which they would supply the demand be considered, it would seem that prices must keep above their usual average. This has been 8½ cents (Table I) at the seaports for the last thirteen years; and if the influence of a high rate of exchange and the abundance of gold are to be regarded as real causes for elevating the money value of cotton in our markets, it would seem probable that the present prices (9½ cents at Charleston, October 29th, for good middling) will be fully maintained, and that an advance, rather than a decline, may be expected.

TABLE I.—*American Exports—value and price.*

[From Hunt's Merchants' Magazine.]

	Total exports in pounds.	Total value.	Price.
From 1840 to 1844 - -	3,340,000,000	$267,200,000	8 cts.
From 1845 to 1849 - -	3,788,000,000	284,400,000	7.5 "
From 1850 to 1851 - -	1,563,000,000	184,300,000	11.8 "
Estimated for 1852 - -	1,000,000,000	90,000,000	9 "
From 1840 to 1852 - -	9,691,000,000	825,900,000	8.5 "

TABLE II.—*Crop of the United States.*

	Receipts.		Estimate.	
	1849.	1851.	1852.	1853.
	Bales.	Bales.	Bales.	Bales.
Texas - - -	39,000	46,000	64,000	80,000
New Orleans -	1,094,000	933,000	1,373,000	1,350,000
Mobile - - -	519,000	452,000	549,000	560,000
Florida - - -	200,000	181,000	189,000	175,000
Georgia - - -	391,000	322,000	326,000	400,000
South Carolina	458,000	387,000	477,000	500,000
Other places -	28,000	34,000	37,000	35,000
Total - -	2,729,000	2,355,000	3,015,000	3,100,000

TABLE III.—*Imports from the East Indies.*

Years.	Bales.	Remarks.
1830 to 1834, average for 5 years -	81,000	Low prices.
1835 to 1839, " " -	144,000	High prices.
1840 to 1844, " " -	232,000	Chinese war.
1844 to 1849, " " -	177,000	Peace and low prices.
1849, October 5, Liverpool only -	69,000	Low prices.
1851, " 10, " " -	171,000	High prices.
1852, " 8, " " -	75,000	Moderate prices.
1849, whole year, Great Britain -	182,000	Low prices.
1851, " " " -	329,000	High prices.
1852, " estimate -	200,000	Moderate prices.
1853, " " -	200,000	Moderate prices.

TABLE IV.—*English Imports from Egypt, Brazil, etc.*

Years.	Liverpool, about 1st October.	Great Britain, whole year.
	Bales.	Bales.
1846	121,000	153,000
1847	75,000	136,000
1848	94,000	137,000
1849	178,000	245,000
1850	205,000	257,000
1851	138,000	181,000
1852	245,000	
1853, estimated	- - - -	250,000

TABLE V.—*Supply of 1851, and estimate for 1852 and 1853.*

	1851.	1852.	1853.
	Bales.	Bales.	Bales.
Crop of the United States	2,355,000	3,015,000	3,100,000
English imports from East Indies	329,000	200,000	200,000
English imports from other places	181,000	300,000	250,000
Total from these sources	2,865,000	3,515,000	3,550,000

TABLE VI.—*Stocks at recent dates corresponding to the close of our year*

	1849.	1850.	1851.	1852.
	Bales.	Bales.	Bales.	Bales.
United States, Sept. 1	155,000	168,000	128,000	91,000
Liverpool, Oct. 8	582,000	545,000	550,000	507,000
Havre, Oct. 6	45,000	32,000	33,000	34,000
Total	782,000	745,000	711,000	632,000

TABLE VII.—*Deliveries to the Trade at Liverpool.*

	1849.	1851.	Weekly consump'n.	1852.	Weekly consump'n.
	Bales.	Bales.	Bales.	Bales.	Bales.
May 1	532,000	427,000	25,100	630,000	37,100
June 4	688,000	619,000	28,100	870,000	39,600
July 2*	835,000	744,000	28,600	1,001,000	38,500
August 1	993,000	887,000	29,600	1,156,000	38,500
September 3	1,141,000	1,058,000	30,200	1,340,000	38,300
October 1	1,220,000	1,167,000	29,900	1,475,000	37,800
October 8	1,287,000	1,191,000	29,800	1,520,000	38,000
Whole year	1,467,000	1,576,000	30,315	....	....
Do. G. Brit'n	1,590,000	1,663,000	32,000	2,000,000*	39,000*

* Estimated.

TABLE VIII.—*Deliveries to the Trade at Havre.*

	1850.		1851.		1852.	
	All kinds.	U. States.	All kinds.	U. States.	All kinds.	U. States.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
September 1	232,000	220,000	224,000	211,000	300,000	290,000
October 1	250,000	238,000	246,000	234,000	327,000	316,000
Whole year	306,000	294,000	312,000	302,000	....	....

TABLE IX.—*Consumption out of England, France, and United States.*

Years.	American exports.	English exports.	Total.
	Bales.	Bales.	Bales.
1847	169,000	215,000	384,000
1848	255,000	192,000	447,000
1849	322,000	254,000	577,000
1850	194,000	272,000	466,000
1851	269,000	269,000	538,000
1852	354,000	*203,000	†625,000

*October 8. †About.

TABLE X.—*American Consumption.*

Years.	North of Richmond.	Average for three years.	Increase, per ct.	South of Richmond.	Total.
	Bales.	Bales.		Bales.	Bales.
1847 - -	428,000	413,000	....	80,000	508,000
1848 - -	532,000	461,000	11+	90,000	622,000
1849 - -	518,000	493,000	7+	100,000	618,000
1850 - -	487,000	512,000	4+	100,000	587,000
1851 - -	404,000	470,000	8—	100,000	504,500
1852 - -	603,000	498,000	6+	100,000	703,000

TABLE XI.—*Consumption of the World.*

	Result for—		Estimate for—	
	1850.	1851.	1852.	1853.
	Bales.	Bales.	Bales.	Bales.
Great Britain - -	1,514,000	1,663,000	2,000,000	2,000,000
United States - -	487,000	404,000	603,000	625,000
France, of U. States -	300,000	310,000	400,000	400,000
Exports from Great Britain and U. States -	562,000	538,000	625,000	600,000
Total - - -	2,863,000	2,915,000	3,628,000	3,625,000

Acknowledgment of seeds received from the gentlemen named below:

J. L. Hendrick, esq., of Litchfield, Connecticut, potato seed, lettuce, and sweet corn. The potato seed is from the Mercer variety, which Mr. H. says is less subject to rot than formerly, when, for a few years, the plant failed to form seeds, apparently from constitutional debility. The sweet corn is thought to be an improved kind, and the lettuce is also said to be superior.

J. B. Gray, esq., of Fredericksburg, Virginia, seed of a variety of asclepias.

Captain R. B. Marcy, U. S. A., seed of Gama grass, from the head-waters of Red river. [The seed of this grass is in great request, and we should be happy to obtain more of it for distribution.]

Mr. A. Z. V. Purdy, esq., of Trinity Springs, Martin county, Indiana, sample of wheat.

Warren & Co., Sacramento, Cal., Italian wheat, flower seeds, &c.

James S. Wilson, esq., Washington, D. C.

A. H. Ernst, esq., of Cincinnati, Japan peas.

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS

VOL. 2, 1852

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS

VOL. 1, 1853

33d Congress, 1st Session. [SENATE.] Ex. Doc. No. 27.

REPORT

OF THE

COMMISSIONER OF PATENTS

FOR THE YEAR 1853.

U.S. Patent Off.

PART I.

ARTS AND MANUFACTURES.

WASHINGTON:
BEVERLEY TUCKER, PRINTER TO THE SENATE.
1854.

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PART I.

REPORT

OF THE

COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE, *January*, 1854.

SIR: Agreeably to the 14th section of the act approved 3d March, 1837, entitled "An act in addition to the act to promote the progress of science and useful arts," I have the honor to submit herewith my annual report.

The following statement will show the receipts and expenditures of the Office during the past year:

No. 1.

Statement of moneys received at the Patent Office during the year 1853.

Received on applications for patents, reissues, additional improvements, and extensions, and on caveats, disclaimers, and appeals	$110,565 00
Received for copies and for recording assignments	10,939 70
Received from sale of old iron	22 75
Total receipts	$121,527 45

No. 2.

Statement of expenditures from the Patent Fund during the year 1853.

For salaries	$44,826 77
For compensation of librarian	1,200 00
For temporary clerks	23,205 73
For books for the library	3,295 28

For contingent expenses, viz.:		
For ordinary expenses	$17,590 57	
For furnishing rooms in the new building, painting the old, and making cases for rejected models, &c.	11,923 35	
		29,513 92
For agricultural statistics and purchase of seeds . . .		7,086 49
For payments to judges in appeal cases		50 00
For refunding money on withdrawals . . .	23,466 64	
For refunding money paid in by mistake .	225 00	
		23,691 64
		$132,869 83
Making an excess of expenditures over receipts during the year of		$11,342 38

No. 3.

Statement of the Patent Fund.

Amount to the credit of the Patent Fund Jan. 1st, 1853,	$40,292 38
Deduct from this:	
The excess of expenditures during the year 1853, viz. .	11,342 38
Leaving in the treasury, 1st January, 1854	$28,950 00

In addition to the amount already paid for fitting up the rooms in the new building, there are several bills outstanding, amounting to about $3,500, which will diminish by that amount the sum above reported as being still in the treasury.

A contract has also been made to pay $10,800 for the iron frames for the lower tier of cases necessary to be placed in the large hall in the east wing of the Patent Office. The finishing of those cases, and procuring an equal number of cases of wood for the upper tier, and other necessary fixtures for that hall, are estimated to swell this last-mentioned sum to $30,000, which would more than absorb the entire amount in the treasury to the credit of the Patent Fund.

There are, besides, at least 2300 applications which have been rejected by the Office, in which the amounts liable to be withdrawn have not yet been demanded. In each of these the applicant is entitled to withdraw two-thirds of the fee paid by him, making at least $46,000 of additional liability subject to be called for at any time.

From the above statement it will be seen that the Office has already incurred liabilities which it is unable to meet. A justification for the course pursued will, it is hoped, be found in the great necessity of the case.

Congress had made no provision for these expenses. The convenience of all those connected with the Patent Office required the furniture which has been procured; and the condition of the models, which are to occupy the large hall in the east wing, imperatively demand that this hall should be fitted for their reception at the earliest day practicable. Had the matter been postponed till Congress should

make the necessary appropriation, much time might elapse before the bill for that purpose would become a law. Sixty days notice must then have been given before a contract could be made, and several months more for the contractors to complete the works, so that the hall might not be ready to be occupied for a year to come. Under these circumstances, it was thought expedient to take the responsibility of contracting to pay these expenses from the Patent Fund, and trust to Congress to refund the amount so far as it should be found necessary. Should these reasons be deemed sufficient to justify the course pursued, it is respectfully suggested that immediate measures be taken to refund the amount paid by the Patent Office for furniture, to meet the amount that will be due when the iron cases are delivered, and also to furnish the means for immediately providing the other furniture for the large hall. This will be ready in a few weeks for the reception of the cases. The iron cases are to be here by the first day of February next, and the other fixtures can also be soon completed, if contracts for that purpose be made at once. If all this is done, the Patent Office will have a little over $40,000 in its treasury, which, considering the liability for withdrawals above stated, is not much more than should be found there.

Appended hereto will be found a list of all the patents that have been granted during the year, together with an alphabetical list of the patentees, with their places of residence; also, a list of all the patents which, during the same period, have become public property.

The whole number of patents issued during the year is 958, including 24 reissues, 3 additional improvements, 12 extensions, and 75 designs.

The whole number which have expired is 375.

The number of applications made, and the number of patents issued, in each of the last thirteen years, are as follows:

Table exhibiting the business of the Office for thirteen years, ending December 31st, 1853.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1841	847	312	495	$40,413 01	$23,065 87
1842	761	291.	517	36,505 68	31,241 48
1843	819	315	531	35,315 81	30,776 96
1844	1045	380	502	42,509 26	36,344 73
1845	1246	452	502	51,076 14	39,395 65
1846	1272	448	619	50,264 16	46,158 71
1847	1531	533	572	63,111 19	41,878 35
1848	1628	607	660	67,576 69	58,905 84
1849	1955	595	1076	80,752 78	77,716 44
1850	2193	602	995	86,927 05	80,100 95
1851	2258	760	869	95,738 61	86,916 93
1852	2639	996	1020	112,056 34	95,916 91
1853	2673	901	958	121,527 45	132,869 83

From this it will be seen that although the receipts of the Office have been $9,471 11 greater than during the year previous, the expendi-

tures have increased in a much greater proportion, exceeding the whole income by $11,341 38. If the amount of $11,923 35, which has been paid for furniture, as above stated, were to be refunded, it would bring the expenditures slightly below the receipts. The excess of receipts over expenditures would have been about the same as usual but for two circumstances. *First*, an undue proportion of the amount expended for agricultural purposes stands charged to the last year's account, in consequence of those expenses being paid from parts of two separate appropriations. Our fiscal year begins on the first of January instead of the first of July, and it has so happened that most of the payments have been crowded into the closing portion of the last fiscal year, and into the first six months of this. *Secondly*, the number and compensation of the clerks in this Office have been considerably increased, mainly in consequence of the act of the last session of Congress, classifying the clerks in the different departments.

The large accumulation of the Patent Office fund occurred principally prior to the establishment of the system of examinations. On the first of January, 1837, it amounted to upwards of $300,000. Since that time the average amount of receipts over expenditures has not exceeded $10,000 per annum.

The labor and expense of making examinations is every year increasing as the field for examinations is constantly and rapidly widening. The Office is not justified in allowing a patent to issue until fully satisfied, as far as it has the means of becoming so, that the same invention has not been patented in this or any foreign country, nor been described in any printed publication, nor even been *discovered in the United States.* The models and portfolios of the Patent Office, and all printed publications in the library are, therefore, to be constantly examined, and, as these rapidly increase, the labor is augmented somewhat in the same proportion.

To give some idea of the amount of this labor, and of the rapidity of its increase, it may be stated that there are now in the Office very nearly 25,000 models, and about the same number of drawings in the portfolios. The number received within the last nine years is a little upwards of 17,000, and the number filed within the past year nearly 3,000.

The number of volumes in our library at this time is about 5,750: in 1847 it was only 1,850. There have been 1,550 added during the past year; most of these are works which require to be frequently referred to by the examiners in the course of the year.

From these facts it can be understood how the labor of examination is constantly increasing, and how the examinations of applications which once required but one examiner can now be scarcely performed by eighteen. The preceding table shows also that the number of Patents issued during the past year is considerably less than during the year previous. This is principally to be attributed to the fact that the changes and vacancies which occurred near the close of 1852 and in the early part of 1853, as well in the office of commissioner as in those of some of the examiners, left the Office less efficient than it would otherwise have been.

The following table shows that the number of Patents issued during

the last six months of the year is 583, against 375 issued during the first six months. With the present force, and their constantly increasing experience, it will be practicable to issue 1,200 Patents during the ensuing year.

The whole number of Patents issued during each month of the past year is as follows:

In the month of	January,	59	
" "	February,	39	
" "	March,	49	
" "	April,	68	
" "	May,	79	
" "	June,	81	—375
" "	July,	79	
" "	August,	100	
" "	September,	82	
" "	October,	124	
" "	November,	126	
" "	December,	72	—583
Total,			958

The number of cases on hand and undisposed of on the last day of each month in the year is as follows:

January,	544	July,	948
February,	692	August,	900
March,	782	September,	757
April,	859	October,	675
May,	945	November,	614
June,	1028	December,	582

These arrearages had augmented from 155 on the first of January, 1852, to 481 on the first of January, 1853. It will be seen that they constantly and rapidly continued to increase till the first of July, since which time they have been gradually diminishing.

On that day the act of the last session of Congress took effect, which gave the Patent Office eight clerks of the second class. As their duties are not prescribed by law, it was deemed expedient to detail one of their number to act as a second assistant examiner, in each of the six examiners' rooms. The experiment has fully answered the purpose intended, and will require to be made permanent. Even that augmentation of force will not be sufficient to keep the business of the Office in that state of forwardness which the wants of the country require, and additional arrangements should be made, if it is intended that applications shall be acted upon promptly as soon as made.

One of the objects sought to be accomplished by the appointment of this additional force, is to have a number of suitable persons in training, and ready to fill any vacancies in the corps of examiners

proper, that may at any time occur. These vacancies not unfrequently result from resignations, caused by the fact that a person well qualified for an examiner finds a more profitable employment elsewhere than in the Patent Office. One remedy for this would be to increase the compensation of the examiners: another, to prepare for filling the vacancies when they occur. The latter of these has been to some extent resorted to; the former, if deemed desirable, will require the further action of Congress.

The Patent Office should command the highest order of talent. There is no person, whatever be his abilities or his attainments, who would not find, as an examiner, full exercise for all his talents. A practical sound sense is nowhere more important. All learning connected with the arts and sciences finds here an ample field for exercise; and even questions of law, that tax to their utmost the abilities of the most learned jurists, frequently present themselves for the decision of the Office, and should be rightfully decided by the examiner.

The compensation of the lowest class of examiners should be such as to command abilities that, with proper training, would grace the highest; and the compensation of all should be sufficient to induce each one in this employment to content himself with making it a business for life, as the information he is daily acquiring is constantly increasing his usefulness.

From the fact that the Office during the last six months has been constantly gaining upon the work before it, there may be thought no necessity for an augmentation of its force. But the exertions of the past six months have rather overtasked some of the examiners; and as the number of applications is annually increasing, it will be very difficult to overcome the heavy arrearage still standing against us. When that is effected, much of the force of the Office might be very advantageously employed in digesting and indexing the books of reference belonging to the Office.

From the present number and rapid increase of our models, drawings, and books of reference as above shown, it is evident that the only way of preventing the Office from being overwhelmed with its increasing labors, is by systematizing and arranging every thing.

The increased space, of which we have an early promise, will enable us to do this with regard to the models and drawings; but with regard to the books of reference the case is more difficult. Many of these are wholly without indices. In other cases works containing from fifty to a hundred volumes have only a separate index to each volume. A reasonable amount of time appropriated to consolidating these indices, and to digesting and arranging the works in the library, would be undoubted economy; and by promptly reducing all new works to the same system of order and arrangement, augmentation will not tend to produce confusion, or even sensibly to increase the labor of examination.

Any increase of force will absolutely require increase of room for its accommodation. But for this difficulty a further number would before this time have been detailed on this duty, sufficient to have disposed of the greater portion of the present amount of arrearages, so that an application could have been acted upon within a few days after it was filed. The inability to do this is one of the greatest grievances of which inventors have to complain, and should be soon removed.

In fact, the present accommodations are altogether insufficient for the present force: one set of examiners, consisting of the principal and his two assistants, have to occupy a single room. Applicants and their agents must constantly have more or less intercourse with these examiners: the models of cases under examination are thus to some extent exposed to the observation of those who may make an improper use of such an opportunity. There should be the means of preserving greater secrecy than is now possible. Each set of examiners should be provided with two rooms, into one of which, containing the models of cases under examination, no one except a sworn officer should ever be permitted to enter.

The limited space assigned to the models in the Office has long occasioned serious inconvenience, and been the cause of just complaint by inventors. The crowded condition of those models not only prevents a proper arrangement, but necessarily exposes them to constant danger of injury and destruction. A large portion of them are consequently in a crippled condition, very discreditable to the Office, and detracting much from its usefulness.

So far as the patented models are concerned, this difficulty will be remedied as soon as the large hall in the east wing is ready for their reception. The space they now occupy will be barely sufficient, when divided into suitable rooms, for the proper accommodation of the library, the examiners, and the machinist.

The large number of models belonging to rejected applications would therefore still be left in their present condition, which is constantly growing worse as their number continues to augment. The law requires these to be arranged and preserved in the same manner as those of patented inventions. If a discrimination were allowed, some of these, being mere duplicates of other models, or representing contrivances wholly unpatentable, might be dispensed with, which would partially relieve their present crowded condition. But a considerable proportion of these rejected models are almost as useful as those of patented inventions. They show the different shapes in which, what the Office would regard as the same invention substantially, may present itself, and often furnish a far more satisfactory reference on which to reject a new application than could be otherwise obtained. For these reasons those models should, if possible, be brought from their present dark and incommodious recesses in the basement, and exposed to the clear light of the upper day, suitably arranged for convenient and ready examination.

There seems no other practicable way of effecting this object than to get possession of the large hall, now principally occupied by curiosities brought home by our exploring expeditions. These curiosities have no natural connection with the Patent Office, and would find a much more appropriate resting place within the walls of the Smithsonian Institution. There is plenty of room within that building for their reception and proper arrangement; and the only obstacle in the way is the expense attendant upon the care and custody of these vari-

ous articles, which those who have the management of that institution do not feel authorized to defray out of its limited income specially appropriated to other purposes. A small annual appropriation for this purpose by Congress would remove the difficulty that now prevents the restoration of this large hall to the use for which it was designed. It is respectfully submitted whether the dictates of sound policy, and even simple justice, do not require this small expenditure, in order that room should be provided in the Patent Office for the full exhibition and complete arrangement of all our models. If this were done, not only could all our models be properly disposed of, but specimens of fabrics and other manufactures and works of art, might be classified and arranged in the manner which the law now requires, but which requirement absolute necessity has always compelled the Office to disregard.

The rate of fees required to be paid into the Office needs a thorough revision. Perhaps they will require to be somewhat augmented; since, while the salaries and the number of persons in the Office have been all the while increasing, the fees have remained unchanged.

But an augmentation in amount is not so important as changes in other respects. It is believed that a tariff might be adopted which would be quite as acceptable to the inventors as the present, and at the same time bring a much greater income into the Office. If, for instance, the whole system of withdrawals were at once abolished, so that the inventors could keep their money in their own pockets until it was required to be paid, and when once paid it were never to be withdrawn, the fees might be even less than they are at present, and at the same time the available amount paid into the treasury would be greater.

Such an arrangement would be much more convenient for the Office, saving some labor, and the transmission of a considerable amount of money from the Office back to the unsuccessful applicant, and enabling us to know at any time the exact condition of our reliable finances, instead of having, as at present, near $50,000 lying idle in the treasury without a known owner. That money might have been much more usefully employed at home until it was wanted here.

Another change connected with this subject which seems to be imperatively called for, relates to the fee required of foreigners. That fee seems to the undersigned enormous and indefensible upon any principle of justice or sound policy. If a Patent is to be regarded as a downright gratuity conferred by the Government on the inventor, simple equity dictates that we should not impose more onerous conditions on the subjects of other governments than those governments exact from our own citizens. The stern rule of retaliation would ask for nothing more than such reciprocity.

Within the last two years Great Britain has greatly diminished her former high rates of Patent fees. It is believed that in no country in Europe are our citizens taxed for these purposes as severely as we now tax theirs. It is well known that some European governments impose a lower rate of fees on an American citizen than he would be required to pay by this Office; and yet we continue to charge a British subject $500, and any other alien $300, for that which we grant to our own citizens for $30.

But the granting of a Patent is not a mere gratuity by the Government: it is the recognition of an evident right in the inventor. No title to property can be more just or valid than his who has created that property. The rule of natural justice is the same in this respect whether the inventor be a citizen or an alien. It is right that the Government should charge the patentee with the expense of securing him in his title to what was before rightfully his own; but it is questionable whether a revenue should be sought from this source except in cases of great necessity. Is there any sufficient reason why the general rule should be departed from in the case of an alien?

It may seem reasonable that we should charge an alien the same fee that his government would charge one of our own citizens under like circumstances; but it should be recollected that European governments make no discrimination between natives and foreigners. The high or low rates are the same for all. Under such circumstances retaliatory measures are not resorted to by us in regard to any other subject.

The oppression to which an alien is subjected at home has never been held as a reason for oppressing him here, even prior to his taking steps to become a citizen. If he holds real estate, we do not levy extraordinary taxes thereon commensurate with what that same property would be taxed if owned in his country by one of our citizens. Why should a different rule be followed in regard to property in an invention?

But there is a reason, founded in sound policy, why greater liberality should be exercised towards a foreign inventor than towards the alien owner of tangible property. He pays a consideration, which the other does not: by taking out a Patent, he makes the subject thereof public property at the end of fourteen years. The benefits of the invention are then secure, and can never be lost to the world. High charges deter inventors from parting with their secrets. Many an invention is thus strangled in its birth, which, under other circumstances, might have been developed into something of vast consequence to the world.

There are no lost arts under a liberal and well-regulated Patent Office system; and this is one of its great advantages. If foreign nations choose to place these chief means of human progress in subordination to the requirements of their respective exchequers, we are forbidden to imitate them, both by the condition of our treasury and the well-established policy of our government.

Finally, while we extend the free and full benefits of all our institutions to the alien who comes hither to seek them, should not a course equally liberal be pursued in regard to inventions,—the creations of his ingenuity? Why should these be subjected to incapacities and discriminating taxation? In regard to them should not the whole world be regarded as one republic, of which we should seek to render our Patent Office the capital, wherein every region should be permitted a free representation? We tolerate no onerous discriminations against the foreign exhibitors in our Crystal Palaces. At the cannon's mouth we extend the protection of our flag to the alien who has simply declared his purpose of becoming a citizen, in the same manner as though he were native born. Ought we to levy a discriminating tax upon the offspring of genius that seek our shores for the express purpose of being naturalized among us?

From the preceding considerations it seems evident that a great change should be made as to the fees required from foreign applicants. It is respectfully submitted, whether the most convenient, wise, and beneficial rule will not be to abolish all distinctions growing out of geographical considerations, and to charge every applicant a fair remuneration for the trouble given by him to the Office, but no more.

Such a course would be just, generous, and noble; seeking to raise no revenue from those who are the special instruments of human advancement, showing a confidence in the capability of our own inventors to cope on equal terms with those of all the world besides, and taking no inconsiderable step in bringing about that great brotherhood of nations for which a higher civilization is gradually preparing the world.

A change in the manner of taking testimony to be used in cases pending before the Patent Office seems indispensable. There is at present no power to compel the attendance of a witness in such cases, nor to oblige him to answer questions; and it is even doubtful whether he can be punished for perjury. It will not be difficult to provide a remedy for this defect. It will be even practicable to enable a party to obtain a compulsory *affidavit*, or, in other words, to take an ex-parte deposition, to be used the same as an affidavit, which would often be a matter of very great consequence.

The present mode of appealing from the decisions of the Office is extremely inconvenient, and in many respects objectionable. The Patent Office should possess within itself the entire power to act upon a case up to the time when a Patent issues. The whole matter should then be turned over to the Judiciary. If it be thought expedient to have the action of a strictly legal mind brought to bear upon a Patent before it issues, that mind should form a portion of the Patent Office itself, and be made to exercise a supervisory influence upon all the Patents that are issued by the Office. At present the appellate power is vested practically in either of two highly respectable and intelligent judges, either of whom, under proper circumstances, would no doubt be able to exert a salutary supervisory influence over the Office and its decisions. But the two do not act conjointly, and therefore unity of decision is hardly possible. A few cases go up by appeal out of the hundreds that are decided by the Office. The appellate, and therefore controlling power, cannot be expected under such circumstances to give *tone and character to the action of the Office*. Besides, under the present practice, the drawings and models have to be removed from the Patent Office to the offices of the respective appellate judges: away from the custody of their proper keepers, they are often injured, and always liable to be destroyed or lost.

If it is thought expedient to have as wide a range for appeals as at present, it is believed that a much more convenient and judicious arrangement would be found in having a judicial officer to hear appeals from the decisions of the examiners, with the power of ultimate appeal to the commissioner.

Many other minor improvements in the practice of the Office might be suggested; but they would look to a general change in the existing laws on the subject. Should such a course be thought expedient, suggestions can readily be made to those having the matter in charge.

There is one very important question, entirely surrounded with difficulties, which deserves a passing notice. It relates to the practicability of preventing the protracted and expensive controversies that are almost sure to absorb a great portion of the value of every truly valuable patent during its proper lifetime, and which lay the foundation for many of the claims for extension presented to this Office.

To remedy this evil some have proposed that notice of the pendency of applications for Patents should be published, and that the Patent afterwards obtained should convey an absolute unquestionable title. But on the other hand it has been contended that this would introduce greater evils than it would cure; inasmuch as it might work a great injustice to many who would never hear of the notice, or who might not then be in a condition to engage in the controversy. Others have only proposed that after such a notice the Patent should be incapable of being collaterally brought into question, and, like a judgment at law, only be liable to be assailed by a direct proceeding, which would cut off much of the present litigation. But in opposition to this it has been objected that by giving such notice many a poor inventor would be harassed and prevented from procuring his Patent, which, if once obtained without the knowledge of evil-disposed opponents, might be at once turned to account. This objection has no small weight.

The least objectionable course on this subject (if any thing is to be done) would seem to be to allow the patent to issue without notice, as at present, and to possess only its present validity; but that the applicant, either in the beginning or at any subsequent time during its lifetime, should be permitted, if he thought proper, to have the notice given; and that the Patent, if afterwards obtained, should not thereafter be capable of being collaterally assailed.

It will be seen that the usual reports of examiners are herein omitted. This has been done in part because it was believed that their time might be more usefully employed; and in part because such reports rendered it almost impossible to avoid invidious distinctions between patentees who suppose themselves equally meritorious. It was thought a better course to give a clear and brief description of each patent, without further comment, and leave it to the public to make the proper discriminations. A mere publication of the claims, as has hitherto been done, conveys in most cases no adequate idea of the different inventions. It is confidently believed that the advantages resulting from having the Patents more fully described, and those which required it, or which could in that manner be made more perspicuous, accompanied by a cut showing the parts referred to, would be amply sufficient to justify the expense attending upon such an arrangement. The report has therefore been drawn up with a view to such an illustration of the different Patents.

The attention of Congress is invited to the importance of providing some adequate means of preventing attempts to obtain patents by improper means. Several cases have occurred during the past year wherein persons interested in pending cases have sent or offered money to the examiners having those cases in charge, for the purpose

of securing favorable action upon their respective applications. This has sometimes apparently been done through ignorance or thoughtlessness, but in other cases evidently with a premeditated corrupt intent. In cases of this kind it seems proper and necessary that penalties commensurate with the enormity of the offence should be visited upon the heads of wilful transgressors.

Respectfully submitted,

CHARLES MASON, *Commissioner.*

Hon. David R. Atchison,
President of the Senate.

CLASSIFIED LIST OF PATENTS THAT HAVE EXPIRED DURING THE YEAR 1853.

Class I.—Agriculture, *including instruments and operations.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Beehives	Samnel C. Myers	Mount Pleasant, Pa.	July 22
Beehives	John Sholl	New York, N. Y.	Nov. 29
Beehives, (additional improvement, March 29, 1841.)	William M. Hall	Wallingford, Conn.	Dec. 27
Churn	Milo B. Hough	Dover, Ohio	Jan. 21
Churn	John S. Thomson	Wyalusing, Pa	July 27
Corn-sheller	Alonzo R. Dinsmore	Westchester, N. H.	Feb. 28
Corn-sheller	W. McIlroy, jr., Bartley, and William Boon.	Greenwich, N. J.	Mar. 30
Corn-sheller	William R. Parker	Milton, Del	July 9
Corn-sheller	Lester E. Dennison	Saybrook, Conn	Aug. 12
Corn-sheller	Samuel H. Kisinger and E. G. W. Stake.	Williamsport, Md.	Oct. 81
Corn-sheller	John Mercer	Harrisville, Ohio	June 24
Cultivator, corn	John B. Smith	Norfolk, Va.	April 15
Cultivator, garden, (antedated Oct. 10, 1838.)	John B. Smith	Norfolk, Va.	April 10
Harrows, revolving	Moses G. Cass	Utica, N. Y.	Sept. 10
Hulling clover-seed and other grass-seed.	Abraham Keagy	Morrison's Cove, Pa.	June 24
Mowing-machine	Asa P. Trask and Davis Aldrich.	Ellington, N. Y.	Oct. 16
Mowing, attaching scythes to snathes	Ebenezer G. Lamson	Shelburne, Mass.	July 2
Plough	William Small	North Argyle, Mass.	April 22
Plough	Ebenezer G. Whiting	Racine, Wiscon. Ter.	July 31
Plough	Ambrose Barnaby	Ithaca, N. Y	Sept. 11
Plough	Josiah Dutcher	New York, N. Y	Oct. 9
Plough, coupling, &c	J. Card and G. Newell	Mentor, Ohio	Nov. 9
Plough, hill-side and horizontal	John W. Jordon	Lexington, Va	April 19
Plough, mould-board of	S. Witherow and David Pierce	Philadelphia, Pa	Oct. 5
Rake, hay and grain harrow	George Davis	Belmont, Ohio	July 22
Rake, hay and grain, rake-teeth for, (extended.)	Hezekiah Haynes	Middletown, Vt	June 18
Rake, hay, revolving	E. B. and M. D. Wells	Morgantown, Va	Sept. 20
Seeding, planting corn	Niram R. and Orin G. Merchant	Guilford, N. Y	Oct. 12
Seeding, planting corn, &c	David S. Rockwell	New Canaan, Conn	Mar. 12
Seeding, planting-machines	Moses Atwood, jr.	Hampstead, N. H.	June 24
Seeding, planting-machines	John M. Forrest	Princess Ann c. h., Va.	June 25
Seeding, sowing grain, plaster, &c	Samnel Hoffer	Londonderry, Pa	July 17
Seeding, sowing seed	M. and S. L. Seward	Guilford, Conn	July 27
Smut-machine	William C. Grimes	York, Pa	Mar. 25
Smut-machine	John B. Yates	Sherryville, Va	Oct. 12
Smut-machine, (extended.)	Leonard Smith	Plattsburgh, N. Y	Oct. 18
Smut-machine	Luther B. Walker	Orangeburgh, N. Y.	Oct. 18
Smut-machine	Samnel W. Foster	Scio, Mich	Dec. 21
Smut-machine, cleaning grain	George Mann, jr.	Lockport, N. Y	June 29
Smut-machine, cleaning grain	Thomas McCrea	Ann Arundel, Va	Aug. 9
Smut machine, cleaning wheat	Elisha W. and Wm. B. Young	Parkman, Ohio	July 2
Thrashing-machine, and cleaning grain	Matthew McKeever	Staunton, Va	Mar. 15
Thrashing-machine, shelling and hulling grain.	Thomas Elliott, jr.	Middletown, Ky	Mar. 26
Thrashing-machine, teeth for	Jeremiah Wrightson	Tobacco Stick, Md.	May 17
Winnowing-machine, fanning-mill	Alfred Ervin	Jefferson, Md.	Sept. 30

Class II.—Metallurgy *and manufacture of metals and instruments therefor.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Bolts and nuts, and squaring and finishing the heads of, (additional improvement, Sept. 10, 1840.)	John Bellemere	Philadelphia, Pa.	Sept. 25
Dressing iron and other substances	John G Tibbets	New York, N. Y.	June 21
Drilling iron	John H. Currier and Wing H. Taber.	Fairhaven, Mass.	July 8
Drilling metallic and other substances	Elisha Hall	Byron, N. Y.	Aug. 29

Classified list of expired patents.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Forges, blacksmiths', producing the blast for.	William and Heman W. Sharp...	Catherine, N. Y.....	Aug. 2
Furnace, blacksmiths', burning anthracite.	Edward Nichols and Jas. Augur.	Hampden and New Haven, Conn.	Aug. 21
Furnace, revolving fan-wheel for, (extended.)	Frederick P. Dimpfel..........	New York, N. Y....	Dec. 28
Furnace, smelting iron ore, (extended.)..	Augustus Roth..........	Pottsville, Pa........	Oct. 31
Hammers and hatchets, socket of.......	Phineas Eastman..........	Canaan, N. H........	July 17
Latch, door....................	Henry Duntze	New Haven, Conn...	July 6
Lock and double-catch bolts	Conrad Leibrich	Philadelphia, Pa....	Oct. 5
Lock, door, (additional improvement, January 14, 1840.)	Erastus Finney	Cleveland, Ohio.....	June 18
Lock, door, and latches	Nathan and Caleb Hunt	Cleveland, Ohio,....	July 29
Lock, door, safety, (antedated March 14, 1839.)	William Stillman	Westerly, R. I......	Sept. 14
Nails, making..........	Walter Hunt..........	New York, N. Y....	Nov. 12
Needles, manufacture of	Abel Morrall..........	Studley, Gt. Britain.	Dec. 21
Padlocks and other locks	Joseph Nock	Philadelphia, Pa....	July 16
Pipes, casting and drawing lead	Joseph C. Vaughn and Frederick Leach.	Tioga, N. Y..........	Dec. 31
Punching metal..........	Samuel H. Brown..........	Wheeling, Va.......	Aug. 14
Rivets, making	Francis A. Cannon	Boston, Mass........	Sept. 25
Riveting metallic plates for boilers......	Robert Smith..........	Great Britain	Sept. 3
Saw-set	Joseph Beach and David Culver .	Hartford, Conn......	Sept. 20
Screws, wood, and rivets, turning the heads of.	Henry Crum..........	Charlestown, N. Y..	Nov. 16
Screw-wrench	Henry W. Hewet	Troy, N. Y..........	Aug. 24
Sockets for holding tools, (extended.)...	Herrick Aiken..........	Franklin, N. H......	Dec. 27
Stirrups for saddles..........	John Carrel..........	Petersburgh, Va.....	June 7
Tin, &c., double-seaming	Hiram Van Pelt and Benj. Armstrong.	Troy, N. Y..........	Sept. 30
Tuyere, iron, blacksmiths', (antedated December 21, 1838.)	John Shugert..........	Elizabeth, Pa........	May 9
Umbrella-runner..........	Joseph Barnhurst	Francisville, Pa.....	June 25
Vice	John Wetherell..........	Alleghany, Pa........	April 22
Window-blind fasteners	Mileden M. Isbel..........	New Haven, Conn...	June 29
Wire rope, round, flexible	Isaac McCord..........	Harrisburgh, Pa....	July 6

CLASS III.—MANUFACTURES OF FIBROUS AND TEXTILE SUBSTANCES, *including machines for preparing fibres of wool, cotton, silk, fur, paper, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Carding machine, wool	Nathan Freeman..........	Lowell, Mass........	Dec. 31
Cloth, napping and making water-proof..	William K. Phipps..........	Framingham, Mass..	Aug. 31
Cocooneries, lodgements in, &c..........	Sol. M. Jenkins, M. D..........	Easton, Md..........	Sept. 28
Cordage, long, manufacturing..........	William E. Maginnis..........	Philadelphia	Nov. 9
Cordage, manufacturing	Alfred Hathaway..........	Boston, Mass..........	July 9
Cordage, twine and cord..........	Jacob Sloat..........	Sloatsburg, N. Y.....	Nov. 9
Cotton, roping	Jesse Whitehead..........	Manchester, Va.....	June 24
Felt, making, in the manufacture of fur hats.	Hezekiah S. Miller	Philadelphia, Pa....	Mar. 5
Flier and bobbin for twisting silk	Oliver Ellsworth	Hartford, Ct..........	July 12
Gin, cotton	William Whittemore, jr..........	W. Cambridge, Mass.	May 25
Gin, cotton	Henry Conklin..........	Poughkeepsie, N. Y.	June 7
Gin, cotton	John Beath..........	Boston, Mass..........	July 12
Hats, coloring..........	George M. Johnson	Port Deposite, Md...	Dec. 31
Hats, napping..........	Andrew Rankin..........	Newark, N. J........	Sept. 30
Loom, hand, for weaving fringe	Eliza Ann B. Judkins..........	Portland, Me..........	Feb. 2
Oakum, making..........	James Tibbals	Haddam, Ct..........	Feb. 8
Paper, making..........	Wm. and Abij. L. Knight and Edward F. Condit.	Whippany, N. J.....	Sept. 25
Paper, sizing..........	W. W. Wilson and Charles Dickerman.	Westfield, Mass.....	Aug. 8
Pulp-dressing, of which paper is made..	Nathaniel Hebard..........	Dorchester, Mass....	Dec. 27
Reel for chalk-lines..........	Gerard Sickles..........	Middletown, Conn...	Dec. 31
Reeling, spinning, and twisting silk.....	Jacob Pratt..........	Sherburne, Mass....	Oct. 12
Silk-twisting..........	Gamaliel Gay..........	Philadelphia, Pa....	June 7
Spinning, cop-speeder for..........	Truman Estes & Warren Dutcher.	Bennington, Vt.....	July 26

Classified list of expired patents.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Spinning hemp and other fibrous materials.	Charles W. Brown	Roxbury, Mass......	July 16
Spinning hemp, flax..........	Moses Day..........	Roxbury, Mass......	June 24
Spinning wool, (antedated Feb. 22, 1839.).	Isaac B. Hartwell	Northfield, Vt.......	June 7
Winding, spooling wool from the breaker carding-machine.	Zachariah Allen..........	Providence, R. I....	Sept. 10
Wool-burring..........	Henry Concklin..........	Poughkeepsie, N. Y	July 6

CLASS IV.—CHEMICAL PROCESSES, MANUFACTURES, AND COMPOUNDS, *including medicine, dyeing, color-making, distilling, soap and candle making, mortars, cements, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Acid, sulphuric, manufacturing	James Hargreaves	Patterson, N. J......	Aug. 24
Caoutchouc, manufacturing various articles, preparing with sulphur.	C. Goodyear, (assignee of N. Haywood.)	Boston, Mass..........	Feb. 24
Cement, artificial stone, &c., forming .	John Danforth Greenwood and Richard Wynn Keene.	England..........	Oct. 9
Composition for burning in lamps	Isaiah Jennings	New York, N. Y....	Dec. 31
Fluid, blue, for writing..........	Henry King	Baltimore, Md......	Nov. 7
Iron, protecting from oxidation	Palmer Sumner and P. Naylor...	New York	Oct. 18
Lead, white, manufacture of..........	Chas. Button & Harrison G. Dyar.	London, England ...	April 10
Lead, white, separating the oxide of lead.	Edward Clark	Saugerties, N. Y.....	July 11
Lead, white, separating the oxide of lead.	Edward Clark	Saugerties, N. Y.....	Dec. 5
Liquids, mode of exaporating	William Henry..........	Laporte, Ind..........	Jan. 8
Matches, friction, composition of matter.	John H. Stevens	New York, N. Y....	Nov. 16
Matches, friction, preventing accidental ignition.	John H. Stevens	New York, N. Y....	Nov. 16
Matches, friction, retaining fire..........	John H. Stevens	New York, N. Y....	Nov. 16
Soap, process of manufacturing	Arthur Dunn	Stamford Hill, G. B.	Aug. 28
Soda, carbonate, of, manufacturing ...	John Hemming .... Harrison Gray Dyar	England .... Citizen U. S. in Eng.	June 24
Turpentine, oil of, process of rectifying, which he calls camphine	Aug. V. H. Webb..........	New York..........	Feb. 19

CLASS V.—CALORIFICS, *comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Coal sifters	Horace Wells..........	Hartford, Conn......	Dec. 31
Drying flour..........	John Ballantine and Adam Clark.	Zanesville, Ohio.....	March 4
Drying grain	Richard Else	Middlesex co., Eng..	Aug. 14
Fireplace..........	Sarah Hammond..........	Baltimore, Md......	June 25
Flues of cooking-stoves..........	Ebenezer Ferren..........	Haverhill, N. H....	Nov. 12
Flues of cooking-ranges	Ebenezer Barrows	Boston, Mass........	Dec. 31
Flues of stoves	Linus North..........	Palmyra, N. Y......	Oct. 31
Flues of stoves	Micah Ketcham & W. A. Wheeler	Boston, Mass........	Nov. 25
Furnace, economizing fuel and consuming smoke (extended.)	Frederick P. Dimpfel	New York, N. Y....	May 9
Galley, ship's, for the distillation of salt water (extended.)	Enoch Hutchinson..........	Baltimore, Md......	May 20
Gas burners, argand..........	Geo. Darricott and Joseph Nason	Boston, Mass	July 26
Kettles, sugar, setting and arranging ...	Maunsel White	New Orleans, La....	Sept. 17
Lamps, burning cam hene..........	Augustus V. H. Webb	New York..........	Feb. 19
Lamps, regulating the flame of..........	John S. Tough..........	Baltimore, Md......	July 17
Lamps, glass sockets for	Henry Whitney & Thos. Leighton	Cambridge, Mass....	Jan. 11
Lamps, screw head for	Patrick J. Clark	Meriden, Ct..........	June 7

Classified list of expired patents.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Lights, revolving, for light-houses	Benjamin F. Willard	Boston, Mass.	Feb. 20
Ovens, portable	Thaddeus B. Curtis	New Haven, Ct.	June 27
Stoves, coal, applied to furnaces	Eliphalet Nott	Schenectady, N. Y.	July 26
Stoves, coal or wood	Judson B. Galpin	New Haven, Conn.	Aug. 14
Stove, cooking (extended)	Darius Buck	Albany, N. Y.	May 20
Stove, cooking	Micah Ketcham	Boston, Mass.	May 25
Stove, cooking	Elihu Smith	Troy, N. Y.	Aug. 9
Stove, cooking	James Devine	Rochester, N. Y.	Aug. 24
Stove, cooking	Elbridge McCollum	Weare, N. H.	Sept. 20
Stove, cooking	Noble Peck	Carmel, N. Y.	Sept. 30
Stove, cooking	George D. Boyce	W. Wareham, Mass.	Dec. 27
Stove, cooking, coal, anthracite	William Davis and R. W. Lord	New York	Nov. 23
Stoves, cooking, draught arranging	John L. Lathrop	Provincetown, Mass.	Dec. 31
Stoves, cooking, with elevated ovens	John P. Williston and Willard A. Arnold.	Northampton, Mass.	Nov. 16
Stoves, cooking, Franklin	Abner R. Ring	Parma, N. Y.	Dec. 12
Stove, cooking, railway	Anson Atwood	Troy, N. Y.	April 10
Stoves, cooking, valve of	Hiram Root	Deerfield, Mass.	Sept. 3
Stoves, draught of, changing by an elliptical valve	Horace Bushnell	Hartford, Conn.	June 21

CLASS VI.—STEAM AND GAS ENGINES, *including boilers and furnaces therefor, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Boilers, steam	Rd. Varick De Witt	Albany, N. Y.	Sept. 25
Boilers, steam, furnaces of, increasing combustion by the decomposition of steam.	Lucien Maillard	New York, N. Y.	May 18
Boilers, steam, furnaces of, supplying steam to promote combustion	John B. Petitval	Charleston, S. C.	July 17
Boilers, steam, inverted arch	John C. F. Saloman	Cincinnati, Ohio.	Nov. 16
Boilers, steam, preventing explosion of.	Philip C. Friese	Baltimore, Md.	April 10
Boilers, steam, preventing explosion of (extended.)	Cadwallader Evans	Pittsburgh, Pa.	April 15
Boilers, steam, preventing explosion of.	William H. Hale	Brooklyn, N. Y.	Sept. 14
Boilers, steam, preventing explosion of.	Isaac N. Coffin	Washington, D. C.	Sept. 30
Spark arresters	Henry Wilton	Wrightsville, Pa.	Aug. 17
Spark arresters	William Knight	Chambersburg, Pa.	Oct. 26
Spark arresters	Leonard Phleger	Philadelphia, Pa.	Nov. 25
Spark arresters	Nicholas Turbutt	Fredericktown, Pa.	Dec. 7
Steam-engine, &c., apparatus to be substituted for the piston cylinder of.	Abram Patterson	Rush, Pa.	Feb. 26
Steam-engine, locomotive, ascending inclined planes.	Davis H. Dotterer and Thomas Jackson.	Reading, Pa.	Mar. 25
Steam-engine, locomotive, supplying water to.	Stephen Vail	Speedwell Iron Works, Morristown, N. J.	July 12
Steam-engine, rotary	Roger M. Sherman	Fairfield, Ct.	Mar. 12
Steam-engine, rotary	John Drummond	Elizabethtown, N. J.	Aug. 3
Steam-engine, rotary	Wm. H. Baker & Sml. H. Baldwin	Cohoes, N. Y.	Aug. 21
Steam-engines, valves, safety	John S. Bakewell	Pittsburgh, Pa.	Dec. 21

Classified list of expired patents.—Continued.

CLASS VII.—NAVIGATION AND MARITIME IMPLEMENTS, *comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving-dresses, life-preservers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Boats, life and anchor	Joseph Francis	New York, N. Y.	Jan. 11
Boats, life, constructing	George James	Philadelphia, Pa.	Jan. 21
Boats, towing on canals	Thomas Jackson	Reading, Pa.	June 25
Propelling boats, &c., canal and other	Wm. Leavenworth	New York, N. Y.	April 18
Propelling boats and other vessels	Benjamin D. Beecher	Prospect, Conn.	Dec. 31
Raising canal boats for repairing	N. R. Penrose and S. F. Palmer	Beaver Meadow, Pa.	May 11
Ships, preventing dragging their anchors, &c.	Russel Evarts	Madison, Ct.	Nov. 25

CLASS VIII.—MATHEMATICAL, PHILOSOPHICAL, AND OPTICAL INSTRUMENTS, *including clocks, chronometers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Area of irregular figures, mode of finding.	Thomas Wood	Smithfield, Ohio	July 22
Lightning conductors	Joseph S. Barber	Gloucester	Mar. 5
Odometer	Smith Beers	Waterbury, Conn.	Sept. 14
Spectacles, preparing the glasses, &c.	Charles H. L. Jackson	New York	April 20
Spectacles, revolving glasses, &c.	Christopher H. Smith	Niagara Falls, N. Y.	June 29
Spectacles, side glasses	Daniel Thaxter	Hingham, Mass.	June 18

CLASS IX.—CIVIL ENGINEERING AND ARCHITECTURE, *comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, wiers, dams, and other internal improvements, buildings, roofs, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Blinds, window	Alonzo S. Grenville and Thos. John Lewis.	Cambridge & Boston, Mass.	Aug. 9
Boring earth, auger for	George Page	Baltimore, Md.	May 8
Bridges, construction of	Henry Wilton	Wrightsville, Pa.	June 24
Bridges, lattice	Herman Haupt	York, Pa.	Dec. 27
Bridges, wooden brace	Stephen H. Long	United States Army.	Nov. 7
Bridges, wooden frame suspension (extended).	Stephen H. Long	United States Army.	Nov. 7
Canal locks, balance for	Josiah White	Philadelphia, Pa.	May 17
Canal locks, sliding valves	William Lake	Richmond, Va.	June 7
Canal locks, wicket gates for	William L. Potter	Clifford Park, N. Y.	Aug. 31
Drag for removing stones from the bottom of lakes.	Philander Lee	Lyme, N. Y.	Oct. 31
Dredging machine	Wm. P. Brayton & Jas. Hamilton	New York, N. Y.	Jan. 8
Drilling rocks	Isaac M. Singer	Lockport, Ill.	May 16
Excavating and removing earth	George W. Cherry	Washington, D. C.	Jan. 16
Excavating and removing earth, crane excavator for (extended).	William S. Otis	Philadelphia, Pa.	Feb. 24
Excavating and removing earth, scraper for.	John Scholder	Canton, Ohio	Sept. 25
Houses, portable, constructing	Frederick S. Barnard	Philadelphia, Pa.	Dec. 21
Inclined planes on railroads, ascending and descending.	William F. Ketchum	Buffalo, N. Y.	Mar. 20
Inclined planes on railroads, ascending and descending.	John Mercer	Harrisville, Ohio	June 21
Inclined planes on railroads, ascending and descending.	John Drummond	Elizabethtown, N. J.	June 21
Railroad, chairs of, &c.	Moncure Robinson	Philadelphia, Pa.	Mar. 16
Railroad, chairs of, &c.	Brittom M. Evans	Lancaster, Pa.	Dec. 27
Railroad, cleaning the rails, &c.	Thomas S. Ridgaway	Pottsville, Pa.	Oct. 31

Classified list of expired patents.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Railroad, cleaning the tracks	John N. Dennison & Elias Kirkpatrick.	Plainfield, N. J	July 29
Railroad, construction of	James Stimpson	Baltimore, Md.	July 26
Railroad, switches for, self-adjusting	John C. Past	Morrisville, Pa.	Aug. 21
Railway cars, and mode of fastening	Edward Tilghman	Philadelphia, Pa.	Dec. 5
Roofs, covering with metal	Peter Naylor	New York, N. Y	Sept. 11
Snags, sawing or cutting	James Hamilton	New York	June 27
Streets and roads, grading	Randal Fish	New York	Nov. 9
Stump extracting	Benjamin Burling	Catherine, N. Y	June 25
Walls and ceilings, protecting from fire	Peter Naylor	New York	Feb. 22

CLASS X.—LAND CONVEYANCE, *comprising carriages, cars, and other vehicles, used on roads and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Brakes, arresting the motion of carriage wheels.	Cyrus Walker	Lewisbury, Va.	July 8
Brakes, safety, self-acting, for railroad cars.	George S. Griggs	Roxbury, Mass.	Dec. 31
Carriage bodies, hanging	Azlma Vallerchamp	McDowellsville, Pa.	Oct. 12
Carriage bodies, hanging	Dimon B. Barnum	New Field, Ct.	Oct. 16
Carriage bodies, hanging	Ira W. Brittan	Medina, Ohio	Oct. 25
Carriage, railroad, constructing	Lewis J. Germain	Cattskill, N. Y	May 7
Carriage shaft, clip for	John Cooper	New York	Jan. 22
Coaches, pleasure carriages, and railroad cars.	Thomas Shriver	Cumberland, Md	Nov. 7
Journals of railroad cars, constructing the bearings and oil boxes.	John H. Tims	Newark, N. J	Oct. 31
Sleighs	Daniel Carpenter	Nelson, N. Y	Sept. 20
Springs, elliptical, for carriages	Frankling Hatch and Jonathan W. Terry.	South Cortlandt, N. Y	July 10
Springs, elliptical, for carriages	Sumner King	Connecticut	Oct. 31
Springs, elliptical, setting and fitting	George J. Neveil	Philadelphia, Pa	Sept. 20
Springs for railroad carriages	Patrick Riley	Shamokin, Pa	June 21
Tire, bending	Aaron Whitcomb	Choconut, Pa	Aug. 21
Wagons, carts, &c., attaching boxes to	Jason C. Osgood	Chittenango, N. Y	Sept. 28
Wheels, boxes, and axles of carriage, applying anti-friction rollers to.	George G. Tibbets	New York, N. Y	July 22
Wheels, boxes for axle-trees and gudgeons (extended).	Isaac Babbitt	Boston, Mass	July 17
Wheels, car	David Cockley	Lancaster, Pa	Oct. 29
Wheels, car, iron	William W. Pennell	Lancaster, Pa	Feb. 8
Wheels for carriages	Elisha Tolles	Hartford, Conn	Dec. 27
Wheels, carriage, hubbands for	Samuel Farrand	Newark, N. J	June 11
Wheel-hubs and axles for cars, cutting the seats.	Thomas J. Butter	Johnstown, Pa	Dec. 31
Wheel-hubs, carriage, attaching to the arms of axle-trees.	George Hunt	Prattsville, N. Y	July 8
Wheel-hubs, carriage, attaching to axles	John Loudon, jr	Auburn, N. Y	Oct. 12

CLASS XI.—HYDRAULICS AND PNEUMATICS, *including water-wheels, windmills, and other implements operated on by air or water, or employed in the raising and delivery of fluids.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Bellows, portable	Alexander Ewing	New York	Oct. 31
Cocks, molasses gate	Jonathan D. Kellogg and Jus. Wright, assig. to J. D. Kellogg.	Northampton, Mass.	Aug. 16
Cocks, molasses gate	Jervice Whittemore	Boston, Mass	Oct. 9
Cocks, stop	Chas. F. Johnson & J. J. Speed, jr.	Oswego & Ithaca, N. Y	June 21

Classified list of expired patents.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Cocks, stop	Air Davis	Boston, Mass	Oct. 16
Engine, fire	John Williams, jr	Salem, N. Y.	May 11
Pump, cattle	Andrew Bailey	Jefferson, Ohio	Aug. 3
Pump, double, preparing moulds for casting.	Foster Henshaw	Brookfield, Mass.	June 29
Pump, force, for wells, constructing the parts.	Thos. W. H. Mosely	Paris, Ky	Sept. 30
Pump, stone, water-tight joints	Abraham Van Vorhes	Hebardsville, Ohio	May 3
Water-wheel	Eliza Martinean, adm'x of John Martinean, deceased.	Elbridge, N. Y	April 18
Water-wheel	William C. Bishop	Ovid, N. Y	Sept. 5
Water-wheel	Timothy Rose	New York	Oct. 18
Water-wheel, letting the water on	Thomas Ruble	St. Marys, Ind	Aug. 29
Water-wheel, reaction, moulding preparatory to casting	Stephen Parsons	Edgecomb, Me	April 13
Water-wheel, spiral bucket	Lorenzo D. Adkins	Perry, Ohio	May 17
Windmill	Wantsford Evans	Dumfries, Va	July 12

CLASS XII.—LEVER, SCREW, AND OTHER MECHANICAL POWER, *as applied to pressing, weighing, raising, and moving weights.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Balance, or counter scales, for weighing.	George White	Louisville, Ky	Nov. 16
Balance, scales for weighing	Jonathan Ball	Buffalo, N. Y	April 20
Jack-screw	Stephen Vail	Morris, N. Y	May 7
Press, cheese	Adin Gaunt	Springfield, N. J	July 6
Press, cheese	Wm. W. Townsend	Shoreham, Vt	Dec. 18
Press, construction of	John J. Wise	Baltimore, Md	May 16
Press, cotton	Jas. R. Hitchcock & W. F. Serrell.	New York, N. Y	Sept. 30
Press, cotton	John Price	Nashville, Tenn	Dec. 7
Press, cotton and hay	Charles W. Hawkes	Brunswick, Me	April 13
Press, cotton and hay	Joseph C. Baldwin	Staunton, Va	Feb. 22
Weigh locks, for weighing canal boats and other bodies.	Jeremiah Brainard	Rome, N. Y	July 17

CLASS XIII.—GRINDING-MILLS AND MILL-GEARING, *containing grain-mills, mechanical movements and horse-powers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Coffee-mill	John Rittenhouse	Germantown, Pa	July 2
Grinding and crushing corn, mill for	J. C. and C. B. Baldwin	Virginia	June 26
Grist-mill	David D. Wagener	Pittsburg, Pa	Jan. 8
Grist-mill	Oliver Wyman	E. Cambridge, Mass.	April 18
Grist-mill	Henry Pearce	Cincinnati, Ohio	July 28
Horse-power	William E. Arnold	Rochester, N. Y	April 26
Horse-power, endless chain	Moses Davenport	Phillips, Me	July 10
Mill, paint	Joseph W. Webb	Mount Morris, N. Y.	Feb. 15
Mill, spindles for	Joseph C. Gentry	Dayton, Ohio	Sept. 25
Millstones, dressing	Shadrach Trumbull	Suffield, Ct	Aug. 2
Motion, double-acting, reciprocating	Christian Willson	Bedford, N. Y	Oct. 5
Motion, in machinery, to be used as a substitute for cog-gearing, mode of increasing, reducing, and communicating.	Frederick S. Barnard	New York, N. Y	Sept. 10
Power, manual, mode of driving machinery.	Ammi West	Greene, Maine	Aug. 16
Shafts, vertical, and spindles, preventing friction and adhesion in the steps or gudgeons of	Stephen Parsons	Edgecombe, Maine	June 7

Classified list of expired patents.—Continued.

CLASS XIV.—LUMBER, *including machines and tools for preparing and manufacturing, such as sawing, planing, mortising, shingle and stave, carpenters' and coopers' implements.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Barrels, vents for	Samuel Pike	Brattleboro', Vt.	July 12
Boring posts	William H. Shay	New York, N. Y.	Nov. 25
Boring timber	Moses Hubbell, (assignee of Roswell Hubbell.)	Sheffield, Ohio	Oct. 26
Boxes, wooden, preparing wood for	Jacob Bentz	New York	Sept. 20
Mitering and dovetailing boards	Richard Urann	Boston, Mass	Oct. 26
Mitering and dovetailing the ends of boards, &c.	Air Davis	Princeton, Mass	Aug. 21
Mortising, tenoning, and boring machine.	Barnt Richtmyre and James H. Martin.	Conesville, N. Y.	July 16
Planing-machine	Freeman Walcott and James H. Hutchinson, (Hutchinson, assignee of Walcott.)	Boston, Mass	July 16
Saw, circular, preparing blocks for matches.	Jonathan Morgan	Portland, Me	June 27
Saw, circular, relieving the collar of a	Manassah Andrews & James Sproat	Taunton, Mass	Dec. 31
Saw-mills	Eden Baldwin	Ashfield, Mass	Jan. 31
Saw, rotary, for cutting round tenons	Charles Whitsitt	Connersville, Ind.	Sept. 25
Screws, cutting in wood	Samuel H. Wills	Abingdon, Va	June 18
Shingles, cutting	Ludram M. Parsons	Castleton, Vt	Mar. 12
Shingles, cutting	Justus Hinman, John Thatcher, and Alonzo Palmer.	Persia, N. Y	Mar. 25
Shingles, cutting from steamed, boiled, or other timber.	Daniel C. McMillen, John B. Knoll, Thomas S. Henry, and Matthew Knoll.	Persia, Collins, and Tully, N. Y.	Sept. 10
Shingles and heading for barrels, cutting from steamed or boiled timber.	J. Burt and E. Smith	Sullivan, N. Y	July 9
Shingles, sawed, planing and dressing	Oliver N. May	Windsor, N. Y	April 29
Staves, blind-slits, cutting	Hardin Branch	New York, N. Y	May 3
Staves, cutting	Jonathan Burt and Erasmus Smith.	Sullivan, N. Y	June 29
Staves, sawing	Royal E. House	Choconut, Pa	Aug. 12
Staves, sawing	Hart Pepper	Southwick, Mass	Sept. 3
Tools used in the manufacture of barrels.	William G. Burr	Mount Pleasant, N.Y.	Oct. 12

CLASS XV.—STONE AND CLAY MANUFACTURES, *including machines for pottery, glass-making, brick-making, dressing and preparing stone, cements, and other building materials.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Brick-press	Daniel Carpenter	Cortland, N. Y	July 26
Clay and mortar, mixing, for making brick	Ansel Teall	Waterloo, N. Y	Mar. 12
Kiln, lime	A. H. Tyson	Baltimore, Md	Sept. 28
Mortar, preparing for the manufacture of bricks.	Oran W. Seeley	Sodus, N. Y	Mar. 5
Pipes, earthen or cement, for conveying water.	Charles Stearns	Springfield, Mass	May 8

Classified list of expired patents.—Continued.

CLASS XVI.—LEATHER, *including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Boot-crimps	Joseph Sanderson	Cincinnati, Ohio	June 7
Boot-crimps	Horace Ferre	Springfield, Mass	Sept. 25
Boots and shoes, cutting	Jeremiah B. Keen	Bridgeton, N. J.	June 21
Boots and shoes, heel-plates for	Wm. Lewis and Wm. H. Lewis	New York	Oct. 31
Crimping leather, machine, regulating the jaws.	John Goodwin, jr.	Sterling, Mass	May 30
Curriers' and tanners' knife, sharpening.	Warren Egleston	Troy, N. Y	Jan. 8
Harness, bridle-bit, for horses	Dan. Shaw Balch	Bradford, Vt	Aug. 23
Hides, constructing rollers for pressing	Lewis R. Palmer	Maryland, N. Y	Dec. 31
Leather, rolling	Thomas J. Patterson, (assignee of Wm. Coburn.)	Mount Joy, Pa	Oct. 31
Leather, splitting	Horace White	Binghamton, N. Y	Aug. 2
Leather, stitching	Samuel Sheldon	Cincinnati, Ohio	Aug. 3
Tanning hides and skins	William Herapath	Bristol, England	May 30

CLASS XVII.—HOUSEHOLD FURNITURE, MACHINES, AND IMPLEMENTS FOR DOMESTIC PURPOSES, *including washing machines, bread and cracker machines, feather-dressing, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Bedsteads, attaching curtain-posts to	Thomas Early	Washington co., Tenn.	Jan. 8
Bedsteads, constructing	C. J. Fountain, J. F. Adams, and G. F. Hillyer.	New York	April 20
Bedstead fastening	Joseph Rodefer	Cincinnati, Ohio	Dec. 18
Bedstead, sofa, raising or inclining	Edmund Cherrington	Boston, Mass	Feb. 9
Bedstead, tightening sacking-bottom of.	John Hart	Nicholasville, Ky	June 21
Bedstead, tightening sacking-bottom of.	Benijah Bosworth	Fayette co., Ky	Dec. 14
Bells, hanging and mode of constructing.	Ebenezer Dewey	New York, N. Y	April 10
Brooms, metallic clasp or head for	Isaac Cheney	Leyden, Mass	June 25
Crackers and biscuit, making and baking.	Benjamin F. Mason	Kennebunk-Port, Me.	June 6
Cutting potatoes	Abel Williams	Ashfield, Mass	Mar. 12
Sausages, making	G. D. Metettal	Pittsburg, Pa	Aug. 29
Washing-machine	Samuel Swett, jr	Portsmouth, N. H	July 12
Washing-machine	Isaac Leavitt, Adnah Gilmore, and William Sturtevant.	Turner, Me	Aug. 9

CLASS XVIII.—ARTS, POLITE, FINE, AND ORNAMENTAL, *including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Ink, supplying to the pens of paper-ruling machines.	Lewis Edwards	Norwich, Ct	Aug. 31
Music, writing	Thomas Harrison	Springfield, Ohio	Oct. 26
Pen-holder	William Fife	Philadelphia, Pa	Sept. 28
Pencil-case, ever-pointed	John Hague	New York, N. Y	Aug. 16
Pencil-case, ever-pointed	J. Stockman and S. L. Hopper (assignees of G. W. Simons.)	Philadelphia, Pa	Oct. 12
Piano-forte	William Cumston	Boston, Mass	Aug. 8
Piano-forte	Jonas Chickering, John Mackay, and William H. Mackay (assignees of Alpheus Babcock)	Boston, Mass	Oct. 31
Piano-forte, action of	John J. Wise	Baltimore, Md	June 27
Piano-forte, action of	Hiram Herrick	New York	Oct. 26
Printing press	William and Thomas Schnebly	Hagerstown, Md	Sept. 7
Printing-press	J. Lemuel Kingsley	New York	Oct. [illegible]

Classified list of expired patents.—Continued.

Class XIX.—Fire-arms and implements of war, *and parts thereof, including the manufacture of shot and gunpowder.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Fire-arms	David Edwards	Zanesville, Ohio	April 25
Fire-arms	Nathan Starr	Middletown, Ct	May 3
Fire-arms	Benjamin F. Smith	South Hadley, Mass	Dec. 5
Fire-arms, and apparatus used therewith	Samuel Colt	Paterson, N. J	Aug. 29
Fire-arms, gun-breech	Silas Day, (assignee of Samuel Hall.)	New York, N. Y	Dec. 31
Fire-arms, many-chambered	Elon B Butterfield	Brattleboro', Vt	Mar. 16
Fire-arms, rifles, water-proof	L. Bailey, J. B. Ripley, and W. B. Smith.	Portland, Me	Feb. 20

Class XX.—Surgical and medical instruments, *including trusses, dental instruments, bathing apparatus, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Fractures, apparatus for the cure of	Orson M. Allaben	Middletown, N. Y	Dec. 12
Teeth, key for extracting	John McConnell	Philadelphia, Pa	Sept. 20
Truss, for hernia	John M. Sinton	Hackettstown, N. Y	June 27
Truss, for hernia	William B. Dey	Hope, N. J	July 9
Truss, for prolapsus uteri	Aliran Poteet	Danville, Ind	June 29
Truss, for prolapsus uteri	Wm. Reynolds	Camden, S. C	Dec. 14

Class XXI.—Wearing apparel, articles for the toilet, &c., *including instruments for manufacturing.*

Inventions or discoveries.	Patentees.	Residence.	1839. Date of patent.
Buttons, mode of constructing bright dies for stamping highly polished blanks or shells for.	Green Kenrick, (assignee of Wm. B. Dunbar.)	Waterbury, Ct	Oct. 31
Garments, cutting the bodies of coats in one piece.	William W. Wiswell	Portland, Me	April 10
Garments, instruments for measuring the human body, &c.	Daniel Williams	New York, N. Y	April 26
Garments, tailors' instruments for measuring.	John P. Barnett and Francis Story	Cattskill, N. Y	Nov. 19
Garments, tailors' draughting instruments	Edward J. Axford	Philadelphia, Pa	Mar. 30
Razor-strop and case	Aaron and Luther Hill	Stoneham, Mass	July 17
Shears, tailors'	Rochius Heinisch	Newark, N. J	Feb. 27
Straps for pantaloons	M. H. Simpson	Boston, Mass	May 30

Class XXII.—*Miscellaneous.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
			1839.
Coffins, lodgments in	Moses Leonard	New York	July 2
Ice, mode of obtaining and securing	Jos. E. Manuel	Philadelphia, Pa	July 12
Pills, mode of counting	J. P. Peters	New York, N. Y	June 27
Sun-flower leaves and rhubarb-plants as a substitute for smoking-tobacco, and for the formation of cigars.	Wm. D. Duff	Marietta, Pa	Jan. 8
Trap for catching animals	William Biddle	Pittsburg, Pa	July 12

ALPHABETICAL LIST OF PERSONS WHOSE PATENTS HAVE EXPIRED DURING THE YEAR 1853, WITH THEIR INVENTIONS OR DISCOVERIES, AND CLASS.

Patentees.	Inventions or discoveries.	Class.
Adkins, Lorenzo Dow	Water-wheel, spiral bucket	XI.
Aiken, Herrick	Sockets	II.
Allaben, Orson M.	Fractures, for cure of	XX.
Allen, Ethan	Locks for fire-arms	XIX.
Allen, Zachariah	Winding, spooling wool	III.
Andrews, Manassah, and James Sproat	Saw, circular, relieving collar	XIV.
Arnold, Wm. E.	Horse-power	XIII.
Atwood, Anson	Stove, cooking, railway	V.
Atwood, Moses, Jr.	Seeding, planting machine	I.
Axford, Edward J.	Garments, draughting instruments	XXI.
Babbitt, Isaac	Wheel boxes	X.
Bailey, Andrew	Pump, cattle	XI.
Bailey, Libbeus, John B. Ripley, and Wm. B. Smith,	Fire-arms, rifles, water-proof	XIX.
Baker, Wm. H., and Samuel H. Baldwin	Steam engine, rotary	VI.
Bakewell, John S.	Steam engine safety valves	VI.
Balch, Dan. Shaw	Harness, bridle bit	XVI.
Baldwin, Eden	Saw-mills	XIV.
Baldwin, Joseph C., and Cyrus B.	Corn-mill	XIII.
Baldwin, J. C.	Press, cotton and hay	XII.
Ball, Jonathan	Balance scales	XII.
Ballantine, John, and Adam Clark	Drying flour	V.
Barber, Joseph S.	Lightning conductors	VIII.
Barnaby, Ambrose	Plough	I.
Barnard, Frederick S.	Houses, constructing	IX.
Barnard, Frederick S.	Motion, substitute for cog-gearing	XIII.
Barnhurst, Joseph	Umbrella runner	II.
Barnett, Jno. P., and Francis Story	Garments measuring	XXI.
Barnum, Dimon B.	Carriage bodies, hanging	X.
Barrows, Ebenezer	Flues, cooking ranges	V.
Beach, Joseph, and David Culver	Saw set	II.
Beath, John	Gin, cotton	III.
Beecher, Benjamin D.	Propelling vessels	VII.
Beers, Smith	Odometer	VIII.
Bellemere, John	Bolts and nuts, heads	II.
Bentz, Jacob	Boxes, wood for	XIV.
Biddle, William	Trap	XXII.
Bishop, William C.	Water-wheel	XI.
Bosworth, Benijah	Bedstead sacking	XVII.
Botts, Charles T.	Straw-cutter	I.
Boyce, George D.	Stove, cooking	V.
Brainard, Jeremiah	Weigh locks	XII.
Branch, Hardin	Staves, blind slits, cutting	XIV.
Brayton, Wm. P., and James Hamilton	Dredging machines	IX.
Brittan, Ira W.	Carriage bodies, hanging	X.
Brown, Charles W.	Spinning hemp	III.
Brown, Samuel H.	Punching metal	II.
Buck, Darius	Stove, cooking	V.
Burling, Benjamin	Stump extracting	IX.
Burr, William G.	Tools for barrels	XIV.
Burt, Jonathan, and E. Smith	Shingles and barrel heads from steamed timber	XIV.
Burt, Jonathan, and E. Smith	Staves, cutting	XIV.
Bushnell, Horace	Stove valve.	V.
Butler, Thomas J.	Wheel hubs, cutting seats	X.
Butterfield, Elon B.	Fire-arms, many-chambered	XIX.
Button, Charles, and Harrison G. Dyar	Lead, white	IV.
Cannon, Francis A.	Rivets, making	II.
Card, Joseph, and G. Newell	Plough, coupling	I.
Carpenter, Daniel	Sleighs	X.
Carpenter, Daniel	Brick press	XV.
Carrel, John	Stirrups, saddle	II.
Cass, Moses G	Harrows, revolving	I.
Chater, Nathaniel	Pigment, black, from anthracite coal	IV.
Cheney, Isaac	Brooms, metallic heads for	XVII.
Cherrington, Edmund	Bedstead sofa, raising	XVII.
Cherry, George W.	Excavating earth	IX.
Chickering, Jonas, and others, assignees of A. Babcock.	Piano-forte	XVIII.
Clark, Edward	Lead, white, from oxide	IV.
Clark, Edward	Lead, white, from oxide	IV.
Clark, Patrick J.	Lamps, screw head	V.
Coffin, Isaac N.	Boilers, preventing explosion	VI.
Colt, Samuel	Fire-arms	XIX.
Conklin, Henry	Gin, cotton	III.
Conklin, Henry	Wool, burring	III.

Alphabetical List of expired patents.—Continued.

Patentees.	Inventions or discoveries.	Class.
Crum, Henry	Screws, heads and rivets, turning	II.
Cumston, William		
Currier, John H., and W. H. Taber	Drilling iron	II.
Curtis, Thaddeus B.	Ovens, portable	V.
Darricott, George, and Joseph Nason	Gas burners, argand	V.
Davenport, Moses	Horse-power	XIII.
Davis, Air	Cockstop	XI.
Davis, Air	Mitering and dovetailing	XIV.
Davis, George	Rake, hay and grain harrow	I.
Davis & Lord	Stove, cooking, anthracite	V.
Day, Moses	Spinning hemp, flax	III.
Day, Silas, and Samuel Hall	Fire-arms, gun-breech	XIX.
Dennison, John N., and Elias Kirkpatrick	Railroad track, cleaning	IX.
Denison, Lester E.	Corn-sheller	I.
Devine, James	Stove, cooking	V.
Dewey, Ebenezer	Bells, hanging and constructing	XVII.
De Witt, Richard V.	Boilers, steam	VI.
Dey, William B.	Truss for hernia	XX.
Dimpfel, Frederick P.	Furnace, revolving fan-wheel	II.
Dimpfel, Frederick P.	Furnace, consuming smoke, &c.	V.
Dinsmoor, Alonzo R.	Corn-sheller	I.
Dotterer, David H., and Thomas Jackson	Steam engine, locomotive	VI.
Drummond, John	Steam engine, rotary	VI.
Drummond, John	Inclined planes, ascending and descending	IX.
Dunn, Arthur	Soap manufacturing	IV.
Duntze, Henry	Latch, door	II.
Dutcher, Josiah	Plough	I.
Early, Thomas	Bedstead, attaching curtains	XVII.
Eastman, Phineas	Hammers a d hatchets, sockets	II.
Edwards, David	Fire-arms	XIX.
Edwards, Lewis	Ink, supplying pens of ruling machine	XVIII.
Egleston, Warren	Currier's knife, sharpening	XVI.
Elliott, Thomas, jr.	Thrashing machine, &c.	I.
Ellsworth, Oliver	Flier and bobbin, twisting silk	III.
Else, Richard	Drying grain	V.
Ervin, Alfred	Winnowing machine, &c.	I.
Estes, Truman, and Warren Dutcher	Spinning cap, speeder for	III.
Evans, Britton M.	Railroad, chairs of	IX.
Evans, Cadwallader	Explosion of boilers, preventing	VI.
Evans, Wantsford	Wind-mill	XI.
Evarts, Russell	Ships, preventing dragging anchors	VII.
Farrand, Samuel E.	Wheels, carriage, hubbands for	X.
Ferre, Horace	Boot-crimps	XVI.
Ferren, Ebenezer	Flues, cooking-stove	V.
Fife, William	Pen-holder	XVIII.
Finney, Erastus	Lock, door	II.
Fish, Randal	Streets and roads, grading	IX.
Forrest, John M.	Seeding, planting machines	I.
Foster, Samuel W.	Smut machine	I.
Francis, Joseph	Boats, life and other	VII.
Freeman, Nathan	Carding machine, wool	III.
Friese, Philip C.	Boilers, preventing explosions	VI.
Galvin, Judson B.	Stoves, coal or wood	V.
Gaunt, Adin	Press, cheese	XII.
Gay, Gamaliel	Silk, twisting	III.
Gentry, Joseph C.	Mill spindles	XIII.
Germain, Lewis J.	Carriage, railroad	X.
Goodwin, John, jr,	Crimping leather, machine	XVI.
Goodyear, Chas., assignee of N. Haywood	Caoutchouc, manufacturing with sulphur	IV.
Grantham, Willis	Straw-cutter	I.
Grenville, Alonzo S., and T. J. Lewis	Blinds, window	IX.
Greenwood, John D., and R. W. Keene	Cement, artificial stove	IV.
Griggs, George S.	Brakes, safety, railroad cars	X.
Grimes, William C.	Smut machine	I.
Groff, William D.	Substitute for cigars, &c.	XXII.
Hague, John	Pencil-case, ever-pointed	XVIII.
Hale, Elisha	Umbrellas, &c.	XXI.
Hale, William H.	Boilers, preventing explosion	VI.
Hall, Elisha	Drilling, metallic and other substances	I.
Hall, William M.	Beehives	I.
Hamilton, James	Snags, sawing or cutting	IX.
Hammond, Sarah	Fireplace	V.
Hargreaves, James	Acid, sulphuric, manufacturing	IV.
Harrison, Thomas	Music, writing	XVIII.
Hart, John	Bedstead, tightening	XVII.
Hartwell, Isaac B.	Spinning wool	III.
Hatch, Franklin, and Jona. W. Terry	Springs, elliptical, carriages	X.
Haupt, Herman	Bridges, lattice	IX.
Hawkes, Charles W.	Press, cotton and hay	XII.

Alphabetical List of expired patents.—Continued.

Patentees.	Inventions or discoveries.	Class.
Haynes, Hezekiah	Rake, hay, teeth for	I.
Hebard, Nathaniel	Pulp, dressing	III.
Heinisch, Rochus	Shears, tailors, &c.	XXI.
Hemming, John, and Harrison G. Dyar	Soda, carbonate, manufacturing	IV.
Henry, William	Liquid, mode of evaporating	IV.
Herapath, William	Tanning	XVI.
Hewet, Henry W.	Screw wrench	II.
Hill, Luther and Aaron	Razor strop and case	XXI.
Hinman, Justus, John Thatcher, and Alonzo Palmer.	Shingles, cutting	XIV.
Hoffer, Samuel	Seeding, sowing grain, &c.	I.
Hopper, Thomas	Straw-cutter	I.
Hough, Milo B.	Churn	I.
House, Royal E.	Staves, sawing	XIV.
Hubbell, Moses, assignee of R. Hubbell	Boring timber	XIV.
Hunt, George	Wheel hubs, attaching to axles	X.
Hunt, Nathan and Caleb	Lock, door, latches	II.
Hutchinson, Enoch	Galley, ships, distilling salt water	V.
Isbel, Miladen M.	Window-blind fasteners	II.
Jackson, Charles H. L.	Spectacles, preparing the glasses	VIII.
James, George	Boats, life	VII.
Jennings, Isaiah	Composition for burning in lamps	IV.
Jenkins, Solomon M., M. D.	Cocooneries, lodgments in, &c.	III.
Johnson, Charles F., and J. J. Speed, jr.	Cocks, stop	XI.
Johnson, George M.	Hats, coloring	III.
Jordon, John W.	Plough, hill-side and horizontal	I.
Judkins, Eliza Ann B.	Loom, hand, weaving fringe	III.
Keagy, Abraham	Hulling clover seed, &c.	I.
Keen, Jeremiah B.	Boots and Shoes, cutting	XVI.
Kellogg, Jonathan D. (assignee of Justus Wright),	Cocks, molasses gate	XI.
Kenrick, Green (assignee of Wm. Dunbar)	Buttons, &c.	XXI.
Ketcham, Micah, and Wm. A. Wheeler	Flues of stoves	V.
Ketcham, Micah	Stoves, cooking	V.
Ketchum, William F.	Incline planes, &c., ascending, &c.	IX.
King, Henry	Fluid, blue, for writing	IV.
King, Sumner	Springs, elliptical	X.
Kingsley, J. Lemuel	Printing press	XVIII.
Kisinger, Samuel, H. and E. G. Stake	Corn-sheller	I.
Knight, William	Spark-arresters	VI.
Knight, Wm., A. L. Knight, & E. F. Condit	Paper making	III.
Lake, William	Canal locks, &c., sliding valves	IX.
Lamson, Ebenezer G.	Mowing, scythes to snaths, attaching	I.
Lathrop, John L.	Stoves, cooking	V.
Leavenworth, William	Propelling boats, &c.	VII.
Leavitt, Isaac, Adna Gilmore, and Wm. Sturtevant,	Washing-machine	XVII.
Lee, Philander	Drag for removing stones, &c.	IX.
Leibrich, Conrad	Lock and double catch bolts	II.
Leonard, Moses	Coffins, lodgments in, &c.	XXII.
Lewis, William and William H.	Boots, &c., heel plates for	XVI.
Long, Stephen H.	Bridges, wooden frame brace	IX.
Long, Stephen H.	Bridges, wooden frame suspension	IX.
Loudon, John, jr.	Wheel hubs, carriage, attaching to axles	X.
Maillard, Lucien	Boilers, steam, furnaces of, &c.	VI.
Mann, George, jr.	Smut-machine, cleaning grain	I.
Manuel, Joseph E.	Ice, mode of obtaining and securing	XXII.
Martineau, Eliza (administratrix of John Martineau, deceased),	Water-wheel	XI.
Mason, Benjamin F.	Crackers and biscuits, making and baking	XVII.
May, Oliver N.	Shingle, sawed, &c.	XIV.
Mercer, John	Corn-sheller and hulling grain	I.
Mercer, John	Incline planes, &c.	IX.
Merchant, Hiram R. and Orin G.	Seeding, planting corn	I.
Mettetal, G. D.	Sausages, making	XVII.
Miller, Hezekiah S.	Felt making, &c.	III.
Morgan, Jonathan	Saw, circular, &c.	XIV.
Morrall, Abel	Needles, manufacture of	II.
Mosely, Thomas W. H.	Pump, force, for wells, &c.	XI.
Myers, Samuel C.	Beehives	I.
McCollum, Elbridge	Stove, cooking	V.
McConnell, John	Teeth, key for extracting	XX.
McCord, Isaac	Wire rope, round flexible	II.
McCrea, Thomas	Smut-machine, for cleaning grain	I.
McIlroy, William, jr., and Wm. Boon	Corn-sheller	I.
McKeever, Matthew	Thrashing machine, &c.	I.
McMillen, Daniel C., and others	Shingles, cutting from steamed timber, &c.	XIV.
Naylor, Peter	Walls and ceiling, protecting from fire	IX.
Naylor, Peter	Roofs, covering with metal	IX.

Alphabetical List of expired patents.—Continued.

Patentees.	Inventions or discoveries.	Class.
Nevell, George J.	Springs, elliptical, setting and fitting	X.
Nickols, Edward, and James Augur	Furnaces, blacksmith, burning anthracite	II.
Nock, Joseph	Padlocks, &c.	II.
North, Linus	Flues of stoves	V.
Nott, Eliphalet	Stoves, coal, applied to furnaces	V.
Osgood, Jason C.	Wagons, &c., attaching boxes, &c.	X.
Otis, William S.	Excavating and removing earth, crane excavator for	IX.
Page, George	Boring earth, augur for	IX.
Palmer, Lewis R.	Hides, constructing rollers for pressing	XVI.
Parker, William R.	Corn-sheller	I.
Parsons, Lud'am M.	Shingles, cutting	XIV.
Parsons, Stephen	Water-wheel, reaction, moulding preparatory to casting	XI.
Parsons, Stephen	Shafts, vertical, &c., preventing friction	XIII
Past, John C.	Railroad, self-adjusting	IX.
Patterson, Abram	Steam engine, &c., apparatus, &c.	VI.
Patterson, Thos. J., assignee of Wm. Coburn	Leather, rolling	XVI.
Pearce, Henry	Grist-mill	XIII.
Peck, Noble	Stove, cooking	V.
Pennell, William W.	Wheels, car, iron	X.
Penrose, N. R., and S. F. Palmer	Raising canal boats	VII.
Pepper, Hart	Staves, sawing	XIV.
Peters, Joseph P	Pills, &c., counting	XXII.
Petitval, John B	Boilers, steam furnaces of, &c	VI.
Phipps, William R.	Cloth, napping and making waterproof	III.
Phleger, Leonard	Spark-arresters	VI.
Pike, Samuel	Barrels, vents for	XIV.
Poteet, Allran	Truss, for prolapsus uteri	XX.
Potter, William L.	Canal locks, wicket gates for	IX.
Pratt, Jacob	Reeling and spinning and twisting silk	III.
Rankin, Andrew	Hats, napping	III.
Reaney, Thomas, and John Naglee (Naglee, assignee of Reaney),	Spark-arresters	VI.
	Truss, for prolapsus uteri	XX.
Reynolds, William	Mortising, tenoning, and boring	XIV.
Richtmyre, B., and James H. Martin	Railroad, cleaning the rails, &c	IX.
Ridgway, Thomas S	Springs for railroad carriages	X.
Riley, Patrick	Stoves, cooking, Franklin	V.
Ring, Abner R.	Coffee-mill	XIII.
Rittenhouse, John	Railroad, chairs of	IX.
Robinson, Moncure	Seeding, planting corn, &c	I.
Rockwell, David S	Bedsteads, fastening	XVII.
Rodefer, Joseph	Stoves, cooking, valve of	V.
Root, Hiram	Water-wheel	XI.
Rose, Timothy	Furnace, smelting iron ore	II.
Roth, Augustus	Water-wheel, letting the water on	XI.
Ruble, Thomas	Boilers, steam, inverted arch	VI.
Salomon, John C. F	Boot-crimp	XVI.
Sanderson, Joseph	Printing-press	XVIII.
Schnebly, William and Thomas	Excavating and removing earth, scraper for	IX.
Scholder, John	Mortar, preparing for the manufacture of bricks, &c.	XV.
Seely, Oran W	Seeding, sowing seed	I.
Seward, Martin and Samuel L.	Forges, blacksmiths', producing blast	II.
Sharp, William and Heman W.	Boring posts, &c.	XIV.
Shay, William H	Leather, stitching	XVI.
Sheldon, Samuel	Steam-engine, rotary	VI.
Sherman, Roger M.	Beehives	I.
Sholl, John	Coaches, &c.	X.
Shriver, Thomas	Tuyere, iron, blacksmiths'	II.
Shugert, John	Reel for chalk lines	III.
Sickels, Gerard	Straps for pantaloons	XXI.
Simpson, M. H	Drilling rocks	IX.
Singer, Isaac M	Truss for hernia	XX.
Sinton, John M.	Plough	I.
Small, William	Fire-arms	XIX.
Smith, Benjamin F.	Spectacles, revolving glass	VIII.
Smith, Christopher H	Stoves, cooking	V.
Smith, Elihu	Cultivator, corn	I.
Smith, John B.	Cultivator, garden	I.
Smith, John B.	Smut machine	I.
Smith, Leonard Smith, Robert	Riveting metallic plates for boilers	II.
Staples, William A	Straw-cutter	I.
Starr, Nathan	Fire-arms	XIX.
Stearns, Charles	Pipes, earthen, for conveying water	XV.
Stevens, John H	Matches, friction, composition, &c	IV.
Stevens, John H	Matches, friction, preventing accidental ignition	IV
Stevens, John H	Matches, friction, retaining fire	IV.
Stillman, William	Lock, door, safety	II.
Stimpson, James	Railroad, construction of	IX.

Alphabetical list of expired patents.—Continued.

Patentees.	Inventions or discoveries.	Class.
Stockman, Jacob and Samuel L. Hopper, assignees of G. W. Simons.	Pencil-case, ever-pointed	XVIII.
Sumner, Palmer, and Peter Naylor	Iron, protecting from oxidation	IV.
Swett, Samuel, jr.	Washing-machine	XVII.
Teall, Ansel	Clay and mortar, mixing, &c	XV.
Thaxter, Daniel	Spectacles, side-glass	VIII.
Thomson, John S.	Churn	I.
Tibbals, James	Oakum, making	III.
Tibbets, John G.	Dressing iron, &c.	II.
Tibbets, John G., (not George G. as in classification.)	Wheels, boxes, &c., applying anti-friction rollers to	X.
Tilghman, Edward	Railway bars, fastening	IX.
Tims, John H.	Wheels, boxes, &c	X.
Tolles, Elisha	Wheels, carriage	X.
Tough, John S.	Lamps, regulating the flame of	V.
Townsend, William W.	Press, cheese	XII.
Trask, Asa P., and Davis Aldrick	Mowing-machine	I.
Trumbull, Shadrach	Mill-stones, dressing	XIII.
Turbutt, Nicholas	Spark-arresters	VI.
Tyson, A. H	Kiln, lime	XV.
Urann, Richard	Mitering and dovetailing boards, &c.	XIV.
Vail, Stephen	Steam-engine, locomotive	VI.
Vail, Stephen	Jackscrew	XII.
Vallerchamp, Azima	Carriage bodies, hanging	X.
Van Pelt, H., and Benjamin Armstrong	Tin, &c., double-seaming	II.
Van Vorhes, Abraham	Pump, stone, &c.	XI.
Vaughn, J. C., and Frederick Leach	Pipes, casting and drawing lead	II.
Wagenor, David D	Grist-mill	XIII.
Walcott, Freeman. (See J. H. Hutchinson.)		
Walker, Cyrus	Brakes, &c	X.
Walker, Luther B.	Smut-machine	I.
Webb, Augustus V. H	Turpentine, oil of, rectifying	IV.
Webb, Augustus V. H	Lamp, camphine	V.
Webb, Joseph W.	Mill, paint	XIII.
Wells, Ep B., and Moses D	Rake, hay, revolving	I.
Wells, Horace	Coal-sifters	V.
West, Ammi	Power, manual, &c	XIII.
Wethered, John	Vice	II.
Whitcomb, Aaron	Tire-bending, &c	X.
White, George	Balance, &c	XII.
White, Horace	Leather, splitting	XVI.
White, Josiah	Canal-lock, balance for	IX.
White, Lemuel B.	Mineral-water, soda-fountain, &c	IV.
White, Maunsel	Kettles, sugar, setting, &c	V.
Whitehead, Jesse	Cotton, roping	III.
Whiting, Ebenezer G.	Plough	I.
Whitney, Henry, and T. Leighton	Lamps, glass socket for	V.
Whitsilt, Charles	Saw, rotary, for cutting round tenons	XIV.
Whittemore, Jervice	Cock, molasses-gate	XI.
Whittemore, Wm., jr	Gin, cotton	III.
Willard, Benjamin F	Lights, revolving, &c	V.
Williams, Abel	Cutting potatoes, &c	XVII.
Williams, Daniel	Garments, instruments for measuring the human body, &c.	XXI.
Williams, John, jr.	Engine, fire	XI.
Williston and Arnold	Stoves, cooking, with elevated ovens	V.
Willson, Christian	Motion, double-acting, &c	XIII.
Willson, W. W., and C. Dickerman	Paper-sizing	III.
Wilton, Henry	Spark-arresters	VI.
Wilton, Henry	Bridges, construction of	IX.
Wise, John J.	Press, construction of	XII.
Wiswell, William W	Garments, cutting the bodies of coats in one piece	XXI.
Witherow and Pierce	Plough, mould-board of	I.
Wood, Thomas	Area of irregular figures, finding	VIII.
Wrightson, Jeremiah	Thrashing-machine, teeth for	I.
Wyman, Oliver	Grist-mill	XIII.
Yates, John B.	Smut-machine	I.
Young, Elisha W. and Thos. H. Wilson, (not Nelson, as in classification.)	Smut-machine	I.

Classified list of expired patents.—Continued.

Classified list of patents for Designs that have expired during the year 1853.

Designs.	Patentees.	Residence.	Date of patent.
Bathing-tubs	Jordan L. Mott	New York	Aug. 18, 1846.
Carpets and other fabrics	James D. Sparkman, assign. of Melville Kelsey	Williamsburgh; Brooklyn	July 25, 1846; antedated March 28, 1846.
Carpets and other fabrics	James D. Sparkman, assign. of Melville Kelsey	Williamsburgh; Brooklyn	July 25, 1846; antedated March 28, 1846.
Clock frames	Nath. Batchelor, assign. of Nath. Batchelor and Henry Biggins	New York	July 10, 1846.
Fountain, ornamental	John Dutton	Village Green, Pa.	Oct. 3, 1846.
Grate, fire-place	Adam Hampton	New York	July 25, 1846.
Grate, parlor	Adam Hampton	New York	July 10, 1846.
Grate, parlor	William and Nathan H. Jackson	New York	Jan. 7, 1846.
Spittoons	Henry Biggins	New York	Mar. 14, 1846.
Spoons, forks, &c.	Michael Gibney	New York	July 10, 1846.
Stoves	Alonzo L. Blanchard	Albany, N. Y.	July 25, 1846.
Stoves	Ames A. Lincoln	Norton, Mass.	Dec. 22, 1846.
Stoves	Augustus Quackenboss, assign. of Samuel W. Gibbs	Albany, N. Y.	Oct. 3, 1846.
Stoves	D. F. Goodhue and Chas. Guild	Cincinnati, Ohio	Aug. 18, 1846.
Stoves	Dunham, Sage, Jones, and Chollar, assigns. of Samuel Hanley	Troy, N. Y.	Oct. 10, 1846.
Stoves	Ezra Ripley	Troy, N. Y.	July 25, 1846; antedated May 28, 1846.
Stoves	Ezra Ripley	Troy, N. Y.	July 25, 1846; antedated May 28, 1846.
Stoves	Geo. W. and Henry Sizer	Springfield, Mass.	July 25, 1846; antedated Jan. 24, 1846.
Stoves	Geo. W. and Henry Sizer	Springfield, Mass.	July 25, 1846; antedated Jan. 24, 1846.
Stoves	Geo. M. Norton	Rochester, N. Y.	July 25, 1846.
Stoves	Jas. Wager	Troy, N. Y.	Oct. 10, 1846.
Stoves	John F. Seymour, assign. of Lucius O. Palmer	Utica, N. Y.	Oct. 10, 1846.
Stoves	John F. Seymour, assign. of Lucius O. Palmer	Utica, N. Y.	Oct. 10, 1846.
Stoves	John N. Wilder, Wm. E. Bleecker, and Samuel D. Vose, assigns. of Wm. Shaw	Albany, N. Y.	July 10, 1846.
Stoves	John S. and Merritt Peckham	Utica, N. Y.	Oct. 8, 1846.
Stoves	John S. and Merritt Peckham	Utica, N. Y.	Oct. 3, 1846.
Stoves	Johnson and Cox, assigns. of Ezra Ripley	Troy, N. Y.	Oct. 3, 1846.
Stoves	Lathrop S. Bacon	Le Roy, N. Y.	July 25, 1846.
Stoves	Robert A. Gregory	New York	Oct. 8, 1846.
Stoves	Robert Barber and Michael Hoffman	Bridgeton, N. J.	July 10, 1846; antedated May 18, 1846.
Stoves	Samuel D. Vose	Albany, N. Y.	Aug. 18, 1846; antedated June 1, 1846.
Stoves	Samuel D. Vose	Albany, N. Y.	Aug. 18, 1846; antedated June 1, 1846.
Stoves	Samuel D. Vose	Albany, N. Y.	Aug. 18, 1846; antedated June 29, 1846.
Stoves	Samuel D. Vose	Albany, N. Y.	July 25, 1846; antedated March 21, 1846.
Stoves	Samuel D. Vose	Albany, N. Y.	July 25, 1846; antedated March 21, 1846.
Stoves	Samuel D. Vose	Albany, N. Y.	July 25, 1846; antedated March 21, 1846.
Stoves	Sherman S. Jewett and Francis H. Root	Buffalo, N. Y.	Oct. 3, 1846.
Stoves	Sherman S. Jewett and Francis H. Root	Buffalo, N. Y.	Oct. 3, 1846.
Stoves	W. and R. P. Resor	Cincinnati, Ohio	Oct. 10, 1846.
Stoves	Wm. Jackson	Syracuse, N. Y.	July 25, 1846.
Stoves	Wm. Jackson	Syracuse, N. Y.	July 25, 1846.
Stoves	Wm. P. Cresson, assign. of Wm. P. Cresson, David Stuart, and Jacob Beesley	Philadelphia, Pa.	July 25, 1846.
Stoves	Wm. P. Cresson	Philadelphia, Pa.	May 23, 1846.
Stoves	Wm. P. Cresson, assign. of Cresson, Stuart, Beesley, and Sailor	Philadelphia, Pa.	Oct. 3, 1846.
Stoves	Wm. Resor	Cincinnati, Ohio	May 23, 1846.
Stoves, air-tight	John F. Rathbone	Albany, N. Y.	July 10, 1846.
Stoves, box	John F. Rathbone	Albany, N. Y.	July 10, 1846; antedated April 20, 1846.
Stoves, box	John F. Rathbone	Albany, N. Y.	July 10, 1846; antedated April 20, 1846.
Stoves, cooking	Calvin Fulton	Rochester, N. Y.	Aug. 18, 1846.
Stoves, cooking	Jesse E. Potts, assign. of L. Graviline	Albany, N. Y.	July 10, 1846.
Stoves, cooking	John F. Rathbone	Albany, N. Y.	July 10, 1846.
Stoves, cooking	John Morrison	Troy, N. Y.	July 10, 1846.
Stoves, cooking	Peter Low	Troy, N. Y.	Oct. 10, 1846.
Stoves, cooking, air-tight	John F. Rathbone, assign. of John E. Thomas	Albany, N. Y.	July 10, 1846.
Stove plates	Wm. P. Cresson, assign. of Wm. P. Cresson, David Stuart, and Samuel H. Sailor	Philadelphia, Pa.	Oct. 24, 1846.
Stoves, parlor	C. Goodwin and W. Littlejohn	New York	Dec. 10, 1846; antedated Nov. 11, 1846.
Vases	John Bt. Clute	Schenectady, N. Y.	July 25, 1846.
Vases	W. and R. P. Resor	Cincinnati, Ohio	Oct. 10, 1846.

Alphabetical list of persons whose patents for designs have expired during the year 1853.

Patentees.	Designs.
Bacon, Lathrop S.	Stoves.
Barber, Robert, and Michael Hoffman	Stoves.
Biggins, Henry	Spittoons.
Biggins, Henry. (See Nathaniel Batchelor.)	
Blanchard, Alonzo L.	Stoves.
Bleecker, Wm. E. (See John N. Wilder.)	
Clute, John Bt.	Vases.
Cox. (See Johnson and Cox.)	
Cresson, Wm. P., assignee of Wm. P. Cresson, David Stuart, and Jacob Beesley	Stoves.
Cresson, Wm. P.	Stoves.
Cresson, Wm. P., assignee of Cresson, Stuart, Beesley, and Sailor	Stoves.
Cresson, Wm. P., assignee of Wm. P. Cresson, David Stuart and Samuel H. Sailor	Stove plates.
Dunham, A. T., B. H. Sage, E. Jones, and John B. Chollar, assignees of Sam. Hanley	Stoves.
Dutton, John	Fountain, ornamental.
Fulton, Calvin	Stoves, cooking.
Gibbs, Samuel W. (See Augustus Quackenboss.)	
Gibney, Michael	Spoons, forks, &c.
Goodhue, D. F., and Chas. Guild	Stoves.
Goodwin C. and W. Littlejohn	Stoves, parlor.
Gravline, L. (See Jesse E. Potts.)	
Gregory, Robert A.	Stoves.
Guild, Chas. (See D. F. Goodhue)	
Hampton, Adam	Grate, fire-place.
Hampton, Adam	Grate, parlor.
Hanley, Samuel. (See Dunham, Sage, Jones, and Chollar.)	
Hoffman, Michael. (See Robt. Barber.)	
Jackson, William and Nathan H.	Grate, parlor.
Jackson, William	Stoves.
Jackson, William	Stoves.
Jewett, Sherman S., and Francis H. Root	Stoves.
Jewett, Sherman S., and Francis H. Root	Stoves.
Johnson and Cox, assignees of Ezra Ripley	Stoves.
Kelsey, Melville. (See Jas. D. Sparkman.)	
Kelsey, Melville. (See Jas. D. Sparkman.)	
Lincoln, Ames A.	Stoves.
Littlejohn, W. (See C. Goodwin.)	
Low, Peter	Stoves, cooking.
Morrison, John	Stoves, cooking.
Mott, Jordan L.	Bathing tubs.
Norton, Geo. M.	Stoves.
Palmer, Lucius O. (See John F. Seymour.)	
Palmer, Lucius O. (See John F. Seymour.)	
Peckham, John S. and Merritt	Stoves.
Peckham, John S. and Merritt	Stoves.
Potts, Jesse E., assignee of L. Gravline	Stoves, cooking.
Quackenboss, Augustus, assignee of Samuel W. Gibbs	Stoves.
Rathbone, John F.	Stoves, air-tight.
Rathbone, John F.	Stoves, box.
Rathbone, John F.	Stoves, box.
Rathbone, John F.	Stoves, cooking.
Rathbone, John F., assignee of John E. Thomas	Stoves, cooking, air-tight.
Resor, W. and R. P.	Stoves.
Resor, W. and R. P.	Vases.
Resor, William	Stoves.
Ripley, Ezra	Stoves.
Ripley, Ezra	Stoves.
Ripley, Ezra (See Johnson and Cox.)	
Root, Francis H. (See Sherman S. Jewett.)	
Root, Francis H. (See Sherman S. Jewett.)	
Seymour, John F., assignee of Lucius O. Palmer	Stoves.
Seymour, John F., assignee of Lucius O. Palmer	Stoves.
Sizer, Geo. W. and Henry	Stoves.
Sizer, Geo. W. and Henry	Stoves.
Shaw, William. (See John N. Wilder and others.)	
Sparkman, James D., assignee of Melville Kelsey	Carpets and other fabrics.
Sparkman, James D., assignee of Melville Kelsey	Carpets and other fabrics.
Thomas, John E. (See John F. Rathbone.)	
Vose, Samuel D.	Stoves.
Vose, Samuel D.	Stoves.
Vose, Samuel D.	Stoves.
Vose, Samuel D.	Stoves.
Vose, Samuel D.	Stoves.
Vose, Samuel D.	Stoves.
Vose, Samuel D. (See John N. Wilder.)	
Wager, James	Stoves.
Wilder, John N., Wm. E. Bleecker and Sam. D. Vose, assignees of Wm. Shaw	Stoves.

CLASSIFIED LIST OF PATENTS GRANTED DURING THE YEAR 1853, WITH THE NAMES OF PATENTEES, PLACES OF RESIDENCE, AND DATE OF PATENTS.

CLASS I.—AGRICULTURE, *including instruments and operations.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Beehives	George Calvert	Upperville, Va.	Nov. 1, 1853.
Beehives	Sylvester Davis	Claremont, N. H.	July, 26, 1853.
Beehives	Wooster A. Flanders	Sharon, Vt.	Oct. 25, 1853.
Cane and maize cutters	J. W. Cormack	Quincy, Ill.	Nov. 1, 1853.
Churns, rotary	H. H. Grover	North Cohocton, N. Y.	Nov. 15, 1853.
Cob and stalk cutters	Thos. B. Jones	Carleville, Ala.	Oct. 11, 1853.
Corn-shellers	Eben L. Millis	Rochester Depot, Ohio	Aug. 9, 1853.
Corn-shellers	George W. Reid	Evansville, Ind.	May 3, 1853.
Corn-shellers	Jeremiah P. Smith	Hummelstown, Pa.	Jan. 18, 1853.
Corn-shellers	Levis H. Davis	Kennet Square, Pa.	Sept. 6, 1853.
Corn-shellers	Porter Dickinson	Amherst, Mass.	Sept. 6, 1853.
Cotton in the field, machine for topping	A. A. Dickson	Griffin, Ga.	Oct. 4, 1853.
Cotton, stalk-cutters and pulverizers	George Gorman	Lamar, Miss.	Sept. 20, 1853.
Cultivators	Philip H. Keck	Morgantown, Va.	May 31, 1853.
Cultivators, bog-cutting	E. L. Freeman	Ann Arbor, Mich.	June 21, 1853.
Cultivators, devices for steering	Seneca Lapham	Salem, Ohio	Nov. 1, 1853.
Cultivator, ploughs	Wm. S. Hyde	Townsend, Ohio	June 21, 1853.
Cultivators, rotary root-digging	Samuel Snow and Alexander Hine	Fayetteville, Lafayette, N. Y.	Oct. 11, 1853.
Fork, dung, devices of a convertible	Ezra H. Dawes	Litchfield, Me.	Oct. 25, 1853.
Forks, manure and other	Benjamin H. Franklin	Worcester, Mass.	Dec. 20, 1853.
Grain-cradles	Christopher P. Kelsey	Livingstonville, N. Y.	Nov. 1, 1853.
Grain-separators	J. V. A. Wemple	Chicago, Ill.	Nov. 1, 1853.
Grain-separators, carriers to	John Blue	Covert, N. Y.	Nov. 8, 1853.
Grain-separators, straw and	John A. Taplin	Fishkill, N. Y.	Nov. 1, 1853.
Grain-washers	Geo. and Geo. W. Feaga	Frederick, Md.	Jan. 4, 1853.
Harrows	William Berlin	Berryville, Va.	April 12, 1853.
Harrows, the construction of	Lewis Lupton	Winchester, Va.	May 24, 1853.
Harrow to a land-roller, attachment of a	Daniel Hill	Bartonia, Ind.	Oct. 11, 1853.
Harvesters and binders	Joseph E. Neson	Buffalo, N. Y.	Dec. 13, 1853; in England, Aug. 27, 1853.
Harvesters and binders, grain	P. H. Watson and E. S. Renwick	Washington, D. C.	Dec. 6, 1853; antedated June 6, 1853.
Harvesters, clover	Jeptha A. Wagener	Pultney, N. Y.	May 24, 1853.
Harvesters, cutter-fingers of	John H. Manny	Waddams Grove, Ill.	April 19, 1853; in England, Dec. 9, 1852.
Harvesters, cutters to	John H. Manny	Waddams Grove, Ill.	June 21, 1853; in England, Dec. 9, 1852.
Harvesters, grain	Frederick Nishwitz	Williamsburg, N. Y.	Aug. 30, 1853

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Harvesters, grain	Thos. D. Burrall	Geneva, N. Y.	April 5, 1853.
Harvesters, grain and grass	John E. Brown and S. S. Bartlett	Woonsocket, R. I.	Dec. 20, 1853.
Harvesters, grain and grass	Philo Sylla and Augustus Adams	Elgin, Ill.	Sept. 20, 1853.
Harvesters, grain and grass	Uriah H. Goble	Springfield, Ohio	Dec. 20, 1853.
Harvesters, grain and grass	William and Thomas Schnebly	New York, N. Y.	Dec. 20, 1853.
Harvesters, grain and grass, cutters of	William Pierpont	Salem, N. J.	Nov. 22, 1853.
Harvesters, grain and grass, cutting-gear of	Samuel S. Allen	Salem, N. J.	Nov. 8, 1853.
Harvesters, grass	William K. Hall	Phillippi, Va.	Nov. 22, 1853.
Harvesters of grain and grass	William G. Huyett	Williamsburgh, Pa.	June 14, 1853.
Harvesters, rakes to	Thos. Baylis and Daniel Williams	Tecumseh, Mich.	Jan. 11, 1853.
Harvesters, track-clearers to	Rufus L. Howard, assignee of Wm. F. Ketchum	Buffalo, N. Y.	May 17, 1853.
Hoes, garden and other	Jacob T. Sargent	Sutton, N. H.	Oct. 25, 1853.
Hoes, seeding	Julius A. Pease	New York, N. Y.	May 17, 1853.
Hullers of grass-seed	Henry P. Byram	Louisville, Ky.	Oct. 11, 1853.
Hullers, rice	D. Marsh and B. Whitney	Fairfield, Conn.	April 26, 1853.
Hulling and scouring coffee, machines for	Robt. P. Walker	New York, N. Y.	Dec. 20, 1853.
Hulling-cylinders, clover, fastening the teeth to	Samuel Karns	Bloody Run, Pa.	Nov. 8, 1853.
Husking maize machines	Thomas C. Hargreaves	Schenectady, N. Y.	Oct. 4, 1853.
Manure-carts	Daniel Reid	Washington, N. C.	May 3, 1853.
Manure-crushers and sowers	Thomas F. Nelson	Clark Co., Va.	Dec. 20, 1853.
Manure-spreaders	Silas A. Hedges	Lancaster, Ohio	Jan. 11, 1853.
Planters, corn	Gardner A. Bruce	Mechanicsburg, Ill.	Oct. 4, 1853.
Planters, corn	Jacob H. Carothers	Davidsburg, Pa.	July 26, 1853.
Planters, cotton-seed	Samuel Miller	Washington College, Tenn.	April 19, 1853.
Planters, seed	David and Herman Wolf	Lebanon, Pa.	Feb. 15, 1853.
Planters, seed	George Rohr	Charlestown, Va.	June 21, 1853.
Planters, seed	Geo. W. Brown	Tylerville, Ill.	Aug. 2, 1853; antedated Feb. 2, 1853.
Planters, seed	Henry Perrin and Wm. Rudduck	Wilmington, Ohio	Sept. 20, 1853.
Planters, seed	Isaac H. Garretson	Richland, Iowa	Mar. 29, 1853.
Planters, seed	Lebbeus Caswell	Harrison, Me.	Aug. 2, 1853.
Planters, seed	Milton Satterlee	Louisa, Ill.	July 26, 1853.
Planters, seed	Nathan C. Davis	West Jefferson, Ohio	Oct. 25, 1853.
Planters, seed	Peter Horn	Hagerstown, Md.	Aug. 23, 1853.
Planters, seed	R. C. Wrenn	Mount Gilead, Ohio	Nov. 29, 1853.
Planters, seed	Samuel Witherow, assignee of Samuel and Wm. H. Witherow	Gettysburg, Pa.	Jan. 18, 1853.
Planters, seed	Samuel Jenkins	Portsmouth, Pa.	Sept. 20, 1853.
Planters, seed	William Cressler	Shippensburg, Pa.	May 17, 1853.
Planters, seed, draught apparatus of	Jacob Mumma	Mount Joy, Pa.	Aug. 16, 1853.
Planting cultivators, seed	George Phillips	Philadelphia, Pa.	Nov. 15, 1853.
Ploughs	Cornelius R. Brinckerhoff	Batavia, N. Y.	Oct. 11, 1853.
Ploughs	Robert A. Graham	New Paris, Ohio	Oct. 4, 1853.
Ploughs	Samuel Hulbert	Ogdensburg, N. Y.	Sept. 20, 1853; in Canada, Sept. 20, 1852.
Ploughs	Solomon Horney, jr.	Richmond, Ind.	April 5, 1853.
Ploughs	William V. Burton	Orange, Ohio	July 26, 1853.
Ploughs, attaching horses to	John D. Filkins and Wm. H. De Puy	Lima, Ind.	Oct. 25, 1853.
Plough-beams	Levi B. Griffith	Honey Brook, Pa.	Oct. 4, 1853.
Ploughs, cultivating	Sam. G. Wise, assignee of L. M. Whitman	Weedsport, N. Y.	Oct. 11, 1853.
Ploughs, hill-side	D. H. B. Newcomb	Conewango, N. Y.	June 21, 1853.
Ploughs, hill-side	J. B. Wilder	Belfast, Me.	June 21, 1853.
Ploughs, hill-side	J. C. Bidwell and Jno. Hall, executors of Sam. Hall	Pittsburg, Pa.	Jan. 4, 1853.
Ploughs, hill-side	Nathan Harrison and John W. H. Metcalf	Ridgeville, Va.	Oct. 11, 1853.
Ploughs, hill-side	William H. Babbit	Waynesburg, Pa.	Aug. 16, 1853.
Potatoes, cutting and planting	Samuel Hutchinson	Rockport, Ind.	Oct. 25, 1853.
Potato-diggers	Francis C. Schaffer	Brooklyn, N. Y.	Jan. 4, 1853.
Potato-diggers	Thomas B. Stout	Keyport, N. J.	April 26, 1853.
Rakes, hay	Frederick B Parker	Queensville, Ind.	Aug. 23, 1853.
Rakes, power	Hiram N. Tripp	Alfred, Maine	Dec. 20, 1853.
Scythe-fastenings	Alpheus Kimball	Fitchburg, Mass.	Feb. 22, 1853.
Scythe-fastenings	Pinckney Frost	Springfield, Vt.	Jan. 11, 1853.
Scythes, shape of	Wm. P. Greenleaf	Washington, N. H.	Sept. 13, 1853.
Straw-cutters	James T. Asbury	Taylorville, N. C.	Sept. 6, 1853.
Straw-cutters	J. J. Parker	Marietta, Ohio	Oct. 11, 1853.
Straw-cutters	John Moyle	Martinsburg, Va.	Sept. 6, 1853.
Straw-cutters	O. W. Seely, assign. of J. P. Smith & O. W. Seely	Albany, N. Y.	July 12, 1853.
Straw-cutters	Reuben Daniels	Woodstock, Vt.	April 26, 1853.
Straw-cutters	Richard Ketchum	Seneca Castle, N. Y.	Oct. 4, 1853.
Straw-cutters, cutting-gear of	Thomas Allison	Milton, N. Y.	Sept. 6, 1853.
Straw-cutters, feed-rollers of	John Jones and Alex. Lyle	Rochester, N. Y.	Nov. 8, 1853.
Threshers and separators, grain	Robert Sinclair, jr., and R. F. Maynard	Baltimore, Md.	Nov. 15, 1853.
Threshers and separators of grain	Abram B. Peterson	Dexter, Mich.	Nov. 8, 1853.
Vegetable-cutters	Napoleon B. Lucas	Otter Creek, Ill.	June 28, 1853.
Winnowers	D. H. Whittemore	Chicopee Falls, Mass.	Oct. 11, 1853.
Winnowers	D. S. Mackey and J. R. Smith	Batavia, N. Y.	Oct. 25, 1853.
Winnowers and Threshers	Lewis S. Ingraham	Cuyahoga Falls, Ohio	Aug. 9, 1853.
Winnowers, grain	Geo. F. S. Zimmerman	Charlestown, Va.	Feb. 8, 1853.
Winnowers, grain	George B. Salmon	Elmira, N. Y.	July 19, 1853; antedated July 6, 1853.
Winnowers of grain	Augustus B. Childs	Rochester, N. Y.	Jan. 25, 1853; in England, May 22, 1852.
Winnowers of grain	Henry M. Keller	Newark, Ohio	Oct. 11, 1853.
Winnowers of grain	Samuel Canby	Ellicott's Mills, Md.	Aug. 9, 1853.
Winnowers of grain	Schuyler Briggs and Jno. G. Talbot	Sloansville, N. Y.	Mar. 29, 1853.
Winnowers, screens of	Ab. Lash and Miles Moore	Belleville, Ohio	Nov. 8, 1853.
Winnowers, shaking shoes for	Jacob L. Van Valkenburgh	Ogdensburg, N. Y.	Oct. 11, 1853.
Winnowers, shoes to	Joseph and James Montgomery	Lancaster, Pa.	Dec. 20, 1853.
Yokes, ox	Albert Vose	Pittsfield, Vt.	Oct. 25, 1853; antedated Aug. 10, 1853.

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Classified list of patents issued.—Continued.

CLASS II.—METALLURGY *and manufacture of metals and instruments therefor.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Annunciators for hotels. (See Class XXII.)			
Anvils, apparatus for polishing	M. Fisher and John H. Norris	Trenton, N. J.	Oct. 4, 1853.
Anger handles and braces, socket for. (See Class XIV.)			
Axes, machine for making	Jonas Simmons	Cohoes, N. Y.	Mar. 1, 1853.
Axes, pick	D. and D. F. Tompkins, assignees of J. C. Conklin	New York, N. Y.	Dec. 20, 1853.
Beams, sheet-metal	Elizabeth Montgomery, assignee of Richard Montgomery.	New York, N. Y.	July 12, 1853; in England, Oct. 13, 1852.
Bolts, knob, operating and locking	Oliver Ellsworth	Hartford, Conn.	June 7, 1853.
Bolts, window shutter	S. Green and C. Arnett, assignees of Sam. Green.	Lambertville, N. J.	Nov. 8, 1853.
Burglar alarms. (See Class XXII.)			
Cable-chain stopper. (See Class VII.)			
Casting pipes, core-bars for forming cores of	George Peacock	West Troy, N. Y.	Feb. 8, 1853.
Castors for furniture	William W. Wade	Springfield, Mass.	May 17, 1853.
Chains, making	Christian Sleppy	Wilkesbarre, Pa.	Sept. 27, 1853.
Curry-combs, construction of	William Wheeler	Troy, N. Y.	Mar. 1, 1853.
Curry-combs, cutting the bars and teeth of	Chas. H. Kellogg, assign. of William Wheeler	Troy, N. Y., West Poultney, Vt.	Oct. 25, 1853.
Dies, block, cleansing and cooling in rivet machines	Davis L. Weatherhead	Philadelphia, Pa.	May 17, 1853
Discs, metallic, machinery for cutting and bending	Roys & Wilcox, assignees of Elliot Savage	Berlin, Ct.	Aug. 30, 1853.
Door-fastener	Duncan E. McDougall	Troy, N. Y.	May 31, 1853.
Door-fastener	Samuel P. Kittle	Buffalo, N. Y.	June 7, 1853.
Drills, expanding	Thomas Prosser	New York, N. Y.	Jan. 25, 1853.
Drills, metal	Warren Lyon	New York, N. Y.	Sept. 20, 1853.
Fastener and holder, window-shutter	Calvin Adams	Pittsburg, Pa.	Oct. 25, 1853.
Files and Rasps	Hiram Powers	Now of Florence, Italy	Oct. 4, 1853.
Gold amalgamator, arrangement of quartz pulverizer and	P. G. Gardiner	New York, N. Y.	June 7, 1853.
Gold, machines for pulverizing auriferous quartz and amalgamating the.	Hiram Berdan	New York, N. Y.	May 24, 1853.
Gold, magnetic machine for washing and separating. (See Class VIII., M.)			
Gold, processes for preparing (for filling teeth)	Alfred J. Watts	Utica, N. Y.	April 26, 1853.
Gold separator	M. O. Gritzner	Washington, D. C.	Nov. 29, 1853.
Gold washer	Henry M. Ritterband	New York, N. Y.	Nov. 1, 1853.
Gold washer	John H. Ward	Sonora, Cal.	Oct. 4, 1853.
Gold washer and amalgamator	Abiather F. Potter	Boston, Mass.	Jan. 25, 1853.
Gold washer and amalgamator	Jno. D. Lynde, assignee of Arnold Buffum	New York, N. Y.	May 31, 1853.
Grinding plough-castings, machine for	Joshua Gibbs	Canton, Ohio	Oct. 4, 1853.
Hammers, drop	E. K. Root	Hartford, Conn.	Aug. 16, 1853.
Hammers, machine	Daniel Noyes	Abington, Mass.	Oct. 25, 1853.
Hammers, steam, arrangement of valves, ports, and passages for operating.	Robert R. Taylor	Reading, Pa.	Nov. 29, 1853.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Hammers, steam, valve arrangement for	James Watt	South Boston, Mass.	Dec. 6, 1853.
Hammers, trip	John W. Peer	Schenectady, N. Y.	Nov. 29, 1853.
Hammers, trip	Wm. Van Anden	Poughkeepsie, N. Y.	Aug. 16, 1853.
Hooks and eyes to cards, attaching. (See Class XXI., H.)			
Iron, covering with gutta percha. (See Class IV., G.)			
Iron, malleable, directly from the ore, manufacturing	Geo. A. Whipple	Newark, N. J.	May 10, 1853.
Iron, railroad and other, rolling. (See rolling.)			
Iron, sheet, manufacture of	Henry McCarty	Pittsburg, Pa.	Sept. 27, 1853.
Iron ware, hollow, annealing	David Stuart	Philadelphia, Pa.	Sept. 27, 1853.
Keys, swivel-nibbed, for door-locks	Augustus C. Harig	Louisville, Ky.	Mar. 1, 1853.
Knives, table, attaching handles to the blades of	David N. Ropes	Meriden, Ct.	Nov. 29, 1853.
Locks, bank	James H. Crygier	New York, N. Y.	Nov. 22, 1853.
Locks, bank	Linus Yale, jr.	Newport, N. Y.	July 12, 1853.
Locks, bank	Thomas P. Murphy	New York, N. Y.	May 31, 1853.
Locks, door	Linus Yale	Newport, N. Y.	Oct. 18, 1853.
Mandrel, revolving, for lining cylinders with metal	George Potts	Cincinnati, Ohio	Sept. 13, 1853.
Metal bars, machinery for reducing	Cyrus G. Howard, assignee of Dexter H. Chamberlain.	Boston, Mass.	Jan. 18, 1853.
Metal, coating sheets of	Edmund Morewood and Geo. Rogers	London, England	Nov. 1, 1853.
Metal, sheet, machine for cutting	Stephen P. Ruggles	Boston, Mass.	Aug. 30, 1853.
Metal, sheet, machines for cutting	Jno. Wilmington	South Bend, Ind.	Dec. 13, 1853.
Metals, apparatus for grinding and shaping	Samuel Darling	Bangor, Me.	Aug. 30, 1853.
Metals, planing machines for	Wm. W. Spafford	Boston, Mass.	Sept. 6, 1853.
Metals, treating, while in the molten state	Horace W. Woodruff	Watertown, N. Y.	Oct. 11, 1853.
Metallic plates, joining and riveting	William Beschke	Alexandria, Va.	Nov. 22, 1853.
Metallic trunk frames. (See Class XVI., T.)			
Moulding for cast-iron plates with dove-tailed recesses	Thaddeus A. Smith	Albany, N. Y.	Mar. 8, 1853.
Moulding in flasks, machines for	Lysander A. Orcutt	Albany, N. Y.	Mar. 8, 1853.
Nails, screw. (See Screw-nails.)			
Nails, wrought, machines for making	John P. Sherwood	Fort Edward, N. Y.	May 10, 1853.
Nut-machines	Henry Carter and James Rees	Pittsburg, Pa.	Nov. 22, 1853; antedated June 3, 1853.
Ore-washer	M. Peckham and L. O. Palmer	Utica, N. Y.	Jan. 4, 1853.
Ores, machines for washing	Richard Edwards	Eagle River, Mich.	Nov. 29, 1853.
Ores, or other substances of different specific gravities, apparatus for separating.	H. Bradford and E. Fitzgerald	New York, N. Y.	Feb. 22, 1853.
Padlock	S. C. Thompson, G. W. Westerfield, and H. Ritchie, assignees of H. Ritchie.	Newark, N. J.	Aug. 23, 1853.
Pins, machines for sticking	C. O. Crosby	New Haven, Conn.	Nov. 1, 1853.
Pins, machines for sticking	C. O. Crosby	New Haven, Conn.	Nov. 1, 1853.
Pins, machines for sticking	C. O. Crosby	New Haven, Conn.	Nov. 1, 1853.
Planing metal, machines for. (See Class XIV.)			
Printers' rules, machines for cutting and bevelling. (See Class XVIII.)			
Punching metal, machines for	O. J. Davie and Thos. W. Stephens	Erie, Pa.	Oct. 4, 1853.
Rolling iron, bar, machines for	Jas. T. Hartupee and A. Alexander	Pittsburg, Pa.	April 19, 1853.
Rolling railroad and other iron	A. B. Seymour	Hudson, N. Y.	Aug. 9, 1853.
Sash-fastener	Henry Hochstrasser	Philadelphia, Pa.	Sept. 27, 1853.
Sash-fasteners, arrangement of	Henry R. Noll	Lewisburg, Pa.	April 5, 1853.
Saw-setting machine	Rand B. White	Mendon, N. Y.	Feb. 15, 1853.
Saws, mill, forming teeth on. (See Class XIV.)			

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Screw-blanks, machines for pointing and threading	Thomas J. Sloan	New York, N. Y	April 26, 1853.
Screw-blanks, machinery for shaving the heads of	New England Screw Company, assignee of Cullen Whipple.	Providence, R. I.	April 12, 1853; antedated Nov. 30, 1852.
Screw-blanks, machines for threading	Thompson Newbury	Taunton, Mass.	April 19, 1853.
Screw-cutting dies	John Griffiths	Philadelphia, Pa.	Jan. 18, 1853.
Screw-cutting dies, arrangement of	Andrew Mayer	Philadelphia, Pa.	Jan. 11, 1853.
Screw-cutting dies in the die-stock, arrangement of	Simeon Goodfellow	New Orleans, La	Dec. 6, 1853.
Screw-machines, apparatus for feeding blanks to	Thompson Newbury	Taunton, Mass.	April 5, 1853.
Screw-nails	Samuel Pratt	Boston, Mass.	Oct. 25, 1853.
Screw-wrench	Aury G. Coes	Worcester, Mass.	Aug. 16, 1853.
Screw-wrench	George B. Read	New York, N. Y	Feb. 1, 1853.
Screws, wood, machine for cutting the threads of	Elliot Savage	Berlin, Conn	April 5, 1853.
Screws, wooden, machines for cutting	Abner H. Longley	Lebanon, Ind.	May 17, 1853.
Shoes, horse	Wm. H Towers	Philadelphia, Pa	Dec. 20, 1853.
Shoes, horse, expanding	Benjamin P. Sargent	Sutton, N. H	Oct. 25, 1853.
Shovel blades, uniting to the handle-straps	Jonathan White	Antrim, N. H	Nov. 15, 1853.
Shovels, spades, &c., making	William W. Richards	Philadelphia, Pa.	Oct. 25, 1853.
Spike-machines	Philip P. Trayser	Baltimore, Md.	July 19, 1853.
Spike-machines, adjustable heading-lever in	Joshua C. Cary	Richmond, Va.	Feb. 15, 1853.
Spike-machines, arrangement of the die-rollers in	James H. Swett	Boston, Mass.	Mar. 29, 1853.
Spikes, machines for making	J. R. Richardson, J. Westerman, and E. Wilder	Newcastle, Pa	Aug. 2, 1853.
Spikes, hook-headed, machines for making	John H. Snyder	Troy, N. Y.	May 10, 1853.
Steel to cast-iron, moulds for uniting	Charles Peters	Trenton, N. J	Feb. 8, 1853.
Tubes, metal, manufacture of	Geo. Frederick Muntz, jr.	Birmingham, England	June 14, 1853; in England, May 8, 1852.
Zinc, coating with lead	E. Morewood and G. Rogers	London, England	June 28, 1853; in England, Dec. 12, 1850.

CLASS III.—MANUFACTURES OF FIBROUS AND TEXTILE SUBSTANCES, *including machines for preparing fibres of wool, cotton, silk, fur, paper, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bobbins	Horatio Clarke	Dedham, Mass.	June 28, 1853.
Cards, machine-cleaning	George Wellman	Lowell, Mass.	Dec 6, 1853.
Carpets, printed	Thomas Crossley	Roxbury, Mass.	Aug. 16, 1853.
Cloth, bucking	Andrew Robeson, jr.	Newport, R. I.	Sept. 13, 1853; in England, Nov. 8, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cloth-dressing, gig-mills for	Amasa Woolson	Springfield, Vt.	April 19, 1853.
Condensers, wool	James S. Hogeland	Lafayette, Ind.	Jan. 18, 1853.
Counterpanes	Zachariah Allen	Providence, R. I.	Aug. 28, 1853.
Fabrics, bleached, processes for decolorinating	J. Augustus Roth	Philadelphia, Pa.	Oct. 4, 1853.
Fabrics, manufacture of plain and figured	Fred. Wm. Norton	Lasswade, North Britain	Sept. 13, 1853.
Fibre, vegetable, processes for preparing	Charles J. Pownall	Addison Road, Kensington, England	April 5, 1853; in Ireland, Aug. 11, 1852.
Fibrous materials, combing	Joshua Heilmann, administrator of Joshua Heilmann.	France	Nov. 29, 1853; in France, Dec. 17, 1845.
Flax, machines for breaking and dressing	S. A. Clemens	Springfield, Mass	Mar. 8, 1853.
Flyers, compressors for	Wm. H. Thompson and Richard H. Plummer	Biddeford, Me	July 19, 1853.
Gins, cotton	Henry L. Weeks	Hannahatchie, Ga	Sept. 6, 1853.
Hackling flax and hemp, machines for	James P. Arnold	Louisville, Ky	Jan. 4, 1853.
Hat bodies, conductors in machines for forming	Lansing E. Hopkins	New York, N. Y	Aug. 30, 1853.
Hat bodies, machines for shrinking	James S. Taylor	Danbury, Conn	May 3, 1853.
Hemp and flax, breaking-machines	O. S. Leavitt	Maysville, Ky	Aug. 30, 1853.
Hemp and flax, drawing-frames for	O. S. Leavitt	Marcellus, N. Y	Sept. 20, 1853.
Hemp-brakes	O. S. Leavitt	Marcellus, N. Y	Sept. 20, 1853.
Hemp, machines for breaking	Lewis W. Colver	Louisville, Ky	Mar. 29, 1853.
Knitting-looms	John Mee, John Rourke, and Gilbert MacKennon, assignees of John Mee.	Lowell, Mass.; Portsmouth, N. H.	May 10, 1853.
Knitting-machines	John Maxwell	Galeville, N. Y	Mar. 29, 1853.
Knitting-machines	M. Marshall, W. Aldrich, and L. B. Ting, assignees of Moses Marshall.	Lowell, Mass.	Mar. 15, 1853.
Knitting-machines	William Mansfield	Dracut, Mass.	Mar. 22, 1853.
Looms	Jonathan Knowles	Cohoes, N. Y.	Nov. 8, 1853.
Looms	Oliver A. Kelly	Woonsocket, R. I	Nov. 22, 1853.
Looms	William Townshend	Hinsdale, Mass	Mar. 1, 1853.
Looms	William Townshend	Hinsdale, Mass	Nov. 15, 1853.
Looms for making weavers' harness	Kasimer Vogle	Chelsea, Mass.	Oct. 25, 1853.
Looms for weaving coach-lace	James H. Murrill	Richmond, Va.	Oct. 4, 1853.
Looms for weaving fancy goods	Benjamin F. Rice	Clinton, Mass.	Oct. 18, 1853.
Looms for weaving haircloth	Halvor Halvorson	Hartford, Conn	Sept. 27, 1853.
Looms for weaving pile fabrics	E. B. Bigelow	Clinton, Mass.	Nov. 15, 1853.
Looms, hand	James A. Mitchell	Ringgold, Ga	Dec. 20, 1853.
Looms, jacquard, apparatus of	John A. Elder	Westbrook, Me	June 21, 1853.
Looms, jacquard, harness-boards for	Edward Everett and Sam'l T. Thomas	Lawrence, Mass.; Lowell, Mass.	Jan. 18, 1853.
Looms, let-off motion for	Amos B. Taylor and Stephen Wilcox, jr.	Mystic, Conn.; Westerly, R. I	Feb. 22, 1853.
Looms, machines for manufacturing harness for	Darius C. Brown	Lowell, Mass.	Feb. 15, 1853.
Looms, operating the treadles of	Robert W. Andrews	Stafford, Conn	Jan. 18, 1853.
Looms, power	James Greenhalgh, jr	Waterford, Mass.	Nov. 8, 1853.
Looms, power	John Gledhill	New York, N. Y	Nov. 15, 1853.
Looms, power	John J. Hepworth, assignee of Wm. Baird	Spring Garden, Pa	Nov. 29, 1853.
Looms, power	John Pender	Worcester, Mass	Oct. 18, 1853.
Looms, power	William Mason	Taunton, Mass.	Oct. 18, 1853.
Looms, power, shuttle-motions for	William Creighton	Fall River, Mass.	Oct. 18, 1853.
Looms, shuttle-box motion in	Christopher Duckworth	Thompsonville, Conn	June 28, 1853.
Looms, temples for	Jerome B. Greene	Worcester, Mass.	Nov. 8, 1853.
Looms, temples for	Jos. A. Scholfield	Westerly, R. I	Aug. 2, 1853.
Paper, copying, manufacturing	William Mann	Philadelphia, Pa	Jan. 11, 1853; antedated July 11, 1852.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Paper, method of drying	John Hartin	New York, N. Y.	Aug. 9, 1858.
Paper stuff, manufacture of. (See Class IV.)			
Sewing-machines	N. Hunt, assignee of Henry Edwards, assignee of C. Morey, assignee of S. C. Blodgett.	Boston, Mass.	Dec. 20, 1858.
Sewing-machines	Thomas C. Thompson	Ithaca, N. Y.	Mar. 29, 1858.
Sewing-machines	Wm. G. Bates, assignee of Wm. H. Johnson	Westfield, Mass.; Greenville, Mass.	Feb. 22, 1858.
Sewing-machines	William Wickersham	Lowell, Mass.	April 19, 1858.
Sewing-machines, feed-motion in	Freeman Palmer	Conneaut, Ohio	Jan. 25, 1858.
Sewing-machines, feeding-clamps for	William H. Johnson	Granville, Mass.	April 12, 1858.
Sewing on binding, guides for	Henry L. Sweet	Foxborough, Mass.	Dec. 20, 1858.
Shuttles	David Carroll	Baltimore, Md.	Dec. 20, 1858.
Spinning-jacks	John Jackson	Andover, Mass.	July 19, 1858.
Stamping patterns on rollers, machines for. (See Class XVIII.)			
Warp net fabrics	John Mee, John Rourke, and Gilbert MacKennon, assignees of John Mee.	Lowell, Mass.; Portsmouth, N. H.	May 10, 1858.
Weaving corded fabrics	William Smith	New York, N. Y.	April 5, 1858.
Willowers, feed-motion in	Francis A. Calvert	Lowell, Mass.	April 19, 1858.
Yarn, process of forming by felting	John H. Bloodgood	Rahway, N. J.	April 5, 1858.

CLASS IV.—CHEMICAL PROCESSES, MANUFACTURES, AND COMPOUNDS, *including medicines, dyeing, color-making, distilling, soap and candle making, mortars, cements, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Alcohol, processes for purifying	Luther Atwood	Boston, Mass.	Aug. 28, 1858.
Alcohol, separating from water and other heavier fluids	B. F. Greenough	Cincinnati, Ohio	Dec. 20, 1858.
Benzole vapor apparatus	Oliver P. Drake	Boston, Mass.	Aug. 30, 1858.
Candle-mould apparatus	George Kendall	Providence, R. I.	May 8, 1858; in England, Nov. 12, 1852.
Candle-mould machines	D. E. and M. Battershall	Troy, N. Y.	Dec. 20, 1858.
Caoutchouc compounds, processes of vulcanizing	L. O. P. Meyer	Newtown, Conn.	Dec. 20, 1858.
Cementing materials for ornamental compounds	Conrad Poppenhusen, assignee of Carl Ludwick Gran.	Brooklyn, N. Y.; Hamburg, Germany	April 26, 1858; in Germany, Dec. 18, 1847.
Chromates, processes for obtaining	James C. Booth	Philadelphia, Pa.	July 19, 1858; antedated Nov. 9, 1852.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Compositions for a filter	James M. Parker, assignee of Eliza Millington, executrix, and William S. Toole, executor, of Charles Millington and John Jordan, assignee of William H. Jennison.	New York, N. Y.	May 31, 1858.
Compounds for stereotype plates. (See Class XVIII., S.)			
Compositions for treating wool	W. S. Hubbell and A. Barrett	Kingsville, Ohio	June 7, 1858.
Dyeing compounds	Frederick G. Vettercke	New York, N. Y.	July 26, 1858.
Dyeing yarn particolored	Daniel B. Hinman	Philadelphia, Pa.	July 26, 1858.
Evaporators, cane-juice	Henry Bessemer	Middlesex County, England	Mar. 8, 1858; in England, Feb. 24, 1852.
Fabrics, bleached, processes for declorinating. (See Class III.)			
Fatty materials, purifying	Jean Baptiste Moinier and Pierre Hippolyte Boutigny.	Paris, France	Feb. 8, 1858; in France, Nov. 14, 1849.
Fibre, vegetable, processes for preparing. (See Class III.)			
Filters, for cane-juice	Henry Bessemer	Middlesex County, England	Mar. 8, 1858; in England, Feb. 24, 1852.
Gas-apparatus, portable	Wm. and Matthias Stratton	Philadelphia, Pa.	Feb. 1, 1858.
Gas generators, feed-apparatus	Stephen Meredith	Erie, Pa.	Sept. 6, 1858.
Gas meters	Alexander A. Croll	London, England	Feb. 22, 1858.
Gas meters	E. R. Hallam, assignee of E. R. Hallam and T. B. Barnard.	New Haven, Conn.; New Haven, Conn.; Brooklyn, N. Y.	Feb. 8, 1858.
Gas, purifying apparatus for	William Wigston	New York, N. Y.	Aug. 30, 1858.
Glue, processes for making	David A. James	Cincinnati, Ohio	July 26, 1858.
Gutta percha and caoutchouc, covering metals with	Charles Goodyear	New Haven, Conn.	Oct. 11, 1858; in England, Mar. 4, 1851.
Gutta percha and india-rubber manufacturing	C. Goodyear, assignee of Charles Goodyear and Robert Haering.	New Haven, Conn.	April 12, 1858; in England, Mar. 4, 1851.
Gutta percha, moulding stereotypes plates. (See Class XVIII., S.)			
Gutta percha, stereotype compositions	Leonardo Westbrook	New York, N. Y.	July 19, 1858.
India-rubber, manufacture of	Richard Solis	New Brunswick, N. J.	Feb. 1, 1858.
India-rubber, preserving in the liquid state	S. T. Armstrong, assignee of Henry Lee Norris	New York, N. Y.	July 26, 1858; in England, Feb. 24, 1858; in France, Mar. 18, 1858.
India-rubber soles for boots and shoes. (See Class XVI., B.)			
Ink, printers'	Samuel H. Turner	Brooklyn, N. Y.	Sept. 6, 1858.
Oil, paraffine, preparing	William Brown	Glasgow, Scotland	Sept. 27, 1858.
Oil, rosin, manufacturing	Samuel W. Hawes	Boston, Mass.	April 12, 1858.
Oil, rosin, processes for distilling	James Riley and Wm. Allen	Southfield, N. Y.	Mar. 22, 1858.
Oil, rosin, processes for distilling	Samuel W. Hawes, assignee of Madison Page	Chelsea, Mass.; Williamsburgh, N. Y.	May 24, 1858.
Oil, rosin, purifying	Proprietors of Locks and Canals on Merrimack River, assignees of Samuel L. Dana.	Lowell, Mass.	April 19, 1858.
Oils, lubricating, preparing	Luther Atwood	Boston, Mass.	Mar. 29, 1858.
Paint compounds	Charles F. Sibbald	Philadelphia, Pa.	May 10, 1858; in England, April 15, 1852.
Painting on cloth	Leon Jarosson	Jersey City, N. J.	June 7, 1858.
Paper stuff, manufacture of	Theodore Couple and M. A. C. Mellier	Paris, France	Aug. 2, 1858; in France, May 7, 1851.
Seidlitz powders, machine for folding. (See Class XXII., F.)			
Soap-cutting machines	James B. Duff	New York, N. Y.	Aug. 23, 1858.
Soap ingredients	Ira F. Payson	New York, N. Y.	Dec. 6, 1858.
Soda fountains	William Coughlan	Baltimore, Md.	Oct. 25, 1858.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Soda-water fountains	Alex. Frankenberg	Columbus, Ohio	Dec. 20, 1853.
Stills, condensers for	Carl E. Werner	Newcastle, Ill	Dec. 6, 1853.
Stone, artificial	Julius Hornig and Ludwig Suess	Union Hill, N. J.	June 7, 1853.
Sugar-cane juice, machines for expressing	Henry Bessemer	Middlesex County, England	Mar. 15, 1853; in England, Feb. 24, 1852.
Sugar drainers	Henry Bessemer	Middlesex County, England	April 26, 1853; in England, Feb. 24, 1852.
Sugar-draining machines	Horace Southmayd, assignee of Josiah W. Archbald.	New York, N. Y.; Porto Rico, West Indies.	Jan. 25, 1853.
Sugar syrup, heaters for	Henry Bessemer	Middlesex County, England	Mar. 15, 1853; in England, Feb. 24, 1852.
Zinc, coating with lead. (See Class II.)			

CLASS V.—CALORIFICS, *comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparation of fuel, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Candlesticks, iron, construction of	W. P. Merriam, N. C. Harris, Wm. Wheeler, and E. N. Merriam.	Poultney, Vt	April 26, 1853.
Candlesticks, press-mould	Samuel T. Barnes	Columbus, Ohio	July 19, 1853.
Cans, oil or fluid	James R. Nichols	Haverhill, Mass	Sept. 20, 1853.
Dust, excluding from railroad cars	James M. Cook	Taunton, Mass	April 19, 1853.
Fire-places and stoves	Charles Neer	Troy, N. Y	May 31, 1853.
Furnaces, hot-air	C. D. Yale, assignee of James Bolton	Richmond, Va	April 26, 1853.
Furnaces, hot-air	James Bolton, M. D.	Richmond, Va	Dec. 20, 1853.
Furnaces, hot-air	M. B. Dyott	Philadelphia, Pa	Aug. 30, 1853.
Furnaces, hot-air	Nathaniel A. Boynton	Boston, Mass	Feb. 8, 1853.
Furnaces, hot-air	William Ennis	New York, N. Y	Mar. 29, 1853.
Furnaces, hot-blast, arrangement of pipes for	Jesse Young	Franklin Furnace, Ohio	Aug. 2, 1853.
Gas-burners	Samuel R. Brick	Philadelphia, Pa	May 24, 1853.
Grate-bars	Maria Louise Rocout	Paris, France	May 31, 1853; in France, Sept. 10, 1851.
Grate-bars	Samuel Van Syckel	Little York, N. J	Aug. 23, 1853.
Kettle bails	Thos. H. Dodge	Nashua, N. H	May 24, 1853.
Lamps	Charles J. Conway	New York, N. Y	July 19, 1853.
Lamps	Owen Redmond	Rochester, N. Y	July 26, 1853.
Lamps, camphene	John Newell	Boston, Mass	Oct. 4, 1853.
Lamps, fluid	Samuel F. Allen	New York, N. Y	Nov. 29, 1853.
Lamps, lard	Leonard A Stockwell	Batavia, N. Y	Sept. 13, 1853.
Lamps, spirit	Alex. J. Walker	New York, N. Y	May 24, 1853.
Lanterns	Wm. Porter and Edward A. Tuttle	Williamsburgh, N. Y	July 5, 1853.
Lanterns, frames for	Elijah F. Larker	Proctorsville, Vt	Feb. 1, 1853.
Lanterns, omnibus	F. O. Deschamps	Philadelphia, Pa	July 26, 1853.
Ovens	Ephraim Treadwell	New York, N. Y	July 19, 1853.
Ranges, cooking	Alexander McPherson	New York, N. Y	April 19, 1853.
Ranges, cooking	Geo. S. G. Spence	Boston, Mass	Oct. 4, 1853.
Ranges, cooking	John P. Hayes	Boston, Mass	Oct. 4, 1853.
Ranges, cooking	Nicholas Mason	Roxbury, Mass	Sept. 27, 1853.
Registers, hot-air	Edward A. Tuttle	Williamsburgh, N. Y	April 12, 1853.
Registers, hot-air	Wm. H. Towers	Philadelphia, Pa	Nov. 15, 1853.
Safes, fire-proof, linings for	John Farrel	Philadelphia, Pa	July 19, 1853.
Smoke and gases, condensing	J. Bloom	East Woburn, Mass	Nov. 29, 1853.
Stove-pipe collar	R. R. Finch, jr	New York, N. Y	Aug. 30, 1853.
Stoves	John J. Updegraff	Selin's Grove, Pa	April 5, 1853.
Stoves	S. S. Jewett and F. H. Root	Buffalo, N. Y	June 14, 1853; antedated Dec. 14, 1852.
Stoves	Thomas S. Gore	Jersey City, N J	Aug. 30, 1853.
Stoves, air-tight, self-acting dampers for	Sergius P. Lyon	Farmington, Mich	Nov. 15, 1853.
Stoves, cooking	Giles F. Filley	St. Louis, Mo	June 14, 1853.
Stoves, cooking	Jordan L. Mott	New York, N. Y	Sept. 27, 1853.
Stoves, cooking	Matthäus Heim	Cincinnati, Ohio	May 17, 1853.
Stoves, cooking, and ranges, oven-doors for	Gibson North	Philadelphia, Pa	Aug. 16, 1853.
Stoves, cooking, boilers for	R. W. Belson	Philadelphia, Pa	June 7, 1853.
Stoves, radiator for	John C. Fletcher	Burlington, Iowa	May 24, 1853.
Stoves, radiator for	Samuel D. Tillman	Seneca Falls, N. Y	April 26, 1853.
Ventilating railroad cars	S. A. Clemens	Springfield, Mass	Nov. 22, 1853.
Ventilators	Joseph Leeds	Philadelphia, Pa	Nov. 15, 1853.
Ventilators, railroad car	Geo. Spencer	Utica, N. Y	Nov. 8, 1853.

CLASS VI.—STEAM AND GAS ENGINES, *including boilers and furnaces therefor, and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boilers, steam	Benjamin Irving	Green Point, N. Y	Aug. 30, 1853; in France, May 12, 1853; in Belgium, May 17, 1853.
Boilers, steam	Charles F. Sibbald	Philadelphia, Pa	Dec. 20, 1853.
Boilers, steam, &c., corrugated plates for	Elizabeth Montgomery, assignee of Richard Montgomery.	New York, N. Y	May 17, 1853; in England, Feb. 17, 1853.
Boilers, steam, apparatus to regulate the supply of water to	Samuel R. Cline	Philadelphia, Pa	Aug. 2, 1853.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boilers, steam, construction of	John M. Reeder	Memphis, Tenn	Aug. 2, 1853.
Boilers, steam, detachable lining, for the fire-boxes of	John B. Collan	Reading, Pa	Oct. 11, 1853.
Boilers, steam, explosions, mode of obviating the danger from	Stephen Waterman	Williamsburgh, N. Y	Aug. 2, 1853.
Boilers, steam, method of connecting the sheets of sheet-flue and water-space.	Richard Montgomery	New York, N. Y	Jan. 11, 1853.
Boilers, steam, mode of indicating the height of water in	Nathan Thompson, jr	Williamsburgh, N. Y	Aug. 2, 1853.
Cut-off gearing, adjustable, for puppet-valve engines	Horatio Allen and D. G. Wells	New York, N. Y	Feb. 15, 1853.
Cut-off, steam-engines for	Horatio Allen and D. G. Wells	New York, N. Y	June 21, 1853.
Engines, actuating, process for mixing air and steam for	William Mt. Storm	New York, N. Y	April 5, 1853.
Engines, actuating, use of steam for	Charles E., John, and Sam'l Wethered	Baltimore, Md	Sept. 27, 1853; in England, May 25, 1853.
Engines, air	Austin O. Wilcox	Philadelphia, Pa	July 19, 1853.
Engines, air	J. A. Woodbury, Joshua Merrill, and George Patten.	Winchester, Mass.; Boston, Mass.; Charlestown, Mass.	May 17, 1853; in England, Jan. 5, 1853.
Engines, air	J. A. Woodbury, Joshua Merrill, and George Patten.	Winchester, Mass.; Boston, Mass.; Boston, Mass.	Oct. 4, 1853; in England, Jan. 5, 1853.
Engines, hot-air	Austin O. Willcox	Philadelphia, Pa	Aug. 2, 1853.
Engines, locomotive	D. Winder	Xenia, Ohio	May 10, 1853.
Engines, locomotive, ash-pans for	Gilman Davis	Roxbury, Mass	Oct. 11, 1853.
Engines, oscillating	Alex. B. Latta	Cincinnati, Ohio	Oct. 11, 1853.
Engines, oscillating steam	Morris J. Gardner	York, Pa	Aug. 23, 1853.
Engines, rotary steam	James McKay	Philadelphia, Pa	Mar. 1, 1853.
Engines, rotary steam	John C. F. Salomon	Washington, D. C	Oct. 4, 1853.
Engines, rotary steam	Richard C. Bristol	Chicago, Ill	July 26, 1853.
Engines, steam, condensers for	Benjamin Crawford	Pittsburg, Pa	Nov. 1, 1853.
Engines, steam, planetary hydraulic	James Black	Philadelphia, Pa	Sept. 20, 1853.
Engines, steam, regulating the speed of	L. R. Faught	Macon, Ga	Nov. 1, 1853.
Gauges, pressure	Edward H. Ashcroft	Boston, Mass	July 12, 1853.
Generators, steam	Abel Shawk	Cincinnati, Ohio	Sept. 20, 1853.
Packing, piston, metallic	Henry L. Russell	Hudson, Mich	Oct. 25, 1853.
Packing, tightening of engine and pump pistons	Jno. Crabtree and Jos. Hopkinson	Philadelphia, Pa	Nov. 29, 1853.
Spark-arresters	Samuel Sweet	New York, N. Y	Oct. 25, 1853.
Spark-burner and water-heater for locomotives	David Matthew	Philadelphia, Pa	Dec. 6, 1853.
Steam, generating and condensing	Peter H. Watson	Washington, D. C	Nov. 1, 1853; antedated May 2, 1853.
Steam, method of generating	Jean B. Moinier and Pierre H. Boutigny	Paris, France	Aug. 23, 1853; in France, Jan. 13, 1852.
Valve-motion of oscillating engines	William Stephens	Pittston, Pa	Oct. 11, 1853.
Valves, cut-off, for steam-engines, the gear of variable	M. W. Baldwin	Philadelphia, Pa	Sept. 13, 1853.
Valves of rotary steam-engines	Benj. Gould, assignee of Joseph W. Webb	Aurora, N. Y	Jan. 18, 1853.
Valves of steam-engines, working the	Richard H. Townsend	New York, N. Y	Sept. 13, 1853.
Valves, safety, for locomotive engines	Henry Waterman	Hudson, N. Y	Nov. 15, 1853.
Valves, safety, for steam-boilers	Zadok H. Mann	Cincinnati, Ohio	Sept. 13, 1853.

Valves, supplemental, in reciprocating steam-engines	Charles A. Spring	Kensington, Pa	Mar. 1, 1853.
Valves, supplemental, to the equilibrium-pipe of the cornish engine.	Henry P. M. Birkinbine	Philadelphia, Pa	Nov. 15, 1853.
Valve, throttle, arrangements	John E. Anderson	New York, N. Y	Oct. 4, 1853.

CLASS VII.—NAVIGATION AND MARITIME IMPLEMENTS, *comprising all vessels for conveyance on water, their construction, rigging, and propulsion, diving-dresses, life-preservers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Blocks, ships'	Charles H. Platt	New York, N. Y	Sept. 27, 1853.
Blocks, ships'	Wm. and S. G. Coleman	Providence, R. I	Aug. 16, 1853.
Boats, life	Daniel Dodge and P. Burgess	New York, N. Y.; Boston, Mass	Aug. 9, 1853.
Boats, life	Lawrence F. Frazee	New Brunswick, N. J	Nov. 22, 1853.
Boats, life	Yelland Foreman	New York	Oct. 11, 1853.
Boat or scow	Abijah R. Tewksbury	Boston, Mass	Aug. 16, 1853.
Boats, ships', suspending, lowering, and liberating	William Stirling Lacon	Great Yarmouth, England	Feb. 22, 1853; in England, Feb. 23, 1852.
Cable, chain, stopper	John E. Crane	Lowell, Mass	April 5, 1853.
Diving-bells	Henry B. Sears, assignee of J. Foreman, administrator of E. W. Foreman.	New York, N. Y	Aug. 23, 1853.
Life-preserving bucket	Nathan Thompson, jr	Williamsburgh, N. Y	Oct. 18, 1853.
Life-preserving seat	Nathan Thompson, jr	Williamsburgh, N. Y	Oct. 18, 1853.
Paddle-wheel	Benjamin Irving	Greenpoint, N. Y	Sept. 6, 1853.
Paddle-wheel	Wm. H. Muntz	Norton, Mass	Nov. 15, 1853.
Paddle-wheels for steamers, feathering	Alexander H. Brown	Washington City, D. C	July 19, 1853; in England, Mar. 5, 1853.
Paddles for vessels	Amzi C. Semple	Cincinnati, Ohio	July 5, 1853.
Propellers	Banford Gilbert	Pittsburg, Pa	Nov. 15, 1853.
Propellers	Charles T. P. Ware	New York, N. Y	Oct. 4, 1853.
Propellers	Ebenezer Beard	New Sharon, Me	Oct. 18, 1853.
Propellers	Henry W. Hewitt	New York, N. Y	June 7, 1853.
Propellers	James Trees	Salem, Pa	Oct. 25, 1853.
Propellers for canal navigation	William F. Tyson	Orwigsburg, Pa	June, 21, 1853; antedated Dec. 21, 1852.
Propellers, screw, adjustable	Charles F. Brown	Warren, R. I	July 12, 1853.
Propellers, screw, application of high-pressure engines to	Harry Whittaker	Buffalo, N. Y	Oct. 18, 1853.
Propellers, vibrating, operating	Thos. Spiller and Anthony Crowhurst	Red Lion Square, England	Nov. 8, 1853; antedated Feb. 8, 1853.
Propelling vessels	Frederick P. Dimpfel	New York, N. Y	Oct. 25, 1853.
Propelling vessels	Sir Thomas L. Mitchell	Birkenhead, England	July 5, 1853; in England, Nov. 25, 1848.
Rudder-brace	Benj. F. Delano	Chelsea, Mass	Aug. 16, 1853.
Rudder of steam-vessels, operating and controlling the	Frederick E. Sickels	New York, N. Y	May 10, 1853.

Classified list of expired patents.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Screw for planking ships	Solon Staples	Topsham, Me	Dec. 20, 1853.
Ships, side-lights	Charles Perley	New York, N. Y	Oct. 25, 1853.
Ships, side-lights for	Enoch Hidden	New York, N. Y	June 21, 1853.
Steering apparatus	Charles Flanders	Boston, Mass	Oct. 18, 1853.
Towing apparatus for canal boats	Stephen F. Palmer	New York, N. Y	April 26, 1853.
Vessels, attaching the head cringle to the yards of	Nelson Crocker	Sandwich, Mass	Oct. 25, 1853.
Vessels, centre-board and rudder for shoal-water	George Chase	Prudence Island, R. I	Feb. 8, 1853.
Vessels, sail, supporting the topping-lift and peak-halyard block of	William and Stephen G. Coleman	Providence, R. I	Mar. 15, 1853.
Vessels, war, protecting bulwarks for	William Ballard	New York, N. Y	Nov. 1, 1853.

CLASS VIII.—MATHEMATICAL, PHILOSOPHICAL, AND OPTICAL INSTRUMENTS, *including clocks, chronometers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Clocks, balance, new mode of applying the vibrating spring of	Silas B. Terry	Plymouth, Conn	Nov. 29, 1853.
Clocks, calendar	John H. H. Hawes	Ithaca, N. Y	May 17, 1853.
Clocks, illuminated	James Glenn	New York, N. Y	Dec. 6, 1853.
Electric telegraphs	Moses G. Farmer	Salem, Mass	Mar. 29, 1853.
Electro-magnetic alarms	Rev. Augustus R. Pope	Somerville, Mass	June 21, 1853.
Electro-magnetic annunciators. (See Class XXII., A.)			
Electro-magnetic telegraphs, indicating	John Davis	New Bedford, Mass	Dec. 6, 1853.
Galvanic batteries, porous cells for	Moses G. Farmer	Salem, Mass	Jan. 11, 1853.
Levels, spirit, mounting	Sylvester J. Sherman	New York, N. Y	July 19, 1853.
Magnetic machine for washing and separating gold	Samuel Gardiner, jr	New York, N. Y	Mar. 8, 1853.
Magneto-electric machines	Calvin Carpenter, jr	Pawtucket, Mass	Nov. 1, 1853; in France, April 18, 1853.
Pendulum, apparatus for illustrating the motion of a, upon the earth's surface.	George M. Dimmock	Springfield, Mass	July 12, 1853.
Pendulum-balance for quick weighing. (See Class XII., W.)			
Pendulum-levels	Thomas A. Chandler	Rockford, Ill	May 17, 1853.
Plotting, instruments for	Thomas Hinkley	Hallowell, Me	Oct. 18, 1853.
Square, carpenter's, machines for figuring. (See Class XIV.)			
Telegraph and railway, atmospheric. (See Class IX., R.)			
Telegraphic registers, self-winding	James J. Clark	Philadelphia, Pa	Oct. 18, 1853.
Telegraphic registers, self-winding	James J. Clark	Philadelphia, Pa	Jan. 4, 1853.
Theodolite, plotting	Levi Pitman	Thom's Brook, Va	July 26, 1853.
Time-registers for showing the day of the week and month	W. T. Huntington, assignee of Wm. H. Akins	Ithaca, N. Y	Dec. 20, 1853.
Voltaic batteries, and apparatus for medical and other purposes	Isaac L. Pulvermacher	Breslau, Prussia	Feb. 1, 1853; in Austria, Oct. 9, 1849.
Watches and chronometers	Thomas Nelson	Troy, N. Y	May 24, 1853.

CLASS IX.—CIVIL ENGINEERING AND ARCHITECTURE, *comprising works on rail and common roads, bridges, canals, wharves, docks, rivers, wiers, dams, and other internal improvements, buildings, roofs, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Blasting powder	Wm. Silver, jr	Pittston, Pa	Nov. 22, 1853.
Blowpipe, compound, for enlarging blasting cavities	Ancil Stickney	Norwich, Vt	Sept. 20, 1853; antedated June 11, 1853.
Blowpipe for enlarging blasting cavities	Ancil Stickney	Norwich, Vt	Sept. 20, 1853; antedated May 10, 1853.
Boring rock, machine for	Ebenezer Talbot	Windsor, Conn	June 7, 1853.
Bridges, ferry, self-adjusting platform for	Gerard Sickels	Brooklyn, N. Y	June 7, 1853.
Bridges, transporting	Samuel and Thomas Champion	Washington, D. C	Nov. 22, 1853; antedated May 22, 1853.
Buildings, facing	Michael B. Dyott	Philadelphia, Pa	Aug. 16, 1853.
Chairs, railroad, machines for making	R. Griffiths, assignee of Robert Griffiths and George Shield.	Newport, Ky.; Cincinnati, Ohio	Oct. 18, 1853.
Chairs, railroad, machinery for making	William Van Anden	Poughkeepsie, N. Y	Aug. 2, 1853.
Ditching-machine	Jonathan W. Morrill	Hampton Falls, N. H	May 10, 1853.
Ditching, machines for	Ralph C Pratt	Canandaigua, N. Y	July 19, 1853.
Excavators, bar, self-acting	G. T. Beauregard	New Orleans, La	Oct. 25, 1853.
Fences	Hervy S Ross	Cincinnati, Ohio	Sept. 13, 1853.
Fences, iron	Benj F. Miller	New York, N. Y	Nov. 29, 1853.
Fences, iron posts for	John W. Jenkins	Greenport, N. Y	Aug. 9, 1853.
Fences, wire	Matthew Walker, sen., D. S. Walker, and Matthew Walker, jr.	Philadelphia, Pa	Mar. 29, 1853.
Fences, wire	Wm. H. Meriwether	New Braunfels, Texas	Nov. 8, 1853.
Friction, anti, boxes	Jno. Rice, assignee of Geo. T. Parry	Philadelphia, Pa	Aug. 2, 1853.
Friction rollers	James Patterson	Franklinville, N. Y	Aug. 9, 1853.
Gates, apparatus for opening and closing	Samuel G Dugdale	Richmond, Ind	Oct. 11, 1853.
Gates, farm, hanging	John Filson	Millroy, Pa	Feb. 8, 1853.
Gates, mode of opening and closing	Wm. T. Merritt	Hart's Village, N. Y	Nov. 1, 1853.
Rails, compound	Richard H. Middleton	Alexandria, Va	May 31, 1853.
Rails for railroads	Charles E. Smith, assignee of J. Dutton Steele	Philadelphia, Pa.; Pottstown, Pa	May 3, 1853; antedated Nov. 8, 1852.
Rails for railroads	Patrick O'Reilly	Reading, Pa	May 3, 1853; antedated Nov. 8, 1852.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Rails, machines for straightening or curving	George Williston	Brunswick, Me.	Nov. 1, 1853.
Railway and telegraph, atmospheric	Ithiel S. Richardson	Boston, Mass.	Aug. 2, 1853; in England, Dec. 7, 1852.
Switches, railroad	James M. Dick	Buffalo, N. Y.	Sept. 27, 1853.
Switches, self-acting	Archibald S. Littlefield	Portland, Me.	Oct. 4, 1853.
Tunnels, submarine	Joseph R. Miller	Jersey City, N. J.	Aug. 2, 1853.
Water-closets. (See Class XXII.)			

CLASS X.—LAND CONVEYANCE, *comprising carriages, cars, and other vehicles, used on roads and parts thereof.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Brakes, car	John D'Homergue	New York, N. Y.	Dec. 20, 1853.
Brakes, iron, car	Stephen Morse	Springfield, Mass.	Sept. 6, 1853.
Brakes, operating, by signal-cord	William G. Creamer	New Haven, Conn.	Dec. 20, 1853.
Brakes, railroad car	Gregor Trinks	Jersey City, N. J.	April 5, 1853.
Brakes, wagon	W. D. Williams	Raleigh, N. C.	Nov. 8, 1853.
Car-bodies, iron	Thomas E. Warren	Troy, N. Y.	Oct. 18, 1853.
Car-couplings	A. P. Chatham	Canoga, N. Y.	Nov. 1, 1853.
Car, railroad, ventilator. (See Class V., V.)			
Car, railroad, excluding dust from. (See Class V.)			
Car, replacing upon railroad tracks	Lucian B. Flanders	Dunkirk, N. Y.	Dec. 6, 1853.
Car-seats, railroad	Isaac Fay	Cambridgeport, Mass.	Sept. 20, 1853.
Car-seats, railroad	John Briggs	Boston, Mass.	Feb. 15, 1853.
Car-seats, railroad	Samuel Hicock	Buffalo, N. Y.	Aug. 9, 1853.
Car-seats, railroad	Union Patent Sofa and Railroad-car seat Manufacturing Co., assignee of Chas. P. Bailey.	New York, N. Y.; Zanesville, Ohio	July 12, 1853.
Car-seats, railroad	William M. Warren	Watertown, Conn.	July 26, 1853.
Car-seats, railroad	William M. Warren	Watertown, Conn.	Aug. 23, 1853.
Carriages with shifting seats	Godfrey Simon	Reading, Pa.	Dec. 20, 1853; in England, Mar. 4, 1853.
Omnibus registers	Peter Taltavul	Washington, D. C.	Jan. 25, 1853.
Shafts of vehicles, to the axles attaching	Safford E. Sturtevant	Hartford, Vt.	Nov. 8, 1853.
Shafts to axles, coupling	E. B. Benedict	Clinton Corner P. O., N. Y.	Nov. 29, 1853.
Springs, adjustable, for carriages	Russell S. Morse	Dixfield, Me.	Nov. 1, 1853.
Springs, combined india-rubber and steel	Erastus T. Bussell	Shelbyville, Ind.	Nov. 29, 1853.
Wheels, car	Carmi Hart	Bridgeport, Conn.	Dec. 13, 1853.
Wheels, car	Daniel P. Fales	West Poultney, Vt.	Sept. 27, 1853.
Wheels, car	Joel Baker	Boston, Mass.	Oct. 4, 1853.
Wheels, car	Joseph Farnsworth	Madison, Ind.	Nov. 1, 1853.
Wheels, car	Zadoc H. Mann	Newport, Ky.	Oct. 4, 1853.
Wheels, guide for dowelling felloes for	Wm. C. Dean	Jacksonville, N. Y.	Oct. 4, 1853.
Wheels, railroad car	Thomas J. Eddy	Waterford, N. Y.	Aug. 2, 1853.

CLASS XI.—HYDRAULICS AND PNEUMATICS, *including water-wheels, windmills, and other implements operated on by air or water, or employed in the raising and delivery of fluids.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cock stop	Elisur Wright	Boston, Mass.	Oct. 4, 1853.
Draining-machine, centrifugal	William Richardson	New Orleans, La.	Sept. 27, 1853.
Filter, compositions for a. (See Class IV.)			
Hose coupling	Ralph James Falconer	Washington, D. C.	June 7, 1853.
Hose coupling	Smith Groom	Troy, N. Y.	July 12, 1853.
Hose pipes	Richard Hollings	Boston, Mass.	Jan. 4, 1853.
Hose protector	David Demarest	New York, N. Y.	Nov. 1, 1853.
Hydraulic motors	Uriah A. Boyden	Boston, Mass.	Sept. 20, 1853.
Hydrant valve	James Cochrane	New York, N. Y.	Dec. 13, 1853.
Metres, fluid	William B. Leonard	New York, N. Y.	Nov. 1, 1853.
Metres, water	John Hartin	New York, N. Y.	May 24, 1853.
Pipes, hydraulic cement, forming	John B. and Wm. F. Poagne	Fancy Hill, Va.	Nov. 29, 1853.
Pump valves	James B. Williams, assignee of Joel R. Bassett	Cincinnati, Ohio	Dec. 13, 1853.
Pump valves	Nehemiah Dodge	New York, N. Y.	May 10, 1853.
Pumps	Levi P. and Wm. F. Dodge	Newbury, N. Y.	June 7, 1853.
Pumps, hydraulic steam	Horatio N. Black	Philadelphia, Pa.	Mar. 22, 1853.
Pumps, steam diaphragm, working the condenser attached to	James Black and Orson Beecher	Philadelphia, Pa.	Jan. 25, 1853.
Ram, hydraulic	Joseph C. Strode	East Bradford, Pa.	Oct. 4, 1853.
Turbines	Uriah A. Boyden	Boston, Mass.	Sept. 20, 1853.
Turbines	Uriah A. Boyden	Boston, Mass.	Sept. 20, 1853.
Water from wells, apparatus for drawing	Joseph Kent, assignee of Samuel R. Wilmot	Baltimore Co., Md.; New Haven, Conn.	May 3, 1853.
Water-meters	William H. Lindsay	New York, N. Y.	April 5, 1853.
Water-wheels	Frederick Smith	Pontiac, N. Y.	Nov. 22, 1853.
Water-wheels, overshot	Jno. E. Whitemore	Joliet, Ill.	Dec. 6, 1853.
Water-wheels, saw for	Oscar Willis	Brindletown, N. C.	Sept. 20, 1853.
Water-wheels, turbine	Henry Vendewater	Albany, N. Y.	Oct. 4, 1853.

Classified list of patents issued.—Continued.

Class XII.—Lever, screw, and other mechanical power, *as applied to pressing, weighing, raising, and moving weights.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Presses	Wm. C. Semple, assignee of Amzi C. Semple	Cincinnati, Ohio	June 28, 1858.
Presses, &c., metallic boxes for	J. Foster, jr., and Platt Evens, jr	Cincinnati, Ohio	June 28, 1858.
Presses, cheese	M. A. Hackley	Belleville, N. Y	Mar. 22, 1858.
Presses, cotton	J. B. Armstrong	Barnwell, S. C	Dec. 20, 1858.
Presses, screw, for packing-boxes	George W. Wight	New York, N. Y	June 7, 1853.
Presses, sector	Samuel Rust	New York, N. Y	April 5, 1858.
Presses, self-acting	S. R. Holt	Worthington, Ohio	Nov. 22, 1853.
Scales, platform	Elnathan Sampson	Cornish, N. H	Nov. 22, 1853.
Scales, platform	S. T. McDougall	New York, N. Y	Nov. 22, 1858.
Screw-jacks for raising buildings	Nelson A. Hume, assign. of Frederick Nicholson	Rushford, N. Y.; Warsaw, N. Y	Nov. 29, 1858.
Weighing grain, self-acting machines for	Isaac D. Garlick	Lyons, N. Y	Dec. 20, 1853.
Weighing, pendulum-balance for quick	Benjamin Fenn	Hartford, Ohio	Mar. 29, 1858.

Class XIII.—Grinding-mills and mill-gearing, *including grainmills, mechanical movements and horse-powers, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bran-dusters	Ezra R. Benton	Cleveland, Ohio	July 26, 1853.
Bran-dusters	Levi S. Reynolds	Indianapolis, Ind	June 28, 1853.
Gearing, multiplying	F. Dibben and L. Bolleman	New York, N. Y	Aug. 9, 1853.
Mill-stones, dressing-machines for	W. B. Cummings, N. P. Dadman, and C. A. Blood, assignees of W. B. Cummings and N. P. Dadman.	Tynsborough, Mass.; Chelmsford, Mass.; North Chelmsford, Mass.	Nov. 22, 1853.
Mill-stones, eyes for	Edmund Munson	Utica, N. Y	July 19, 1853.
Mills, cider	John Krauser	Reading, Pa	Aug. 30, 1853.
Mills for grinding apples and other substances	F. B. Hunt	Westfield, Ind	July 26, 1858.
Motion, converting rotary into reciprocating	Henry Baker	Cattskill, N. Y	June 7, 1853.
Smut-machines	Benj. Rutter and Henry Rouzer	Piqua, Ohio	Oct. 4, 1858.
Smut-machines	Dan Pease, jr	Floyd, N. Y	Jan. 11, 1858.
Smut-machines	H. L. Fulton	Chicago, Ill	April 12, 1858.
Smut-machines	Robert Waskey	Millcreek, Va	Sept. 27, 1858.
Smut-machines	Samuel Cook	Brockport, N. Y	April 26, 1853.
Smut-machines	William Zimmerman	Quincy, Ill	Sept. 27, 1858.
Smut-machines, beaters of	Ziba Durkee	Alden, N. Y	July 26, 1858.

Class XIV.—Lumber, *including machines and tools for preparing and manufacturing, such as sawing, planing, mortising, shingle and stave, carpenters' and coopers' implements.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Augur-handles and braces, socket for	Arshal H. McKinley	Higginsport, Ohio	Aug. 16, 1858.
Barrel-heads, chuck for cutting	Franklin Fruit	Jefferson City, Mo	Nov. 15, 1858.
Barrel-heads, machinery for cutting	Charles B. Hutchinson	Waterloo, N. Y	Feb. 1, 1858.
Barrel-heads, machines for sawing	Paris J. Steer	Cheshire, Mass	May 3, 1853.
Bit-stocks of braces	John Comstock	New London, Conn	Dec. 18, 1858.
Brace and bit-fastener, carpenters'	Howard Perkins	South Bridgewater, Mass	Nov. 1, 1858.
Boring-machines	Samuel T. Sanford	Fall River, Mass	July 12, 1853.
Boring wheel-hubs, cutter for	Leonard S. Maring	Westport, Mass	Oct. 4, 1858.
Boxes, &c., method of joining corners of	John Bell	Harlem, N. Y	Jan. 25, 1858.
Clamps, carpenters'	Benj. H. Green	Princeton, N. J	Aug. 9, 1853.
Clamps for laying floors	Stephen E. Parrish	New York, N. Y	Sept. 27, 1858.
Counter-sinks	A. G. Bachelder	Lowell, Mass	May 10, 1858.
Lath-machines	J. R. Shank	Buffalo, Va	June 21, 1853.
Lathes for turning interior and exterior surfaces	Nathan Chapin	New York, N. Y	Jan. 11, 1858.
Lathes for turning irregular forms	Benj. F. Jenkins and Luke L. Knight	Barre, Mass	Jan. 4, 1853.
Lathes, turning	Warren Aldrich	Lowell, Mass	Mar. 15, 1853.
Match-splint machines	R. F. Gustine	Chicago, Ill	April 12, 1858.
Mortising-machines	Fergus Purden	Baltimore, Md	June 14, 1858.
Mortising-machines	James Moreland	Adrian, Mich	Feb. 22, 1858.
Moulding-machines, cutter-heads for	Josiah M. Smith	New York, N. Y	Sept. 13, 1858.
Planing clapboards, machine for sawing and	Ephraim Parker	Rock Island, Ill	Dec. 20, 1858.
Planing-machine	Wm. J. Thurman, assignee of Rich. H. Pindell	Washington, Ky.; Fayette Co., Ky	Oct. 4, 1853.
Planing metal, machines for	Frederick W. Howe	Windsor, Vt	June 21, 1853.
Planing mouldings, cutters for	R. M. Evans and Asa Weeks, assignees of R. M. Evans.	Gilford, N. H	Dec. 6, 1853.
Planing mouldings, machines for	John D. Dale	Philadelphia, Pa	Jan. 4, 1853.
Planing mouldings, machines for	John D. Dale	Philadelphia, Pa	Jan. 4, 1853.
Plug-cutting machines, feed-motion in	Simon Ingersoll	New York, N. Y	June 21, 1858.
Sash, &c., circular-machine for dressing	Leonard Gilson	Brighton, Mass	Nov. 15, 1853.
Saw-mills	Andrew Ralston	West Middletown, Pa	Aug. 30, 1858.
Saws	J. H. Tuttle	Seneca, N. Y	June 21, 1858.
Saws, adjusting dishing	Ephraim B. Wells	Uniontown, Pa	July 12, 1853.
Saws, circular, mode of operating	Ammi M. George	Nashua, N. H	Jan. 11, 1858.
Saws, driving circular	Joseph Harris, jr	Boston, Mass	Oct. 11, 1858.
Saws, etc., driving circular	George and David Cook	New Haven, Conn	Jan. 18, 1858.
Saws, hanging	Nathan T. Coffin	Knightstown, Ind	July 19, 1858.
Saws, mill, forming teeth on	Nathan T. Coffin	Knightstown, Ind	July 12, 1853.
Saws, mill, hanging	James Rankin	Detroit, Mich	Sept. 18, 1853.
Saws, mill, mode of operating	Benjamin Frazee	Verona, N. Y	Oct. 18, 1853.
Saws, mode of driving	Isaac Brown	Baltimore, Md	July 19, 1853.
Saws, straining by compressed air	Jackson A. Rapp and E. S. Wright	Buffalo, N. Y	July 26, 1858.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Sawing sticks for broom-handles, machine for. (See Class XXII., B.)			
Shingle-machines	Abel Bradway, assignee of Elijah Valentine	Monson, Mass.; Palmer, Mass.	Aug. 30, 1858.
Shingle-machine	B. F. Stevens and Walter Kidder	Lowell, Mass	Dec. 20, 1858.
Shingle-machine	Enoch R. Morrison	Troy, Pa.	Nov. 22, 1858.
Shingle-machine	Israel Graves and Charles A. Bogert	West Dresden, N. Y.	Nov. 29, 1858.
Shingle-machine	Simon Ingersoll	New York, N. Y	April 12, 1858.
Shingles, machine for dressing	Joel Tiffany	Cleveland, Ohio	Mar. 8, 1858.
Slat-machine for window-blinds	Elihu R. Benson	Warsaw, N. Y	Oct. 4, 1858.
Spoke-timber, machines for preparing	Aaron W. Geaheart	Beallsville, Ohio	Aug. 16, 1858.
Squares, carpenters', machines for figuring	Norman Millington and Dennis J. George	Shaftesbury, Vt	Oct. 18, 1858.
Staves, machine for dressing	Joseph D. Elliot	Leicester, Mass.	Nov. 15, 1858.
Staves, machine for finishing the ends of	Jonathan E. Warner	Boston, Mass.	Nov. 15, 1858.
Staves, machine for jointing	Charles B. Hutchinson	Syracuse, N. Y.	Oct. 4, 1858.
Tenons, mode of cutting	Charles B. Fitch	Galena, Ill	June 14, 1858.
Timber, crooked, machine for dressing	Franklin Slaughter, assign. of Evan H. Branson	Fredericksburg, Va.	Nov. 15, 1858.
Timber, machine to cut polygonal surfaces in	Elias Unger	Dayton, Ohio	Dec. 20, 1858.
Tongueing, and grooving, and moulding-cutters	John C Da Costa, assignee of James M. Patton and Wm. F. Fergus.	Philadelphia, Pa.	May 10, 1858.
Tongueing and grooving-machines	William Watson	Chicago, Ill	Jan. 4, 1858.
Turning, arrangement of cutters for	Milton Roberts	South Levant, Me.	Aug. 28, 1858.
Turning cylinders of wood, machine for	Increase S. Waite	Hubbardstown, Mass	Nov. 1, 1858.
Turning irregular forms, machines for	Lauren Ward, adm'r of Richard Ward, J. B. Hubbell, and Hart C. Hubbell.	Naugatuck, Conn.	Feb. 22, 1858.
Turning irregular forms, machines for	Lauren Ward, adm'r of Richard Ward	Naugatuck, Conn.	June 28, 1858.
Turning-machinery, expanding mandrels for	Walter Sherrod	Providence, R. I	June 21, 1858.
Turning or cutting irregular forms, machine for	Nathaniel Gear	Zanesville, Ohio	Nov. 8, 1858.
Turning spiral mouldings, machine for	Philip P. Ruger	New York, N. Y	Oct. 4, 1858.
Veneering, method of	L. F. Robinson, assignee of Caleb B. Burnap	Hartford, Conn.	Sept. 27, 1858.

CLASS XV.—STONE AND CLAY MANUFACTURES, *including machines for pottery, glass-making, brick-making, dressing and preparing stone, cements, and other building materials.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Brick-machines	Alex. H. Sampson	New Orleans, La.	June 14, 1858.
Brick-machines	Hiram Sands and Gary Cummings	Now of Washington, D. C.; West Derby, Vt.	Sept. 6, 1858.
Brick, machines for moulding	Jas. Sully and Jno. Butter, assign. of Jno. Butter.	Buffalo, N. Y.	Dec. 13, 1858.
Furnaces, glass, mode of feeding rosin to fires of	Benj. Shiverick	South Sandwich, Mass.	Feb. 1, 1858.
Glass, fire-polishing	John L. Gilliland	Brooklyn, N. Y.	Jan. 11, 1858.
Glass, manufacturing	A. K. Hay and Jas. M. Brookfield, assignees of Jacob Faatz and Ephraim V. White; Faatz declared by Judge Morsell to be joint inventor with White. Jas. M. Brookfield and Ephraim V. White, applicants.	Faatz's residence, Dyberry Township, Pa. Honesdale, Pa.	June 14, 1858.
Glass, plate, manufacture of	J. J. Greenough	Boston, Mass.	June 14, 1858.
Kilns, lime	Samuel J. Seely	New York, N. Y	May 17, 1858; antedated Nov. 17, 1852.
Stone, artificial. (See Class IV.)			
Stone-dressing, machines for	E. G. Matthews	Troy, N. Y.	Oct. 25, 1858.
Stone, machines for sawing	J. T. Bruen and J. G. Wilson	Hastings, N. Y.	Jan. 4, 1858.
Stone-saws	Samuel Chapman, jr	New York, N. Y	Nov. 29, 1858.

CLASS XVI.—LEATHER, *including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boot-counters, machines for skiving	Samuel J. and Charles H. Trofatter	Salem, Mass.	Nov. 29, 1858.
Boot-jacks	Samuel B. Sumner	Grantville, Mass.	Sept. 18, 1858.
Boots and shoes, cutting	John Chilcott and Robert Snell	Brooklyn, N. Y.	Sept. 18, 1858; in Belgium, Sept. 16, 1852; in France, Sept. 17, 1852; in England, Sept. 30, 1852.
Boots and shoes, india-rubber soles for	John Chilcott and Robert Snell	Brooklyn, N. Y.	Sept. 18, 1858.
Boots and shoes, machines for pegging	Alpheus C. Gallahue	Allegheny City, Pa.	Aug. 16, 1858; antedated Feb. 18, 1858.
Boots and shoes, machines for pegging	E. L. Norfolk, assignee of Seth D. Tripp	Salem, Mass.; Rochester, Mass.	April 12, 1858.
Boots and shoes, machine for trimming soles of	John H., Jas. M., and Hosea Q. Thompson	Holderness, N. H.	Nov. 15, 1858.
Boots and shoes, screw-fastenings for	John Chilcott and Robert Snell	Brooklyn, N. Y.	Sept. 18, 1858.
Boots, cutting	Daniel Lynahon	Buffalo, N. Y.	Oct. 18, 1858.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Buckles	P. P. R. Hayden	New York, N. Y.	Jan. 11, 1858.
Collars, horse	Joseph R. Lindner	New York, N. Y.	Sept. 6, 1858.
Collars, horse	William McK. Thornton	Bloomsburg, Pa.	June 21, 1858.
Harness	James Stanbrough	Newark, N. Y.	Mar. 22, 1858.
Leather beltings, fastening	Enoch Osgood	Bangor, Me.	May 10, 1858.
Leather, gripes for holding	Hiram Pierce and George E. Cady, assignees of Bradford Rowe.	Albany, N. Y.	July 19, 1858.
Leather, machines for creasing straps of	Daniel H. Hovey	Kilborn, Ohio	Nov. 15, 1858.
Leather, machines for polishing	Frederick Seibert	Williamsburgh, N. Y.	Nov. 29, 1858.
Leather, machines for rubbing and polishing	Jos. F. Flanders	Newburyport, Mass.	Oct. 4, 1858.
Leather-splitting, machines for	Charles Weston	Salem, Mass.	Aug. 30, 1858.
Leather-straps, edging-machines for	James Barnes	Franklin, N. Y.	Sept. 6, 1858.
Rasps, peg	Joseph Sawyer and Lyman Clark	Royalston, Mass.	Dec. 13, 1858.
Saddle-trees	Joseph Contner	Millroy, Pa.	Jan. 18, 1858.
Tanning	John J. Fulton	Monongahela City, Pa.	July 12, 1858.
Tanning	Roswell Enos and Bela T. Hunt	St. Charles, Ill.	Mar. 22, 1858.
Tanning hides and skins	Henry Bretney	Springfield, Ohio	Jan. 25, 1858.
Trunk-frames, metallic	Lazare Cantel	New York, N. Y.	Dec. 20, 1858.
Wax-ends. (See Class XXII.)			

Class XVII.—Household furniture, machines and implements for domestic purposes, *including washing machines, bread and cracker machines, feather-dressing, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Apples, machines for paring	H. F. Wilson and Sarah E. Fenwick, assignees of W. H. Lazelle.	New York, N. Y.; Washington, D. C.	Jan. 25, 1858.
Apples, machines for paring	James Sargent and D. P. Foster, assignees of E. L. Pratt.	Shelburn, Mass.; Worcester, Mass.	Oct. 4, 1858.
Bed-bottoms	Pierre Demeure and Auguste Mauritz	New York, N. Y.	Sept. 13, 1858.
Beds, air	John Scott	Philadelphia, Pa.	Oct. 18, 1858.
Beds, sofa	Edwin B. Bowditch	New Haven, Conn.	Oct. 18, 1858.
Bedstead-fastenings	Asa N. and Alden Case	Gustavus, Ohio	Mar. 1, 1858.
Bedstead-fastenings	Charles L. Bauder	Cleveland, Ohio	Jan. 18, 1858.
Bedstead-fastenings	E. S. Taylor	Cleveland, Ohio	Mar. 1, 1858.
Bedstead-fastenings	G. W. Baynes, Thos. Hinty, and M. Jackson	Glenville, Va.	Aug. 16, 1858.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bedstead-fastenings	W. E. Merrill and F. Tupper	Nashua, N. H.	Dec. 13, 1858.
Bedstead-rails, &c., cutting screws on, apparatus for	Hiram Smith	Norwalk, Ohio	Nov. 22, 1858.
Bedstead-rails, &c., cutting screws on, apparatus for	James R. Kain	Fiffin City, Ohio	Nov. 22, 1858.
Bedstead-rails, &c., cutting screws on, machine for	J. Parsons Owen	Norwalk, Ohio	Nov. 22, 1858.
Bedsteads, folding, hinges for	John Binder	Chelsea, Mass.	Aug. 16, 1858.
Bedsteads, sectional	Charles Page	North Danvers, Mass.	Dec. 13, 1858.
Bedsteads, sofa	Lewis L. Gilliland and J. R. Wagoner	Dayton, Ohio	May 17, 1858.
Bedsteads, wardrobe, folding bureau or	Andres E. Botter	New York, N. Y.	Dec. 20, 1858.
Bristles for brushes, preparation of	Charles Williams	Philadelphia, Pa.	July 19, 1858.
Brushes	J. Cross	New London, Ohio	July 5, 1858.
Butter-workers	E. J. Dickey	Hopewell Cotton Works, Pa.	July 12, 1858.
Butter-workers	Lettie A. Smith	Pineville, Pa.	Aug. 23, 1858.
Canisters, preserve, sealing	Henry Hunt	Brooklyn, N. Y.	Sept. 6, 1858.
Carpet-stretchers	J. W. Weatherby	Kingsville, Ohio	Oct. 18, 1858.
Chairs, rocking	Peter Ten Eyck	New York, N. Y.	Mar. 15, 1858.
Chairs, step library. (See Class XXII.)			
Clothes-lines, spring clamps for	David M. Smith	Springfield, Vt.	Oct. 25, 1858.
Clothes-lines, spring clamps for	F. S. Hotchkiss and C. W. Blakeslee	Northfield, Conn.	Dec. 13, 1858.
Cradle and tête-à-tête	George H. Hazlewood	Boston, Mass.	July 5, 1858.
Feathers, cleansing hair and, from insects, &c.	William Wisdom	Cleveland, Ohio.	Dec. 20, 1858.
Furniture, upholstering	Frederick Mathesius	New York, N. Y.	May 17, 1858.
Griddles	Banford Gilbert	Pittsburg, Pa.	Oct. 11, 1858.
Lounges	Augustus Ellaers	Boston, Mass.	Oct. 25, 1858.
Mattresses, spring	Edwin L. Bushnell	Poughkeepsie, N. Y.	April 12, 1858.
Meat-cutters	Stanislas Millet	New York, N. Y.	May 24, 1858.
Meat-tenderers	William Beach	Philadelphia, Pa.	Aug. 16, 1858.
Mop-heads	Harvey March	Lebanon, N. H.	June 14, 1858.
Mop-heads	Timothy Randlett	Enfield, N. H.	Nov. 15, 1858.
Nut-crackers	Philos, Eli W., and J. A. Blake	New Haven, Conn.	Sept. 6, 1858; antedated Mar. 6, 1858.
Refrigerators for cooling liquids	B. H. Bartol	Philadelphia, Pa.	June 28, 1858; in Cuba, Oct. 8, 1852.
Table-leaves, falling, supporting	Charles Phelps	Salem, Mass.	Nov. 29, 1858.
Table-tops, machine for jointing	W. J. Hatfield	Dayton, Ohio	Dec. 20, 1858.
Tables, dining, self-waiting	Lea Pusey	Patterson, Pa.	June 14, 1858.
Washing-machines	Charles Wilgus	West Troy, N. Y.	April 12, 1858.
Washing-machines	Evan L. Evans	Hartford, Conn.	May 10, 1858.
Washing-machines	H. G. Robertson	Greenville, Tenn.	Oct. 11, 1858.
Washing-machines	Joel Wisner	Aurora, N. Y.	Nov. 8, 1858.
Washing-machines	Thomas A. Dugdale	Richmond, Ind.	June 7, 1858.

Classified list of patents issued.—Continued.

CLASS XVIII.—ARTS, POLITE, FINE, AND ORNAMENTAL, *including music, painting, sculpture, engraving, books, paper, printing, binding, jewelry, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Boards, binders', machine for cutting	Jno. E. Coffin, assignee of John A. Elder	Portland, Me.; Saccarappa, Me.	Oct. 11, 1858.
Books, bound, paging	John McAdams	Boston, Mass.	Mar. 29, 1858; antedated Sept. 29, 1852.
Books, curving the backs of	John A. Elder	Saccarappa, Me.	July 26, 1858.
Books, paging	Richard M. Leslie	Philadelphia, Pa.	Feb. 15, 1858.
Daguerreotype apparatus	James Brown	New York, N. Y.	Nov. 15, 1858.
Daguerreotype cases	J. F. Mascher	Philadelphia, Pa.	Mar. 8, 1858.
Daguerreotype plate-holders	Marshall Finley	Canandaigua, N. Y.	Oct. 4, 1858.
Daguerreotype plates, coating-box for	Wm. Lewis and Wm. H. Lewis	New York, N. Y.	Nov. 15, 1858.
Daguerreotyping, mercury baths for	Benjamin Franklin Upton	Bath, Me.	April 12, 1858.
Engraving-machine	John B. Blair	Alton, Ill.	May 24, 1858.
Envelope-folding machines	R. L. Hawes	Worcester, Mass.	June 21, 1858.
Envelopes, machines for folding	Ezra Coleman	Philadelphia, Pa.	April 26, 1858.
Ink, printers'. (See Class IV.)			
Inkstand-covers, hinge for	Joseph Nock	Philadelphia, Pa.	Dec. 18, 1858.
Melodeons	Horatio N. Goodman	New Haven, Conn.	June 29, 1858.
Melodeons and other reed instruments, tuning	E. E. Shepardson and E. Lucas	New Bedford, Mass.	June 29, 1858.
Musical reed instruments	James A. Bazin	Canton, Mass.	Aug. 2, 1858.
Musical scale, revolving	Samuel D. Tillman	Seneca Falls, N. Y.	Nov. 8, 1858.
Paper-cutting machine	H. J. Oerter, assignee of Frederick Hesse	Bethlehem, Pa.	July 19, 1858.
Paper files	Daniel Winslow and P. D. Cummings	Portland, Me.	Aug. 30, 1858.
Paper files	Hamilton L. Smith, Levi Buttles, and Henry A. Swift, assignees of Hamilton L. Smith.	Cleveland, Ohio; Ravenna, Ohio	June 7, 1858.
Paper-ruling machine	C. S. Boynton	New York, N. Y.	Aug. 2, 1858.
Paper, separating by single sheets	John P. Comly	Dayton, Ohio	Mar. 22, 1858.
Pen and pencil-case	Gilbert S. Clark	New York, N. Y.	Nov. 1, 1858.
Pen-holders	Ebenezer W. Hanson	Spring Garden, Philadelphia, Pa.	Dec. 6, 1858.
Pens, gold	E. H. Bard and H. H. Wilson	Philadelphia, Pa.	Dec. 20, 1858.
Pens, metallic	Myer Phineas	New York, N. Y.	July 12, 1858.
Pens, metallic	William H. Towers	Philadelphia, Pa.	Nov. 1, 1858.
Pens, metallic-pointed	Benjamin R. Norton	Syracuse, N. Y.	June 21, 1858.
Piano-fortes	Benjamin E. Colley	Cambridge, Mass.	June 21, 1858.
Piano-fortes	William Compton	New York, N. Y.	Sept. 6, 1858.
Piano-fortes, frames of	J. Piffaut	New Orleans, La.	Jan. 25, 1858.
Piano-forte hammers covering	Robert Nunns and Jno. Clark, assignees of Rudolph Kreter.	New York, N. Y.	Jan. 4, 1858.
Pianos, vertical	Edwin Fobes	Boston, Mass.	May 17, 1858.
Pianos, vertical	George Traeyser	Cincinnati, Ohio	Mar. 29, 1858.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Presses, copying	E. H. Smith	New York, N. Y.	June 14, 1858.
Printers' rules, machines for cutting and bevelling	Moore and Crosby, assignees of Snow Magoun	Boston, Mass.	Aug. 23, 1858.
Printing-presses	Charles Montague	Pittsfield, Mass.	Sept. 6, 1858.
Printing-presses	Charles Montague	Pittsfield, Mass.	Sept. 6, 1858.
Printing	John W. Middleton, assignee of James Young	Philadelphia, Pa.	May 10, 1858; antedated Nov. 10, 1852.
Printing presses	Jeptha A. Wilkinson	New York, N. Y.	Jan. 4, 1858; in England, Sept. 28, 1842.
Printing presses	Joel G. Northrup	Syracuse, N. Y.	Aug. 9, 1858.
Printing presses	John Lewis	Buffalo, N. Y.	Aug. 9, 1858.
Printing presses	Seth Adams	Boston, Mass.	Mar. 8, 1858.
Printing presses	Stephen P. Ruggles	Boston, Mass.	Aug. 2, 1858; antedated Feb. 2, 1858.
Printing presses	Victor Beaumont	New York, N. Y.	Sept. 6, 1858.
Printing presses, power	William H. Danforth	Salem, Mass.	June 21, 1858.
Printing presses, registering apparatus for	John W. Richards	Hoboken, N. J.	May 10, 1858.
Stamping patterns on rollers, machine for	James Baxendale	Providence, R. I.	Dec. 20, 1858.
Stereotype plates, compounds for	John L. Kingsley	New York, N. Y.	Jan. 18, 1858.
Stereotype plates, moulding, gutta percha	John L. Kingsley	New York, N. Y.	June 14, 1858.
Type-casting machines	John J. Sturgis	New York, N. Y.	June 14, 1858.
Type, distributing and composing-machine for	William H. Mitchel	Brooklyn, N. Y.	Aug. 30, 1858.
Type, elastic, for printing on irregular surfaces	G. G. Wells, assignee of Julius Herriet	Hartford, Conn.; New York, N. Y.	Aug. 2, 1858.
Violins	Moses Coburn	Savannah, Ga.	May 17, 1858.
Violins, &c.	Cornelius S. Cooper	New York, N. Y.	Nov. 8, 1858.
Violins, keyed finger-board for	William Robertson	New York, N. Y.	Nov. 8, 1858.

CLASS XIX.—FIRE-ARMS AND IMPLEMENTS OF WAR, *and parts thereof, including the manufacture of shot and gunpowder.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cannon and other fire-arms, manufacture of	Charles W. Lancaster	Middlesex County, England	July 5, 1858; in England, Jan. 16, 1851.
Cannon, boring	William F. Lucas, admin. of L. A. B. Walbach	Pikesville, Md.	Aug. 23, 1858.
Cannon, sight	John A. Wagener	Charleston, S. C.	Mar. 8, 1858.
Fire-arms	George Leonard	Shrewsbury, Mass.	Aug. 9, 1858.
Fire-arms, breech-loading	J. P. Schenkl and A. S. Saroni, assignees of John P. Schenkl.	Boston, Mass.	Aug. 16, 1858.
Fire-arms, discharging breech-loading	Henry Stanton, U. S. Army	Kings County, N. Y.	Aug. 16, 1858.
Fire-arms, repeating	Charles N. Tyler	Worcester, Mass.	May 3, 1858.
Fire-arms, repeating	Massachusetts Arms Company, assignees of Joshua Stevens.	Chicopee, Mass.	Aug. 9, 1858.
Fire-arms, revolving	Morgan L. Rood	Marshall, Mich.	Nov. 22, 1858.
Fire-arms, revolving	Robert Adams	London, England	May 3, 1858; in England, Feb. 24, 1851.
Gun-barrels, twisted, process for making	Thomas Warner	Chicopee, Mass.	Sept. 6, 1858.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Guns, magazine	Edmund H. Graham	Biddeford, Me.	Oct. 4, 1853.
Locks, gun	P. F. Charple	Mount Vernon, Ohio	Aug. 16, 1853.
Percussion caps, facing ends of	Joseph Goldmark	New York, N. Y.	Nov. 22, 1853.
Percussion pellets	Christian Sharps	Hartford, Conn.	June 28, 1853; in England, April 22, 1852.
Shot-chargers	Chauncey W. Camp	Hartford, Conn.	July 12, 1853.

Class XX.—Surgical and medical instruments, *including trusses, dental instruments, bathing apparatus, &c.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Bath, shower, tables	Cyrus C. Bisbee	Rochester, N. Y.	July 26, 1853.
Bathing-tubs	Jordan L. Mott	New York, N. Y.	Sept. 27, 1853.
Braces, body	G. S. Browne	Hartford, Conn.	Nov. 22, 1853.
Chair, invalid locomotive	Thomas S. Minniss	Meadville, Pa.	May 10, 1853.
Clavicle-adjuster	Almiron M. Day	Bennington, Vt.	July 5, 1853.
Crutches	John S. Gallaher, jr.	Washington, D. C.	Jan. 4, 1853.
Ear, &c., surgical instruments for examining the	H. Le Riemondie	New Orleans, La.	Feb. 8, 1853; antedated Oct. 23, 1852.
Elastic exercising machine	Richard L. Hinsdale	New York, N. Y.	May 3, 1853.
Gold, processes for preparing (for filling teeth). (See Class II.)			
Spine, instruments for correcting lateral deviations of the	Alanson Abbé	Boston, Mass.	July 5, 1853.
Supporters, abdominal	H. B. Conant	Geneva, Wis.	Aug. 2, 1853.
Syringes, shower	Ira Warren	Boston, Mass.	Dec. 6, 1853.
Teeth, artificial	Louis F. Sheppard	Alhambra, Ill.	Feb. 15, 1853.
Teeth, artificial, attaching to the metallic plate	Henry S. Crider and David Williams	Lancaster, Ohio	Oct. 18, 1853.
Trusses	John North	Middletown, Conn.	July 5, 1853.
Turnkeys	Melvin Jinks	Wayland, N. Y.	Dec. 13, 1853.

Class XXI.—Wearing apparel, articles for the toilet, &c., *including instruments for manufacturing.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Cloth-cutting, implements for	Geo. W. Griswold	Carbondale, Pa.	Oct. 18, 1853.
Combs, pocket	William J. Thorn	Westbrook, Me.	May 17, 1853.
Cutters, graduated, for cloth and other substances	Halsey D. Walcott	Boston, Mass.	May 17, 1853.
Hat-bodies, machines for planking	Phineas Emmons	New York, N. Y.	April 19, 1853.
Hooks and eyes to cards, attaching	Charles Atwood	Birmingham (Derby), Conn.	Dec. 20, 1853.
Razor-straps	Alfred F. Chatman	New York, N. Y.	Sept. 20, 1853.
Toilet furniture	David Freed	Huntingdon, Pa.	Sept. 20, 1853.
Umbrellas and parasols	Samuel Fox	Sheffield, England	May 17, 1853; in England, April 6, 1852.
Umbrellas, cotton, mode of fixing the colors of	Norman Cook	New York, N. Y.	Dec. 13, 1853.
Wearing apparel, &c., seamless felt, manufacture of	Sam'l M. Perkins	Springfield, Pa.	Jan. 25, 1853.
Wigs, manufacture of	Thomas C. Weldon	Hartford, Conn.	July 19, 1853.
Wigs, manufacturing	Charles Bourgard	New York, N. Y.	Jan. 25, 1853.

Class XXII.—*Miscellaneous.*

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Annunciators, electro-magnetic	Charles S. Bulkley	New York, N. Y.	Nov. 15, 1853.
Annunciators for hotels	William Horsfall	New York, N. Y.	Oct. 4, 1853.
Bells, fixed, mode of ringing	Alfred Carson	New York, N. Y.	Dec. 6, 1853; antedated June 6, 1853.
Bottle-fastenings	William Spratt	Cincinnati, Ohio	Sept. 6, 1853.
Bottle-stoppers	Charles T. Kipp, assignee of Walter Hunt	New York, N. Y.	Jan. 4, 1853.
Bottles, valve gauge for	Alphonse Quantin	Philadelphia, Pa.	Oct. 25, 1853.
Broom-handles, machine for sawing sticks for	Thomas J. Alexander	Westerville, Ohio	Sept. 20, 1853.
Burglar alarms	Josiah Norcross, assignee of Edward Brown	South Reading, Mass.; Rindge, N. H.	Oct. 4, 1853.
Cards, business, boxes for supplying	William and William H. Lewis	New York, N. Y.	Nov. 22, 1853.
Chairs, step, library	Augustus Eliaers	Boston, Mass.	Oct. 25, 1853.
Coin, counterfeit, detectors	Gideon B. Smith	Baltimore, Md.	Sept. 6, 1853.
Coin-safe and detector	H. G. Robinson	Schuylkill Haven, Pa.	July 12, 1853.
Coin-safe and detector	Jacob J. Hatcher	Spring Garden, Pa.	April 12, 1853.
Crow killer	Noah J. Tilghman	Salisbury, Md.	July 5, 1853.
Folding Seidlitz powders, machine for	W. Watson and P. Vanzant, assignees of Wm. A. Martin	New York, N. Y.; Brooklyn, N. Y.	Dec. 20, 1853.
Ice, manufacturing	Alexander C. Twining	Middlebury, Vt.	Nov. 8, 1853; in England, July 8, 1850.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Knives, table, attaching handles to the blades of. (See Class II.)			
Match-splint machines. (See Class XIV.)			
Ten-pins, setting up and returning balls	Geo. W. Eichell	New York, N. Y.	Aug. 9, 1853.
Water-closets	H. Goldsmith, jr.	New York, N. Y.	June 7, 1853.
Waxed ends, machines for twisting	Daniel H. Hovey	Kilborn, Ohio	June 28, 1853.

EXTENSIONS FOR 1853.

Inventions or discoveries.	Patentees.	Residence.	Date of extension.	Date of patent.
Axles and gudgeons, boxes for, mode of making	Isaac Babbitt	Roxbury, Mass.	July 8, 1853	July 17, 1839.
Blowers, fan, construction of	F. P. Dimpfel	Philadelphia, Pa.	Dec. 27, 1853	Dec. 28, 1839.
Boilers, steam, and apparatus to be used on board of steamboats to prevent the explosion of boilers.	Cadwallader Evans	Pittsburg, Pa.	April 14, 1853	April 15, 1839.
Bridge, wooden-framed suspension	Stephen H. Long	Louisville, Ky.	Nov. 5, 1853	Nov. 7, 1839.
Excavator, crane, for excavating and removing earth	Elizabeth Otis, adm'x Wm. S. Otis	Canton, Mass.	Feb. 23, 1853	Feb. 24, 1839.
Furnaces for economizing fuel and consuming smoke	Frederick P. Dimpfel	Philadelphia, Pa.	May 7, 1853	May 9, 1839.
Furnaces for smelting iron ore, construction of	J. Augustus Roth	Fairmount, Pa.	Oct. 18, 1853	Oct. 31, 1839.
Rakes	Hezekiah Haynes	Middletown, Vt.	June 17, 1853	June 18, 1839.
Ships, galley for the distillation of salt water	Enoch Hutchinson	New York, N. Y.	May 19, 1853	May 20, 1839.
Smut-machines	Leonard Smith	Troy, N. Y.	Oct. 18, 1853	Oct. 18, 1839.
Sockets for holding tools, mode of constructing	Herrick Aiken	Franklin, N. H.	Dec. 26, 1853	Dec. 29, 1839.
Stoves, cooking	Desire Buck, adm'x of Darius Buck	Albany, N. Y.	May 19, 1853	May 20, 1839; reissued Aug. 27, 1850.

ADDITIONAL IMPROVEMENTS GRANTED DURING THE YEAR 1853.

Inventions or discoveries.	Patentees.	Residence.	Date of improvement.	Date of patent.
Grain, machines for separating straw from	Elisha S. Snyder	Charlestown, Va.	Aug. 23, 1853	June 13, 1848.
Pianos, organ	Rufus Nutting, 2d	Hudson, Ohio	Feb. 8, 1853	Feb. 8, 1848.
Winnowers and threshers	George F. S. Zimmerman	Charlestown, Va.	Sept. 13, 1853	Feb. 8, 1853.

DISCLAIMERS ENTERED DURING THE YEAR 1853.

Inventions or discoveries.	Patentees.	Residence.	Disclaimer entered.	Date of patent.
Fire-arms	Samuel Colt	Hartford, Ct.	Aug. 8, 1853	Aug. 29, 1839.
Lampblack	R. S. Child, assignee of John G. Mini	Gloucester Co., N. J.; Philadelphia, Pa.	Jan. 19, 1853	Aug. 24, 1852.
Mouldings, wood, machines for making	Jno. Lawrence, assignee of A. T. Serrel	New York, N. Y.	Mar. 29, 1853	May 16, 1848.
Presses, seal	James Foster (patent of Foster & Evans)	Cincinnati, Ohio	Aug. 24, 1853	June 28, 1853.
Spark-arresters	Bennett, Radley & Hunter, assignees of Wm. C. Grimes.	New York, N. Y.	Mar. 19, 1853	Feb. 12, 1852.

REISSUES DURING THE YEAR 1853.

Inventions or discoveries.	Patentees.	Residence.	Date of reissue.	Date of patent.
Books, machines for trimming the edges of	Larnard F. Markham	Cambridgeport, Mass.	April 19, 1853	April 18, 1848.
Brakes for railroad cars, mode of operating	Nehemiah Hodge	North Adams, Mass.	Mar. 1, 1853	Oct. 2, 1849.
Composition for stereotype plates	L. Westbrook, assignee of Josiah Warren.	New York, N. Y; Long Island, N. Y	July 26, 1853	April 25, 1846.
Compounds, lubricating	Patrick S. Devlan	Reading, Pa.	June 14, 1853	Jan. 16, 1849.
Dust, excluding from railroad cars	H. B. Goodyear, adm'r of Nelson Goodyear, assignee of Edward Hamilton.	New York, N. Y.; Bridgeport, Ct.	Feb. 15, 1853	May 27, 1851.
Fire-arms, movable breeches for, and appurtenances of the same.	Benjamin Chambers	Washington, D. C.	April 19, 1853	July 31, 1849.
——— cannon-lock	Joanna Chambers, assignee of Benjamin Chambers. Separate patent issued upon the surrender for reissue and division of original patent.	Washington, D. C.	April 19, 1853	April 31, 1849.
Flouring, process of	David P. Bonnel	Tecumseh, Mich.	July 5, 1853	Aug. 14, 1849.
Gas-regulators	Walter Kidder	New York, N. Y	June 28, 1853	Oct. 12, 1852.
Looms, apparatus for operating shuttle-boxes of	J. A. Bowie and Chas. Carr, assignees of Robert B. Goodyear.	Philadelphia, Pa.	June 14, 1853	Mar. 13, 1849; antedated Sept. 13, 1848.
Looms, figure power	M. A. Furbush and G. Crompton, assigns. of E. Fessenden, conservator of Wm. Crompton.	Worcester, Mass.; Bristol Co., Mass.	Sept. 13, 1853	Nov. 25, 1837; extended April 19, 1851.
Mineral, vitrifiable matter to metal attaching	Thos. G. Clinton, assignee through others of Joshua Laird	Cincinnati, Ohio	Nov. 22, 1853	May 22, 1849.
Mouldings, machinery for making	Alfred T. Serrel	New York, N. Y	June, 21, 1853	May 16, 1848; reissued Jan. 7, 1851.
Mules, self-acting, for spinning	Wanton Rouse	Taunton, Mass.	Mar. 15, 1853	Nov. 2, 1852.
Oil-presses	David L. Latourette	St. Louis, Mo.	Nov. 22, 1853	Oct. 28, 1851.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of reissue.	Date of patent.
Planing-machines	Aretus A. Wilder	Detroit, Mich.	Nov. 15, 1853	Dec. 21, 1852; antedated July 17, 1852.
Ranges, cooking	Moses Pond	Boston, Mass.	June 7, 1853	Feb. 25, 1851.
Reaping-machines	Cyrus H. McCormick	Chicago, Ill.	May 24, 1853	Oct. 28, 1847.
Reaping-machines	William F. Ketchum	Buffalo, N. Y.	April 26, 1853	July 10, 1847.
Reaping-machines	William F. Ketchum	Buffalo, N. Y.	Jan. 11, 1853	July 10, 1847; reissued Oct. 21, 1851.
Screw-blanks, machine for arranging and feeding	Thomas J. Sloan	New York, N. Y.	Mar. 29, 1853	Feb. 25, 1853.
Spark and gas consumers	David Matthew	Philadelphia, Pa.	Oct. 4, 1853	Feb. 20, 1849.
Splints for fractures	Adam Hays	Pittsburg, Pa.	Mar. 8, 1853	Aug. 13, 1850.
Vessels, apparatus for discharging water from the holds of.	Nehemiah Hodge	North Adams, Mass.	Feb. 1, 1853	Oct. 19, 1852.

DESIGNS.

Designs.	Patentees.	Residence.	Date of patent.
Bedstead	John H. Barth	Indianapolis, Ind.	Oct. 4, 1853.
Bust of Daniel Webster	Thomas Ball	Boston, Mass.	April 19, 1853.
Clock-case front	Charles Chinnock	New York, N. Y.	April 19, 1853.
Clock-case front	Charles Chinnock	New York, N. Y.	April 19, 1853.
Clock-case front	Charles Chinnock	New York, N. Y.	Oct. 11, 1853.
Coffins, metallic	Theodore J. Gillies	Williamsburg, N. Y.	April 26, 1853.
Combs for ladies' hair	Jeremiah Hill	Newtown, Conn.	Feb. 22, 1853.
Cradle	Alexander Edmonds	Mount Pulaski, Ill.	April 26, 1853.
Girandoles, candelabra, &c.	Robert E. Dietz	New York, N. Y.	May 3, 1853.
Grate frame	James L. Jackson	New York, N. Y.	May 3, 1853.
Grate frame	James L. Jackson	New York, N. Y.	May 3, 1853.
Grate frame	James L. Jackson	New York, N. Y.	May 3, 1853.
Grate frame and summer piece	James L. Jackson	New York, N. Y.	Aug. 30, 1853.
Milk-stool frame	P. A. Palmer	Leroy, N. Y.	
Register	Wm. W. and C. M. Atkins, assignees of Joseph A. Read.	Philadelphia, Pa.	Oct. 25, 1853.
Register face	Albert G. Bristol, assignee of Jas. Cowles	Rochester, N. Y.	June 28, 1853.
Range, cooking	North, Chase, and North, assignees of Reuben H. N. Bates.	Philadelphia, Pa.; Providence, R. I.	July 26, 1853.

Designs.	Patentees.	Residence.	Date of patent.
Range, portable	C. W. Warnick and F. Leibrandt, assignees of Jno. C. Smith.	Philadelphia, Pa.	April 26, 1853.
Range, portable	North, Chase, and North, assignees of G. Smith and H. Brown.	Philadelphia, Pa.	April 26, 1853.
Sewing-bird	A. Gerould and J. H. Ward	Middletown, Conn.	Aug. 2, 1853.
Sewing-bird	Charles Waterman	Meriden, Conn.	Feb. 15, 1853.
Sewing-bird	Julius E. Merriman	New Haven, Conn.	July 26, 1853.
Sewing butterfly	John Lane	New Haven, Conn.	Nov. 8, 1853.
Statue of Daniel Webster	G. W. Nichols, assignee of Thomas Ball	Boston, Mass.	Aug. 9, 1853.
Stove	Abbott and Lawrence, assignees of S. H. Sailor	Philadelphia, Pa.	Aug. 23, 1853.
Stove	C. W. Warnick and F. Leibrandt, assignees of Garrettson Smith and Henry Brown.	Philadelphia, Pa.	Oct. 4, 1853.
Stove	D. F. Goodhue, assignee of Hosea H. Huntley	Cincinnati, Ohio	July 26, 1853.
Stove	North, Chase, and North, assignees of S. W. Gibbs.	Philadelphia, Pa.	Sept. 6, 1853.
Stove	North, Chase, and North, assignees of G. Smith and H. Brown.	Philadelphia, Pa.	Oct. 4, 1853.
Stove	North, Chase, and North, assignees of G. H. Tryday.	Philadelphia, Pa.	Oct. 4, 1853.
Stove, coal, cylinder	J. Wager, V. Richmond, and H. Smith	Troy, N. Y.	Dec. 20, 1853.
Stove, cook	A. and J. Cox, assignees of E. Bolton	Philadelphia, Pa.	June 21, 1853.
Stove, cook	C. and S. Gilbert, assignees of Frederick Schultz	Philadelphia, Pa.	Aug. 30, 1853.
Stove, cook	John T. Davy	Troy, N. Y.	June 21, 1853.
Stove, cook	Johnson, Cox, and Fuller, assignees of Samuel Pierce and J. J. Dulley.	Troy, N. Y.	July 12, 1853.
Stove, cook	N. S. Vedder	Troy, N. Y.	June 28, 1853.
Stove, cooking	A. and J. Cox, assignees of Wm. P. Gray	Philadelphia, Pa.	Sept. 6, 1853.
Stove, cooking	A. Bradley, assignee of Jos. G. Lamb	Cincinnati, Ohio	Jan. 25, 1853.
Stove, cooking	A. J. Gallagher and Jno. J. Baker	Philadelphia, Pa.	May 31, 1853.
Stove, cooking	Bowers, Pratt & Co., assignees of Jos. Pratt	Boston, Mass.	Jan. 25, 1853.
Stove, cooking	C. W. Warnick and F. Leibrandt, assignees of Samuel H. Sailor.	Philadelphia, Pa.	April 19, 1853.
Stove, cooking	C. W. Warnick and F. Leibrandt, assignees of Samuel H. Sailor.	Philadelphia, Pa.	April 26, 1853.
Stove, cooking	D. F. Goodhue, assignee of H. H. Huntley	Cincinnati, Ohio	July 26, 1853.
Stove, cooking	D. F. Goodhue, assignee of H. H. Huntley	Cincinnati, Ohio	Oct. 4, 1853.
Stove, cooking	Edward F. Robinson	Boston, Mass.	May 10, 1853.
Stove, cooking	Hartshorn, Ames & Co., assignees of W. Ames	Nashua, N. H.	Dec. 20, 1853.
Stove, cooking	Jas. Greer & Co., assign. of John W. Van Cleve	Dayton, Ohio	Aug. 16, 1853.
Stove, cooking	Jas. K. Griffin, assignee of John Saby, jr.	Waterdown, Canada West; Rochester, N.Y.	June 21, 1853.
Stove, cooking	J. G. Abbott and A. Lawrence, assignees of Samuel H. Sailor.	Philadelphia, Pa.	May 10, 1853.
Stove, cooking	J. G. Abbott and A. Lawrence, assignees of J. Holzer.	Philadelphia, Pa.	Aug. 2, 1853.
Stove, cooking	J. H. Holden, agent High-street Furnace Co., assignee of John Mason.	Providence, R. I.	July 19, 1853.
Stove, cooking	Johnson, Cox, and Fuller, assignees of J. J. Dulley.	Troy, N. Y.	July 19, 1853.
Stove, cooking	North, Chase, and North, assignees of Thomas Barry.	Philadelphia, Pa.; New York, N. Y.	July 26, 1853.

Classified list of patents issued.—Continued.

Inventions or discoveries.	Patentees.	Residence.	Date of patent.
Stove, cooking	North, Chase, and North, assignees of Julius Holzer.	Philadelphia, Pa.	Aug. 2, 1853.
Stove, cooking	North, Chase, and North, assignees of Julius Holzer.	Philadelphia, Pa.	Oct. 4, 1853.
Stove, cooking	N. P. Richardson	Portland, Me.	Oct. 25, 1853.
Stove, cooking	N. S. Vedder	Troy, N. Y.	Nov. 8, 1853.
Stove, cooking	Samuel D. Vose	Albany, N. Y.	June 28, 1853; antedated May 2, 1853.
Stove, cooking	Samuel D. Vose	Albany, N. Y.	June 28, 1853; antedated May 2, 1853.
Stove, cooking	Samuel D. Vose	Albany, N. Y.	June 28, 1853; antedated May 2, 1853.
Stove, cooking	Simeon F. Moore	Batavia, N. Y.	Nov. 29, 1853.
Stove, cooking	S. S. Jewett and F. H. Root	Buffalo, N. Y.	Jan. 25, 1853.
Stove, cooking	S. S. Jewett and F. H. Root	Buffalo, N. Y.	Jan. 25, 1853.
Stove, cooking	W. P. Cresson & Co., assignees of Jacob Beesley.	Philadelphia, Pa.	April 19, 1853.
Stove, parlor	Abbott and Lawrence, assignees of G. Smith and H. Brown.	Philadelphia, Pa.	Aug. 30, 1853.
Stove, parlor	Elihu Smith	Albany, N. Y.	July 26, 1853.
Stove, parlor	G. W. Eddy, assignee of E. Ripley and N. S. Vedder.	Waterford, N. Y.; Troy, N. Y.	Nov. 8, 1853.
Stove, parlor	Hartshorn, Ames & Co., assignees of W. Ames.	Nashua, N. H.	Nov. 1, 1853.
Stove, parlor	J. Wager, V. Richmond, and H. Smith	Troy, N. Y.	Dec. 20, 1853.
Stove, parlor	Samuel D. Vose	Albany, N. Y.	June 28, 1853; antedated May 2, 1853.
Stove, parlor	Samuel D. Vose	Albany, N. Y.	May 24, 1853.
Stove, parlor	Wm. P. Cresson, assignee of Jas. H. Conklin	Philadelphia, Pa.; New York, N. Y.	Feb. 1, 1853; antedated Dec. 12, 1852.
Stove, wood	S. S. Jewett and F. H. Root	Buffalo, N. Y.	Jan. 25, 1853.
Waffle-baker	Nathaniel Waterman	Boston, Mass.	July 5, 1853.
Water-cooler	E. M. Manigle and Geo. Phipps	Philadelphia, Pa.	April 19, 1853.

ALPHABETICAL LIST OF PATENTEES FOR THE YEAR 1853.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
9826	Abbé Alanson	Spine, instruments for correcting lateral deviation of the	July 5, 1853	XX.
564	Abbott, J. G., & A. Lawrence, assignees of Samuel H. Sailor	Stove, cooking	May 10, 1853	Design.
588	Abbott, J. G., & A. Lawrence, assignees of J. Holzer	Stove, cooking	Aug. 2, 1853	Design.
592	Abbott, J. G., & A. Lawrence, assignees of S. H. Sailor	Stove	Aug. 23, 1853	Design.
595	Abbott, J. G., & A. Lawrence, assignees of G. Smith and H. Brown	Stove, parlor	Aug. 30, 1853	Design.
	Adams, Augustus, and Philo Sylla. (See Sylla and Adams.)			
10146	Adams, Calvin	Fastener and holder, window-shutter	Oct. 25, 1853	II.
9694	Adams, Robert	Fire-arms, revolving	May 3, 1853; in England, Feb. 24, 1851.	XIX.
9606	Adams, Seth	Printing-presses	Mar. 8, 1853	XVIII.
	Aiken, Herrick	Sockets for holding tools, mode of constructing	Dec. 29, 1851; extended Dec. 26, 1853.	
	Akins, Wm. H. (See W. T. Huntington.)			
	Aldrich, W. B., L. Tyng, and M. Marshall. (See Marshall, Moses.)			
9616	Aldrich, Warren	Lathes, turning	Mar. 15, 1853	XIV.
	Alexander, A., and J. T. Hartupe. (See Hartupe, J. T.)			
10028	Alexander, Thomas J.	Broom-handles, machines for sawing sticks for	Sept. 20, 1853	XXII.
9582	Allen, Horatio, and D. G. Wells	Cut-off gearing, adjustable, for puppet-valve engines	Feb. 15, 1853	VI.
9792	Allen, Horatio, and D. G. Wells	Cut-off for steam-engines	June 21, 1853	VI.
10270	Allen, Samuel F.	Lamps, fluid	Nov. 29, 1853	V.
10901	Allen, Samuel S.	Harvesters, grain and grass-cutting, gear of	Nov. 8, 1853	I.
	Allen, William, and James Riley. (See James Riley.)			
9969	Allen, Zachariah	Counterpanes	Aug. 23, 1853	III.
10001	Allison, Thomas	Straw-cutters	Sept. 6, 1853	I.
	Ames, W. (See Hartshorn, Ames & Co.)			
	Ames, W. (See Hartshorn, Ames & Co.)			
10083	Anderson, John E.	Valve, throttle, arrangements	Oct. 4, 1853	VI.
9540	Andrews, Robert W.	Looms, operating the treadles of	Jan. 18, 1853	III.
	Archbald, Josiah W. (See Horace Southmayd.)			
9891	Armstrong, S. T., assignee of Henry Lee Norris	India-rubber, preserving, in the liquid state	July 26, 1853; in England, Feb. 24, 1853; in France, Mar. 13, 1853.	IV.
10329	Armstrong, J. B.	Presses, cotton	Dec. 20, 1853	XII.
	Arnett, C., and S. Green. (See S. Green.)			
9512	Arnold, James P.	Hackling flax and hemp, machine for	Jan. 4, 1853	III.
9984	Asbury, James T.	Straw-cutters	Sept. 6, 1853	I.
9836	Ashcroft, Edward H.	Gauges, pressure	July 12, 1853	VI.
606	Atkins, C. M. and William W., assignees of Joseph A. Read	Register	Oct. 25, 1853	Design.
10330	Atwood, Charles	Hooks and eyes to cards, attaching	Dec. 20, 1853	XXI.
9680	Atwood, Luther	Oils, lubricating, preparing	Mar. 29, 1853	IV.

Alphabetical List.—Continued.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
9951	Atwood, Luther	Alcohol, processes for purifying	Aug. 28, 1853	IV.
	Babbitt, Isaac	Axles and gudgeons, boxes for, mode of making	July 17, 1839; extended July 8, 1853.	
9944	Babbitt, William H.	Ploughs, hill-side	Aug. 16, 1853	I.
9705	Bachelder, A. G.	Countersinks	May 10, 1853	XIV.
	Bailey, Chas. P. (See Union Patent Sofa and Railroad-car seat Manufacturing Company.)			
	Baird, William. (See John J. Hepworth.)			
9761	Baker, Henry	Motion, converting rotary into reciprocating	June 7, 1853	XIII.
10062	Baker, Joel	Wheels, car	Oct. 4, 1853	X.
	Baker, John J., and A. J. Gallagher. (See Gallagher, A. J.)			
10007	Baldwin, M. W.	Valves, cut-off, for steam-engines, the gear of variable	Sept. 13, 1853	VI.
548	Ball, Thomas	Bust of Daniel Webster	April 19, 1853	Design.
	Ball, Thomas. (See Nicholls, G. W.)			
10174	Ballard, William	Vessels, war, protecting bulwarks for	Nov. 1, 1853	VII.
10348	Bard, Edmund H., and Henry H. Wilson	Pens, gold	Dec. 20, 1853	XVIII.
	Barnard, T. B., & E. R. Hallam. (See Hallam, E. R., & T. B. Barnard.)			
9986	Barnes, James	Leather-straps, edging, machine for	Sept. 6, 1853	XVI.
9852	Barnes, Samuel T.	Candlesticks, press-mould	July 19, 1853	V.
	Barrett & Hubbell. (See Hubbell & Barrett.)			
	Barry, Thomas. (See North, Chase & North.)			
598	Barth, John H	Bedstead	Oct. 4, 1853	Design.
9818	Bartol, B. H	Refrigerators for cooling liquids	June 28, 1853; in Cuba, Oct. 8, 1852.	XVII.
	Bassett, Joel R. (See Williams, Jas. B.)			
	Bates, Reuben H. N. (See North, Chase & North.)			
9592	Bates, William G., assignee of Wm. H. Johnson	Sewing-machines	Feb. 22, 1853	III.
10331	Battershall, D. E. & M.	Candle-mould machines	Dec. 20, 1853	IV.
9541	Bauder, Charles L.	Bedstead fastenings	Jan. 18, 1853	XVII.
10332	Baxendale, James	Stamping patterns on rollers, machine for	Dec. 20, 1853	XVIII.
9528	Bayliss, Thomas, and Daniel Williams	Harvesters, rakes to	Jan. 11, 1853	I.
9931	Baynes, G. W., Thos. Hinty, and M. Jackson	Bedstead fastenings	Aug. 16, 1853	XVII.
9892	Bazin, James A.	Musical, reed, instruments	Aug. 2, 1853	XVIII.
9932	Beach, William	Meat-tenderers	Aug. 16, 1853	XVII.
10124	Beard, Ebenezer	Propellers	Oct. 18, 1853	XII.
9987	Beaumont Victor	Printing-presses	Sept. 6, 1853	XVIII.
10147	Beauregard, G. T.	Excavators, bar, self-acting	Oct. 25, 1853	IX.
	Beecher, Orson, and James Black. (See Black & Beecher.)			
	Beesley, Jacob. (See Wm. P. Cresson & Co.)			
9552	Bell, John	Boxes, &c., method of joining corners of	Jan. 25, 1853	XIV.
9766	Bolson, R. W.	Stoves, cooking, boilers for	June 7, 1853	V.
10279	Benedict, E. B	Shafts to axles, coupling	Nov. 29, 1853	X.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
	Bennett, Radley & Hunter, assignees of Wm. C. Grimes.	Spark-arresters	Feb. 12, 1852; disclaimer, Mar. 19, 1853.	
10063	Benson, Elihu R.	Slat-machine, for window-blinds	Oct. 4, 1853	XIV.
9881	Benton, Ezra R.	Bran-dusters	July 26, 1853	XIII.
9741	Berdan, Hiram	Gold, machines for pulverizing auriferous quartz and amalgamating the.	May 24, 1853	II.
9657	Berlin, William	Harrows	April 12, 1853	I.
10247	Beschke, William	Metallic plates, joining and riveting	Nov. 22, 1853	II.
9607	Bessemer, Henry	Cane-juice evaporators	Mar. 8, 1853; in England, Feb. 24, 1852.	IV.
9608	Bessemer, Henry	Filters for cane-juice	Mar. 8, 1853; in England, Feb. 24, 1852.	IV.
9618	Bessemer, Henry	Sugar-syrup, heaters for	Mar. 15, 1853; in England, Feb. 24, 1852.	IV.
9617	Bessemer, Henry	Sugar-cane juice, machines for expressing	Mar. 15, 1853; in England, Feb. 24, 1852.	IV.
9681	Bessemer, Henry	Sugar-drainers	April 26, 1853; in England, Feb. 24, 1852.	IV.
9519	Bidwell, J. C., and John Hall, executors of Sam'l Hall	Ploughs, hill-side	Jan. 4, 1853	I.
10222	Bigelow, E. B	Looms for weaving pile fabrics	Nov. 15, 1853	III.
9933	Binder, John	Bedsteads, folding, hinges for	Aug. 16, 1853	XVII.
10224	Birkinbine, Henry P. M	Valve, supplemental, to the equilibrium-pipe of the Cornish engine.	Nov. 15, 1853	VI.
9873	Bisbee, Cyrus C.	Bath, shower, tables	July 26, 1853	XX.
9622	Black, Horatio N.	Pumps, hydraulic, steam	Mar. 22, 1853	XI.
10024	Black, James	Engine, steam, planetary hydraulic	Sept. 20, 1853	VI.
9553	Black, James, and Orson Beecher	Pumps, steam, diaphragm, working the condenser attached to	Jan. 25, 1853	XI.
9743	Blair, John B.	Engraving-machine	May 24, 1853	XVIII.
9985	Blake, Philos, Eli W., & J. A	Nut-crackers	Sept. 6, 1853; antedated Mar. 6, 1853.	XVII.
	Blakeslee & Hotchkiss. (See Hotchkiss & Blakeslee.)			
	Blodgett, S. C. (See C. Morey, Henry Edwards, and N. Hunt.)			
	Blood, et al. (See Cummings, et al.)			
9643	Bloodgood, John H.	Yarn, process of forming, by felting	April 5, 1853	III.
10271	Bloom, J.	Smoke and gases, condensing	Nov. 29, 1853	V.
10202	Blue, John	Grain-separators, carriers to	Nov. 8, 1853	I.
	Bogert & Graves. (See Graves & Bogert.)			
	Bollman & Dibben. (See Dibben & Bollman.)			
	Bolton, E. (See A. & J. Cox.)			
	Bolton, James, M. D. (See Yale, C. D.)			
10333	Bolton, James, M. D.	Furnaces, hot-air	Dec. 20, 1853	V.
245	Bonnell, David P.	Flouring, process of	Aug. 14, 1849; reissued July 5, 1853.	
	Bontigny, Pierre H. and J. B. Moinier. (See Moinier and Bontigny.)			
9853	Booth, James C.	Chromates, processes for obtaining	July 19, 1853; antedated Nov. 9, 1852.	IV.
10351	Botter, Andres E.	Bedstead, wardrobe or folding bureau	Dec. 20, 1853	XVII.
9554	Bourgard, Charles	Wigs, manufacturing	Jan. 25, 1853	XXI.
	Bontigny, Pierre H. and J. B. Moinier. (See Moinier, J. B., & P. H. Boutigny.)			
10125	Bowditch, Edwin B.	Beds, sofa	Oct. 18, 1853	XVII.

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Alphabetical List.—Continued.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
544	Bowers, Pratt & Co., assignees of Joseph Pratt	Stove, cooking	Jan. 25, 1853	Design.
243	Bowie, J. A., & Chas. Carr, assignees of Robert B. Goodyear	Looms, apparatus for operating shuttle-boxes of	Mar. 18, 1849; antedated Sept. 18, 1848; reissued June 14, 1853.	
10025	Boyden, Uriah A.	Turbines	Sept. 20, 1853	XI.
10026	Boyden, Uriah A.	Turbines	Sept. 20, 1853	XI.
10027	Boyden, Uriah A.	Hydraulic motors	Sept. 20, 1853	XI.
9398	Boynton, C. S.	Paper-ruling machine	Aug. 2, 1853	XVIII.
9578	Boynton, Nathaniel A.	Furnaces, hot-air	Feb. 8, 1853	V.
9590	Bradford, H., and E. Fitzgerald	Ores, or other substances of different specific gravities, apparatus for separating.	Feb. 22, 1853	II.
543	Bradley, A., assignee of Joseph G. Lamb	Stove, cooking	Jan. 25, 1853	Design.
9983	Bradway, Abel, assignee of Elijah Valentine	Shingle-machines	Aug. 30, 1853	XIV.
	Branson, Evan H. (See Slaughter, Franklin.)			
9555	Bretney, Henry	Tanning hides and skins	Jan. 25, 1853	XVI.
9742	Brick, Samuel R.	Gas-burners	May 24, 1853	V.
9583	Briggs, John	Car-seats, railroad	Feb. 15, 1853	X.
9631	Briggs, Schuyler, and John G. Talbott	Winnowers of grain	Mar. 29, 1853	I.
10101	Brinckerhoff, Cornelius R.	Ploughs	Oct. 11, 1853	I.
577	Bristol, Albert G., assignee of James Cowles	Register face	June 28, 1853	Design.
9874	Bristol, Richard C.	Engines, rotary, steam	July 26, 1853	VI.
	Brookfield, James M., and Ephraim V. White. (See Hay, A. K., and James M. Brookfield.)			
9854	Brown, Alexander H.	Paddle-wheels for steamers, feathering	July 19, 1853; in England, Mar. 5, 1853.	VII.
	Brown and Smith, assignors to Warnick and Leibrandt. (See Smith and Brown.)			
	Brown and Smith, assignors to North, Chase, and North. (See Smith and Brown.)			
9849	Brown, Charles F.	Propellers, screw, adjustable	July 12, 1853	VII.
9584	Brown, Darius C.	Looms, machines for manufacturing harness for	Feb. 15, 1853	III.
	Brown, Edward. (See Josiah Norcross.)			
9898	Brown, George W.	Planters, seed	Aug. 2, 1853; antedated Feb. 2, 1853.	I.
	Brown, H., and G. Smith, assignors to North, Chase, and North. (See Smith, G., and H. Brown.)			
	Brown, H., and G. Smith, assignors to Abbott and Lawrence. (See Smith, G., and H. Brown.)			
9855	Brown, Isaac	Saws, mode of driving	July 19, 1853	XIV.
10225	Brown, James	Daguerreotype apparatus	Nov. 15, 1853	XVIII.
10320	Brown, John E., and S. S. Bartlett	Harvesters, grain and grass	Dec. 20, 1853	I.
10055	Brown, William	Oil, paraffine, preparing	Sept. 27, 1853	IV.
10248	Browne, Gardner S., M. D.	Braces, body	Nov. 22, 1853	XX.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
10064	Bruce, Gardner A.	Planters, corn	Oct. 4, 1853	I.
9518	Bruen, J. T., and J. G. Wilson	Stone, machines for sawing	Jan. 4, 1853	XV.
	Buck, Desire, administratrix of Darius Buck, deceased	Stoves, cooking	May 20, 1839; reissued Aug. 27, 1850; extended May 19, 1853.	
	Buffum, Arnold. (See Lynde, John D.)			
10226	Bulkley, Charles S.	Annunciators, electro-magnetic	Nov. 15, 1853	XXII.
	Burnap, Caleb B. (See L. F. Robinson.)			
9644	Burrall, Thomas D.	Harvesters, grain	April 5, 1853	I.
9875	Burton, William V.	Ploughs	July 26, 1853	I.
9658	Bushnell, Edwin L.	Mattresses, spring	April 12, 1853	XVII.
10280	Bussell, Erastus T.	Springs, combined india-rubber and steel	Nov. 29, 1853	X.
	Butter, John. (See Sully, James, and John Butter.)			
	Buttles, et al. (See Hamilton, L. Smith, assignor.)			
10102	Byram, Henry P.	Hullers of grass-seed	Oct. 11, 1853	I.
	Cady and Pierce. (See Rowe, Bradford.)			
9670	Calvert, Francis A.	Willowers, feed-motion in	April 19, 1853	III.
10196	Calvert, George	Beehive	Nov. 1, 1853	I.
9637	Camp, Chauncey W.	Shot-chargers	July 12, 1853	XIX.
9918	Canby, Samuel	Winnowers of grain	Aug. 9, 1853	I.
10354	Cantel, Lazare	Trunk-frames, metallic	Dec. 20, 1853	XVI.
9585	Carey, Joshua C.	Spike-machines, adjustable heading-lever in	Feb. 15, 1853	I.
9882	Carothers, Jacob H.	Planters, corn	July 26, 1853	I.
10175	Carpenter, Calvin, jr.	Magneto-electric machines	Nov. 1, 1853; in France, April 18, 1853.	VIII.
	Carr and Bowie. (See Robert B. Goodyear.)			
10335	Carrol, David	Shuttles	Dec. 20, 1853	III.
10300	Carson, Alfred	Bells, fixed, mode of ringing	Dec. 6, 1853; antedated June 6, 1853.	XXII.
10249	Carter, Henry, and James Rees	Nut-machine	Nov. 22, 1853; antedated June 3, 1853.	II.
9598	Case, Asa N. and Alden	Bedstead fastenings	Mar. 1, 1853	XVII.
9894	Caswell, Lebbeus	Planters, seed	Aug. 2, 1853	I.
	Chamberlain, Dexter H. (See Howard, Cyrus G.)			
236	Chambers, Benjamin	Fire-arms, movable breeches for, and appurtenances of the same.	July 31, 1849; reissued April 19, 1853.	
237	Chambers, Joanna, assignee of Benjamin Chambers	Cannon-lock	July 31, 1849; reissued April 19, 1853.	
10250	Champion, Samuel and Thomas	Bridges, transporting	Nov. 22, 1853; antedated May 22, 1853.	IX.
9722	Chandler, Thomas A.	Pendulum-levels	May 17, 1853	VIII.
9529	Chapin, Nathan	Lathes for turning interior and exterior surfaces	Jan. 11, 1853	XIV.
10281	Chapman, Samuel, jr.	Stone-saws	Nov. 29, 1853	XV.
9064	Charpie, P. F.	Locks, gun	Aug. 16, 1853	XIX.
	Chase and North. (See Smith, G., and H. Brown.)			
	Chase and North. (See Bates, R. H. N.)			
	Chase and North. (See Gibbs, S. W.)			
	Chase and North. (See Barry, Thomas.)			
	Chase, North, and North. (See G. H. Tryday.)			
	Chase, North, and North. (See Holzer, Julius.)			
	Chase, North, and North. (See Smith and Brown.)			

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
9574	Chase, George	Vessels, centre-board and rudder of, for shoal-water	Feb. 8, 1853	VII.
10176	Chatham, A. P.	Car-couplings	Nov. 1, 1853	X.
10028	Chatman, Alfred F.	Razor-straps	Sept. 20, 1853	XXI.
10008	Chilcott, John, and Robert Snell	Boots and shoes, india-rubber soles for	Sept. 13, 1853	XVI.
10009	Chilcott, John, and Robert Snell	Boots and shoes, cutting	Sept. 13, 1853; in Belgium, Sept. 16, 1852; in France, Sept. 17, 1852; in England, Sept. 30, 1852.	XVI.
10021	Chilcott, John, and Robert Snell	Boots and shoes, screw fastenings for	Sept. 13, 1853	XVI.
	Child, R. S., assignee of John G. Mini	Lampblack	Aug. 24, 1852; disclaimer, Jan. 19, 1853.	
9564	Childs, Augustus B.	Winnowers of grain	Jan. 25, 1853; in England, May 22, 1852.	I.
550	Chinnock, Charles	Clock-case front	April 19, 1853	Design.
551	Chinnock, Charles	Clock-case front	April 19, 1853	Design.
552	Chinnock, Charles	Clock-case front	April 19, 1853	Design.
	Clark and Sawyer. (See Sawyer and Clark.)			
10177	Clark, Gilbert S.	Pen and pencil-case	Nov. 1, 1853	XVIII.
9514	Clark, James J.	Telegraphic register, self-winding	Jan. 4, 1853	VIII.
10128	Clark, James J.	Telegraphic register, self-winding	Oct. 18, 1853	VIII.
	Clark, John, and Robert Nunns. (See Nunns, Robert, and J. Clark.)			
9814	Clarke, Horatio	Bobbins	June 28, 1853	III.
9609	Clemens, S. A.	Flax, machines for breaking and dressing	Mar. 8, 1853	III.
10251	Clemens, S. A.	Ventilating railroad cars	Nov. 22, 1853	V.
9895	Clime, Samuel R.	Boilers, steam, apparatus to regulate the supplying of water to	Aug. 2, 1853	VI.
251	Clinton, Thomas G., assignee (through others) of Joshua Laird	Mineral vitrifiable matter to metal, attaching	May 22, 1849; reissued Nov. 22, 1853.	
9723	Coburn, Moses	Violins	May 17, 1853	XVIII.
10306	Cochran, James	Hydrant-valve	Dec. 13, 1853	XI.
9945	Coes, Aury G.	Screw-wrench	Aug. 16, 1853	II.
10122	Coffin, John E., assignee of John A. Elder	Boards, binders', machine for cutting	Oct. 11, 1853	XVIII.
9848	Coffin, Nathan T.	Saws, mill, forming teeth on	July 12, 1853	XIV.
9856	Coffin, Nathan T.	Saws, hanging	July 19, 1853	XIV.
9683	Coleman, Ezra	Envelopes, machines for folding	April 26, 1853	XVIII.
9619	Coleman, William and Stephen G.	Vessels, sail, supporting the topping-lift and peak-halyard block of.	Mar. 15, 1853	VII.
9946	Coleman, William and S. G.	Blocks, ships'	Aug. 16, 1853	VII.
10103	Collan, John B.	Boilers, steam, detachable lining for the fire-boxes of	June 21, 1853	XVIII.
9793	Colley, Benjamin E.	Piano-fortes	Oct. 11, 1853	VI.
	Colt, Samuel	Fire-arms	Aug. 29, 1839; disclaimer, Aug. 8, 1853.	
9632	Colver, Lewis W.	Hemp, machines for breaking	Mar. 29, 1853	III.
9623	Comly, John P.	Paper, separating, by single sheets	Mar. 22, 1853	XVIII.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
9988	Compton, William	Piano-fortes	Sept. 6, 1853	XVIII.
10307	Comstock, John	Bit-stocks of braces	Dec. 13, 1853	XIV.
9896	Conant, H. B.	Supporters, abdominal	Aug. 2, 1853	XX.
	Conklin, J. C. (See D. and D. F. Tompkins.)			
	Conklin, James H. (See Cresson, William P.)			
9543	Contner, Joseph	Saddle-trees	Jan. 18, 1853	XVI.
9857	Conway, Charles J.	Lamps	July 19, 1853	V.
9544	Cook, George and David	Saws, &c., driving circular	Jan. 18, 1853	XIV.
9671	Cook, James M.	Cars, railroad, excluding dust from	April 19, 1853	X.
10308	Cook, Norman	Umbrellas, cotton, mode of fixing the colors of	Dec. 13, 1853	XXI.
9682	Cook, Samuel	Smut-machines	April 26, 1853	XIII.
10203	Cooper, Cornelius S.	Violins, &c.	Nov. 8, 1853	XVIII.
10178	Cormack, J. W.	Cane and maize-cutters	Nov. 1, 1853	I.
10167	Coughlan, William	Soda-fountains	Oct. 25, 1853.	IV.
9910	Coupier, Theodore, and M. A. C. Mellier	Paper stuff, manufacture of	Aug. 2, 1853; in France, May 7, 1851.	IV.
571	Cox, A. and J., assignees of E. Bolton	Cook-stove	June 21, 1853	Design.
597	Cox, A. and J., assignees of William P. Gray	Stove, cooking	Sept. 6, 1853	Design.
	Cox, Johnson, and Fuller. (See Pierce, Samuel, and J. J. Dulley.)			
	Cox, Johnson, and Fuller. (See Dulley, J. J.)			
10283	Crabtree, John, and Joseph Hopkinson	Packing, tightening of engine and pump-pistons	Nov. 29, 1853	VI.
9645	Crane, John E.	Cable, chain, stopper	April 5, 1853	VII.
10179	Crawford, Benjamin	Engines, steam, condensers for	Nov. 1, 1853	VI.
10321	Creamer, William G.	Brakes, operating by signal-cord	Dec. 20, 1853	X.
10126	Crighton, William	Looms, power, shuttle-motions for	Oct. 18, 1853	III.
9740	Cressler, William	Planters, seed	May 17, 1853	I.
545	Cresson, William P., assignee of James H. Conklin	Stove, parlor	Feb. 1, 1853; antedated Dec. 12, 1852.	Design.
553	Cresson, W. P. & Co., assignees of Jacob Beesley	Stove, cooking	April 19, 1853	Design.
10127	Crider, Henry S., and David Williams	Teeth, artificial, attaching to the metallic plate	Oct. 18, 1853	XX.
10168	Crocker, Nelson	Vessels, attaching the head-cringle to the yards of	Oct. 25, 1853	VII.
9591	Croll, Alexander A.	Gas-meters	Feb. 22, 1853	IV.
	Crompton, William. (See Forbush, M. A., and G. Crompton.)			
	Crosby and Moore. (See Magoun, Snow.)			
10180	Crosby, C. O.	Pins, machines for sticking	Nov. 1, 1853	II.
10181	Crosby, C. O.	Pins, machines for sticking	Nov. 1, 1853	II.
10182	Crosby, C. O.	Pins, machines for sticking	Nov. 1, 1853	II.
9827	Cross, J.	Brushes	July 5, 1853	XVII.
9935	Crossley, Thomas	Carpets, printed	Aug. 16, 1853	III.
	Crowhurst and Spiller. (See Spiller and Crowhurst.)			
10265	Crygier, James H.	Locks, bank	Nov. 22, 1853	II.
	Cummings, Gary, and Hiram Sands. (See Sands and Cummings.)			
	Cummings, P. D., and Dan. Winslow. (See Winslow and Cummings.)			
10269	Cummings, W. B., N. P. Dadman, and C. A. Blood, assignees of W. B. Cummings and N. P. Dadman.	Mill-stones, dressing, machines for	Nov. 22, 1853	XIII.
9720	Da Costa, John C., assignee of James M. Patton and Wm. F. Fergus.	Tongueing, and grooving, and moulding-cutters	May 10, 1853	XIV.
	Dadman, et al. (See Cummings, et al.)			
9515	Dale, John D.	Planing mouldings, machines for	Jan. 4, 1853	XIV.
9516	Dale, John D.	Planing mouldings, machines for	Jan. 4, 1853	XIV.
	Dana, Samuel L. (See Proprietors of Locks and Canals on Merrimack river.)			

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
9794	Danforth, William H	Printing-presses, power	June 21, 1858	XVIII.
9684	Daniels, Reuben	Straw-cutters	April 26, 1858	I.
9976	Darling, Samuel	Metals, apparatus for grinding and shaping	Aug. 30, 1858	II.
10098	Davie, O. J., and Thomas W. Stephens	Punching metal, machines for	Oct. 4, 1858	II.
10104	Davis, Gilman	Engines, locomotive, ash-pans for	Oct. 11, 1858	VI.
10002	Davis, Levis H	Corn-shellers	Sept. 6, 1858	I.
10292	Davis, John	Electro-magnetic telegraphs, indicating	Dec. 6, 1858	VIII.
10169	Davis, Nathan C	Planters, seed	Oct. 25, 1858	I.
9883	Davis, Sylvester	Beehives	July 26, 1858	I.
569	Davy, John T	Stove, cook	June 21, 1858	Design.
10148	Dawes, Ezra H	Fork, dung, devices of a convertible	Oct. 25, 1858	I.
9828	Day, A. M	Clavicle adjuster	July 5, 1858	XX.
10092	Dean, William C	Wheels, guide for dowelling felloes for	Oct. 4, 1858	X.
10336	D'Homergue, John	Brakes, car	Dec. 20, 1858	X.
9936	Delano, Benjamin F	Rudder-brace	Aug. 16, 1858	VII.
10188	Demarest, David	Hose-protector	Nov. 1, 1858	XI.
10010	Demeure, Pierre, and Auguste Mauritz	Bed-bottoms	Sept. 13, 1858	XVII.
	De Puy, Wm. H., and John D. Filkins. (See Filkins and De Puy.)			
9885	Deschamps, F. O	Lanterns, omnibus	July 26, 1858	V.
241	Devlan, Patrick S	Compounds, lubricating	June 16, 1849; reissued June 14, 1858.	
9914	Dibben, F., and L. Bollman	Gearing, multiplying	Aug. 9, 1858	XIII.
10058	Dick, James M	Switches, railroad	Sept. 27, 1858	IX.
9838	Dickey, E. J	Butter-workers	July 12, 1858	XVII.
10003	Dickinson, Porter	Corn-shellers	Sept. 6, 1858	I.
10065	Dickson, A. A	Cotton in the field, machines for topping	Oct. 4, 1858	I.
555	Dietz, Robert E	Girandoles, candelabra, &c	April 26, 1858	Design.
9839	Dimmock, George M	Pendulum, apparatus for illustrating the motion of a, upon the earth's surface.	July 12, 1858	VIII.
	Dimpfel, Frederick P	Furnaces for economizing fuel and consuming smoke	May 9, 1839; extended May 7, 1858.	
10149	Dimpfel, Frederick P	Propelling vessels	Oct. 25, 1858	VII.
	Dimpfel, F. P	Blowers, fan, construction of	Dec. 28, 1839; extended Dec. 27, 1858.	
9915	Dodge, Daniel, and P. Burgess	Boats, life	Aug. 9, 1858	VII.
9777	Dodge, Levi P. and Wm. F	Pumps	June 7, 1858	XI.
9706	Dodge, Nehemiah	Pump-valves	May 10, 1858	XI.
9744	Dodge, Thomas H	Kettle-bails	May 24, 1858	V.
9967	Drake, Oliver P	Benzole vapor apparatus	Aug 30, 1858	IV.
9815	Duckworth, Christopher	Looms, shuttle-box motion in	June 28, 1858	III.
9953	Duff, James B	Soap-cutting machines	Aug. 23, 1858	IV.
10105	Dugdale, Samuel G	Gates, apparatus for opening and closing	Oct. 11, 1858	IX.
9762	Dugdale, Thomas A	Washing-machines	June 7, 1858	XVII.

	Dulley, J. J. (See Johnson, Cox & Fuller.)			
	Dulley, J. J., and S. Pierce. (See Pierce & Dulley.)			
9884	Durkee, Ziba	Smut-machines, beaters of	July 26, 1858	XIII.
9966	Dyott, M. B	Furnaces, hot-air	Aug. 30, 1858	V.
9937	Dyott, Michael B	Buildings, facing	Aug. 16, 1858	IX.
608	Eddy, G. W., assignee of E. Ripley and N. S. Vedder	Stove, parlor	Nov. 8, 1858	Design.
9897	Eddy, Thomas J	Wheels, railroad car	Aug. 2, 1858	X.
547	Edmonds, Alexander	Cradle	Feb. 22, 1858	Design.
	Edwards, Henry. (See Blodgett, S. C.)			
10282	Edwards, Richard	Ores, machines for washing	Nov. 29, 1858	II.
9916	Eichell, George W	Ten-pins, setting up and returning balls	Aug. 9, 1858	XXII.
9795	Elder, John A	Looms, jacquard, apparatus of	June 21, 1858	III.
9886	Elder, John A	Books, curving the backs of	July 26, 1858	XVIII.
10150	Ellaers, Augustus	Lounges	Oct. 25, 1858	XVII.
10151	Ellaers, Augustus	Chairs, step library	Oct. 25, 1858	XXII.
10227	Elliot, Joseph D	Staves, machine for dressing	Nov. 15, 1858	XIV.
9767	Ellsworth, Oliver	Bolts, knob, operating and locking	June 7, 1858	II.
9672	Emmons, Phineas	Hat-bodies, machines for planking	April 19, 1858	XXI.
9633	Ennis, William	Furnaces, hot-air	Mar. 29, 1858	V.
9624	Enos, Roswell, and Bela T. Hunt	Tanning	Mar. 22, 1858	XVI.
	Evans, Cadwallader	Boilers, steam, and apparatus to be used on board of steam-boats, to prevent the explosion of boilers.	April 15, 1839; extended April 14, 1853.	
9707	Evans, Evan L	Washing-machines	May 10, 1858	XVII.
10304	Evans, R. M., and Asa Weeks, assignees of R. M. Evans	Planing mouldings, cutters for	Dec. 6, 1858	XIV.
	Evens, Platt, jr. (See Foster, J., jr., and Platt Evens, jr.)			
9545	Everett, Edward, and Samuel T. Thomas	Looms, jacquard, harness-boards for	Jan. 18, 1858	III.
	Faatz, et al. (See Brookfield and White.)			
9768	Falconer, Ralph James	Hose-coupling	June 7, 1858	XI.
10057	Fales, Daniel P	Wheels, car	Sept. 27, 1858	X.
9530	Farmer, Moses G	Galvanic batteries, porous cells for	Jan. 11, 1858	VIII.
9634	Farmer, Moses G	Electric telegraphs	Mar. 29, 1858	VIII.
10184	Farnsworth, Joseph	Wheels, car	Nov. 1, 1858	X.
9861	Farrel, John	Safes, fire-proof, lining for	July 19, 1858	V.
10185	Faught, Luther R	Engines, steam, regulating the speed of	Nov. 1, 1858	VI.
10029	Fay, Isaac	Car-seats, railroad	Sept. 20, 1858	X.
9517	Feaga, George and George W	Grain-washers	Jan. 4, 1858	I.
9635	Fenn, Benjamin	Weighing, pendulum-balance for quick	Mar. 29, 1858	XII.
9558	Fenwick, S. E., and H. F. Wilson, assignees of W. H. Lazelle	Apples, machines for paring	Jan. 25, 1858	XVII.
	Fergus, Wm. F., and James M. Patton. (See Patton and Fergus.)			
10153	Filkins, J. D., and Wm. H. De Puy	Ploughs, attaching horses to	Oct. 25, 1858	I.
9788	Filley, Giles F	Stoves, cooking	June 14, 1858	V.
9576	Filson, John	Gates, farm, hanging	Feb. 8, 1858	IX.
9968	Finch, R. R., jr	Stove-pipe collar	Aug. 30, 1858	V.
10093	Finley, Marshall	Daguerreotype-plate holder	Oct. 4, 1858	XVIII.
10066	Fisher, M., and John H. Norris	Anvils, apparatus for polishing	Oct. 4, 1858	II.
9778	Fitch, Charles B	Tenons, mode of cutting	June 14, 1858	XIV.
	Fitzgerald, E., and H. Bradford. (See Bradford, H., and E. Fitzgerald.)			
10129	Flanders, Charles	Steering-apparatus	Oct. 18, 1858	VII.
10067	Flanders, Joseph F	Leather, machines for rubbing and polishing	Oct. 4, 1858	XVI.
10301	Flanders, Lucian B	Cars, replacing upon railroad tracks	Dec. 6, 1858	X.

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
10152	Flanders, Wooster A.	Beehives	Oct. 25, 1853	I.
9745	Fletcher, John C.	Stoves, radiators for	May 24, 1853	V.
9724	Fobes, Edwin	Pianos, vertical	May 17, 1853	XVIII.
	Foreman, Jonathan, administrator of E. W. Foreman. (See Sears, Henry B.)			
10120	Foreman, Yelland	Boats, life	Oct. 11, 1853	VII.
	Foster and Sargent. (See Pratt, E. L.)			
9823	Foster, J., jr., and Platt Evens, jr.	Presses, &c., metallic boxes for	June 28, 1853; disclaimer Aug. 24, 1853.	XII.
	Foster, James. (See Foster and Evens.)	Presses, seal	June 28, 1853; disclaimer Aug. 24, 1853.	
9725	Fox, Samuel	Umbrellas and parasols	May 17, 1853; in England, April 6, 1852.	XVIII.
10337	Frankenberg, Alexander	Soda-water fountains	Dec. 20, 1853	IV.
10322	Franklin, Benjamin H.	Forks, manure and other	Dec. 20, 1853	I.
10180	Frazee, Benjamin	Saws, mill, mode of operating	Oct. 18, 1853	XIV.
10266	Frazee, Lawrence F.	Boat, life	Nov. 22, 1853	VII.
10030	Freed, David	Toilet furniture	Sept. 20, 1853	XXI.
9796	Freeman, E. L.	Cultivators, bog-cutting	June 21, 1853	I.
9531	Frost, Pinckney	Scythe-fastenings	Jan. 11, 1853	I.
10228	Fruit, Franklin	Barrel-heads, chuck for cutting	Nov. 15, 1853	XIV.
	Fuller, Cox, and Johnson. (See Dulley, J. J.)			
	Fuller, Johnson, and Cox. (See Pierce and Dulley.)			
9659	Fulton, H. L.	Smut-machines	April 12, 1853	XIII.
9840	Fulton, John J.	Tanning	July 12, 1853	XVI.
247	Furbush, M. A., and G. Crompton, assignees of E. Fessenden, conservator of Wm. Crompton.	Looms, figure, power	Nov. 25, 1837; extended April 9, 1851; reissued Sept. 13, 1853.	
	Furnace Co., High-street, J. H. Holden, agent. (See Mason, John.)			
568	Gallagher, A. J., and John J. Baker	Stove, cooking	May 31, 1853	Design.
9518	Gallaher, John S., jr.	Crutches	Jan. 4, 1853	XX.
9947	Gallahue, Alpheus C.	Boots and shoes, machines for pegging	Aug. 16, 1853; antedated Feb. 18, 1853.	XVI.
9769	Gardiner, P. G.	Gold amalgamator, arrangement of quartz pulverizer and	June 7, 1853	II.
9610	Gardiner, Samuel, jr.	Magnetic-machine for washing and separating gold	Mar. 8, 1853	VIII.
9954	Gardner, Morris J.	Engines, oscillating steam	Aug. 23, 1853	VI.
10352	Garlick, Isaac D.	Weighing grain, self-acting machine for	Dec. 20, 1853	XII.
9636	Garretson, Isaac H.	Planters, seed	Mar. 29, 1853	I.
9938	Geaheart, Aaron W.	Spoke-timber, machines for preparing	Aug. 16, 1853	XIV.
10204	Gear, Nathaniel	Turning or cutting irregular forms, machine for	Nov. 8, 1853	XIV.
9532	George, Ammi M.	Saws, circular, mode of operating	Jan. 11, 1853	XIV.
	George, Dennis J., and Norman Millington. (See Millington and George.)			

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
589	Gerould, A., and J. H. Ward	Sewing-bird	Aug. 2, 1853	Design.
10068	Gibbs, Joshua	Grinding plough-castings, machine for	Oct. 4, 1853	II.
	Gibbs, S. W. (See North, Chase, and North.)			
10229	Gilbert, Banford	Propellers	Nov. 15, 1853	VII.
10118	Gilbert, Banford	Griddles	Oct. 11, 1853	XVII.
594	Gilbert, C. and S., assignees of Frederick Schultz	Stove, cook	Aug. 30, 1853	Design.
604	Gillies, Theodore J.	Coffins, metallic	Oct. 11, 1853	Design.
9533	Gilliland, John L.	Glass, fire-polishing	Jan. 11, 1853	XV.
9726	Gilliland, Lewis L., and J. R. Wagoner	Bedsteads, sofa	May 17, 1853	XVII.
10230	Gilson, Leonard	Sash, &c., circular, machine for dressing	Nov. 15, 1853	XIV.
10223	Gledhill, John	Looms, power	Nov. 15, 1853	III.
10302	Glenn, James	Clocks, illuminated	Dec. 6, 1853	VIII.
10323	Goble, Uriah H.	Harvesters, grain and grass	Dec. 20, 1853	I.
10262	Goldmark, Joseph M. D.	Percussion caps, facing ends of	Nov. 22, 1853	XIX.
9770	Goldsmith, H., jr.	Water-closets	June 7, 1853	XXII.
10293	Goodfellow, Simeon	Screw-cutting dies in the die-stock, arrangement of	Dec. 6, 1853	II.
584	Goodhue, Daniel F., assignee of Hosea H. Huntley	Stove	July 26, 1853	Design.
585	Goodhue, Daniel F., assignee of Hosea H. Huntley	Stove, cooking	July 26, 1853	Design.
602	Goodhue, Daniel F., assignee of Hosea H. Huntley	Stoves, cooking	Oct. 4, 1853	Design.
9816	Goodman, Horatio N.	Melodeons	June 28, 1853	XVIII.
10106	Goodyear, Charles	Gutta percha and caoutchouc, covering metals with	Oct. 11, 1853; in England, Mar. 4, 1851.	IV.
9663	Goodyear, C., assignee of Chas. Goodyear and Robt. Hearing	Gutta percha and india-rubber, manufacturing	April 12, 1853; in England, Mar. 4, 1851.	IV.
230	Goodyear, H. B., administrator of Nelson Goodyear, assignee of Edward Hamilton.	Dust, excluding from railroad cars	May 27, 1851; reissued Feb. 15, 1853.	
9969	Gore, Thomas S.	Stoves	Aug. 30, 1853	V.
10043	Gorman, George	Cotton-stalk cutters and pulverizers	Sept. 20, 1853	I.
9550	Gould, Benjamin, assignee of Joseph W. Webb	Valves of rotary steam-engines	Jan. 18, 1853	VI.
10084	Graham, Edmund H.	Guns, magazine	Oct. 4, 1853	XIX.
10069	Graham, Robert A.	Ploughs	Oct. 4, 1853	I.
	Gran, Carl Ludwig. (See Poppenhusen, Conrad.)			
10284	Graves, Israel, and Charles A. Bogert	Shingle-machine	Nov. 29, 1853	XIV.
	Gray, Wm. P. (See Cox, A. and J.)			
9917	Green, Benjamin H.	Clamps, carpenters'	Aug. 9, 1853	XIV.
10220	Green, S., and C. Arnett, assignees of Samuel Green	Bolts, window-shutter	Nov. 8, 1853	II.
10206	Greene, Jerome B.	Looms, temples for	Nov. 8, 1853	III.
10205	Greenhalgh, James, jr.	Looms, power	Nov. 8, 1853	III.
10011	Greenleaf, Wm. P.	Scythes, shape of	Sept. 13, 1853	I.
10349	Greenough, B. F.	Alcohol, separating, from water and other heavier fluids	Dec. 20, 1853	IV.
9791	Greenough, J. J.	Glass, plate, manufacture of	June 14, 1853	XV.
591	Greer, James, and Co., assignees of John W. Van Cleve	Stove, cooking	Aug. 16, 1853	Design.
570	Griffin, James K., assignee of John Saby, jr.	Stove, cooking	June 21, 1853	Design.
10085	Griffith, Levi B.	Plough-beams	Oct. 4, 1853	I.
9547	Griffiths, John	Screw-cutting dies	Jan. 18, 1853	II.
10181	Griffiths, R., assignee of R. Griffiths and George Shield	Chairs, railroad, machines for making	Oct. 18, 1853	IX.
	Grimes, Wm. C. (See Bennett, Radley, and Hunter.)			
10182	Griswold, George W.	Cloth-cutting, implements for	Oct. 18, 1853	XXI.
10272	Gritzner, M. C.	Gold-separator	Nov. 29, 1853	II.
9841	Groom, Smith	Hose-coupling	July 12, 1853	XI.
10245	Grover, Hosea H.	Churns, rotary	Nov. 15, 1853	I.

Alphabetical List.—Continued.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
9660	Gustine, R. F	Match-splint machines	April 12, 1853	XIV.
9625	Hackley, M. A	Presses, cheese	Mar. 22, 1853	XII.
	Hall, Samuel. (See J. C. Bidwell and John Hall.)			
10267	Hall, William K	Harvesters, grass	Nov. 22, 1853	I.
9589	Hallam, Edward R., assignee of Edward R. Hallam and Thomas B. Barnard.	Gas-meters	Feb. 8, 1853	IV.
10044	Halvorson, Halvor	Looms for weaving hair-cloth	Sept. 27, 1853	III.
10294	Hanson, Ebenezer W	Pen-holders	Dec. 6, 1853	XVIII.
10070	Hargreaves, Thomas C	Husking, maize, machines	Oct. 4, 1853	I.
9599	Harig, Angustus C	Keys, swivel-nibbed, for door-locks	Mar. 1, 1853	II.
10108	Harris, Joseph, jr	Saws, driving circular	Oct. 11, 1853	XIV.
	Harris, N. C., W. Wheeler, W. P. and E. N. Merriam. (See Merriam, W. P.)			
10107	Harrison, Nathan, and John W. H. Metcalf	Ploughs, hill-side	Oct. 11, 1853	I.
10309	Hart, Carmi	Wheels, car	Dec. 13, 1853	X.
9746	Hartin, John	Meters, water	May 24, 1853	XI.
9918	Hartin, John	Paper, method of drying	Aug. 9, 1853	III.
607	Hartshorn, Ames & Co., assignees of W. Ames	Stove, parlor	Nov. 1, 1853	Design.
612	Hartshorn, Ames & Co., assignees of W. Ames	Cooking-stove	Dec. 20, 1853	Design.
9673	Hartupee, James T., and A. Alexander	Iron, bar, machines for rolling	April 19, 1853	II.
9661	Hatcher, Jacob J	Coin-safe and detector	April 12, 1853	XXII.
10338	Hatfield, W. J	Table-tops, machines for jointing	Dec. 20, 1853	XVII.
9727	Hawes, John H. H	Clocks, calendar	May 17, 1853	XIII.
9812	Hawes, R. L	Envelope folding-machines	June 21, 1853	XVIII.
9662	Hawes, Samuel W	Oil, rosin, manufacturing	April 12, 1853	IV.
9752	Hawes, Samuel W., assignee of Madison Page	Oil, rosin, processes of distilling	May 24, 1853	IV.
9789	Hay, A. K., and James M. Brookfield, assignees of Faatz and White; James M. Brookfield and Ephraim V. White being the original applicants. Faatz is declared by Judge Morsell to be joint inventor with White. The patent was accordingly issued to Hay and Brookfield.	Glass, manufacturing	June 14, 1853	XV.
9534	Hayden, P. P. R	Buckles	Jan. 11, 1853	XVI.
10097	Hayes, John P	Ranges, cooking	Oct. 4, 1853	V.
	Haynes, Hezekiah	Rakes	June 18, 1839; extended June 17, 1853.	
232	Hays, Adam	Splints for fractures	Aug. 13, 1850; reissued Mar. 8, 1853.	
9829	Hazlewood, George H	Cradle and tête-à-tête	July 5, 1853	XVII.
	Hearing, Robert, and C. Goodyear. (See Goodyear, Chas.)			
9535	Hedges, Silas A	Manure-spreaders	Jan. 11, 1853	I.
10289	Heilmann, Joshua, administrator of Joshua Heilmann	Fibrous materials, combing	Nov. 29, 1853; in France, Dec. 17, 1845.	III.
9728	Heim, Matthäus	Stoves, cooking	May 17, 1853	V.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
10290	Hepworth, John J., assignee of Wm. Baird	Looms, power	Nov. 29, 1853	III.
	Herriot, Julius. (See Wells, G. G.)			
	Hesse, Frederick. (See Oerter, H. J.)			
9763	Hewitt, Henry W	Propellers	June 7, 1853	VII.
9919	Hickok, Samuel	Car-seats, railroad	Aug. 9, 1853	X.
9811	Hidden, Enoch	Ships, side-lights for	June 21, 1853	VII.
10109	Hill, Daniel	Harrow to a land-roller, attachment of a	Oct. 11, 1853	I.
556	Hill, Jeremiah	Combs for ladies' hair	April 26, 1853	Design.
	Hine and Snow. (See Snow, Samuel.)			
10183	Hinkley, Thomas	Plotting, instruments for	Oct. 18, 1853	VIII.
9887	Hinman, Daniel B	Dyeing yarn parti-colored	July 26, 1853	IV.
9695	Hinsdale, Richard L	Elastic exercising-machines	May 3, 1853	XX.
	Hinty, Thomas. (See Baynes, G. W., Hinty, and Jackson.)			
10045	Hochstrasser, Henry	Sash-fastener	Sept. 27, 1853	II.
229	Hodge, Nehemiah	Vessels, apparatus for discharging water from the holds of	Oct. 19, 1852; reissued Feb. 1, 1853.	
231	Hodge, Nehemiah	Brakes for railroad cars, mode of operating	Oct. 2, 1849; reissued Mar. 1, 1853.	
9546	Hogeland, James S	Condensers, wool	Jan. 18, 1853	III.
580	Holden, Isaac H., agent of the High-street Furnace Company, assignee of John Mason.	Stove, cooking	July 19, 1853	Design.
9520	Hollings, Richard	Hose-pipes	Jan. 4, 1853	XI.
10268	Holt, S. R	Presses, self-acting	Nov. 22, 1853	XII.
	Holtzer, J. (See Abbott, J. G., and A. Lawrence.)			
	Holtzer, Julius. (See North, Chase, and North.)			
	Holtzer, J. (See North, Chase, and North.)			
9970	Hopkins, Lansing E	Hat-bodies, conductors in machines for forming	Aug. 30, 1853	III.
	Hopkinson, Joseph. (See Crabtree, John, and Joseph Hopkinson.)			
9955	Horn, Peter	Planters, seed	Aug. 23, 1853	I.
9646	Horney, Solomon, jr	Ploughs	April 5, 1853	I.
9775	Hornig, Julius, and Ludwig Suess	Stone, artificial	June 7, 1853	IV.
10071	Horsfall, Wm	Annunciators for hotels	Oct. 4, 1853	XXII.
10311	Hotchkiss, F. S., and C. W. Blakeslee	Clothes-lines, spring clamps for	Dec. 13, 1853	XVII.
9817	Hovey, Daniel H	Waxed-ends, machine for twisting	June 28, 1853	XXII.
10231	Hovey, Daniel H	Leather, machine for creasing straps of	Nov. 15, 1853	XVI.
9542	Howard, Cyrus G., assignee of D. H. Chamberlain	Metal-bars, machinery for reducing	Jan. 18, 1853	II.
9737	Howard, Rufus L., assignee of Wm. F. Ketchum	Harvesters, track-clearers to	May 17, 1853	I.
9797	Howe, Frederick W	Planing metal, machine for	June 21, 1853	XIV.
	Hubbell, J. B. & H. C., and Lauren Ward, administrator of Richard Ward. (See Ward, Lauren, administrator of Richard Ward.)			
9764	Hubbell, W. S., and A. Barrett	Compositions for treating wool	June 7, 1853	IV.
10031	Hulbert, Samuel	Ploughs	Sept. 20, 1853; in Canada, Sept. 20, 1852.	I.
10291	Hume, Nelson A., assignee of Frederick Nicholson	Screw-jacks for raising buildings	Nov. 29, 1853	XII.
	Hunt, Bela T., and Roswell Enos. (See Enos, Roswell.)			
9876	Hunt, F. B	Mills for grinding apples and other substances	July 26, 1853	XIII.
9989	Hunt, Henry	Canisters, preserve, sealing	Sept. 6, 1853	XVII.
10354	Hunt, N., assignee of Henry Edwards. (See Blodget, S. C.)	Sewing-machines	Dec. 20, 1853	III.
	Hunt, Walter. (See Kipp, Chas. T.)			
	Hunter, et al. (See Wm. C. Grimes.)			
10355	Huntington, W. T., assignee of Wm. H. Akins	Time registers for showing the day of the week and month	Dec. 20, 1853	VIII.

Alphabetical List.—Continued.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
	Huntley, Hosea H. (See Goodhue, Daniel F.)			
	Huntley, Hosea H. (See Goodhue, Daniel F.)			
	Huntley, Hosea H. (See Goodhue, Daniel F.)			
9565	Hutchinson, Charles B.	Barrel-heads, machinery for cutting	Feb. 1, 1853	XIV.
10094	Hutchinson, Charles B.	Staves, machine for jointing	Oct. 4, 1853	XIV.
	Hutchinson, Enoch	Ships' galley, for the distillation of salt water	May 20, 1839; extended May 19, 1853.	
10154	Hutchinson, Samuel	Potatoes, cutting and planting	Oct. 25, 1853	I.
9779	Huyett. Wm. G.	Harvesters of grain and grass	June 14, 1853	I.
9798	Hyde, Wm. S.	Cultivator-ploughs	June 21, 1853	I.
9663	Ingersoll, Simon	Shingle-machines	April 12, 1853	XIV.
9799	Ingersoll, Simon	Plug-cutting machines, feed-motion in	June 21, 1853	XIV.
9920	Ingraham, Lewis S.	Winnowers	Aug. 9, 1853	I.
9971	Irving, Benjamin	Boilers, steam	Aug. 30, 1853; in France, May 12, 1853; in Belgium, May 17, 1853.	VI.
10000	Irving, Benjamin	Paddle-wheel	Sept. 6, 1853	VII.
560	Jackson, James L.	Grate-frame	May 3, 1853	Design.
561	Jackson, James L.	Grate-frame	May 3, 1853	Design.
562	Jackson, James L.	Grate-frame	May 3, 1853	Design.
563	Jackson, James L.	Grate-frame and summer-piece	May 3, 1853	Design.
9858	Jackson, John	Spinning-jacks	July 19, 1853	III.
	Jackson, Minter. (See Baynes, G. W., Minter, and Jackson.)			
9877	James, David A.	Glue, processes for making	July 26, 1853	IV.
9771	Jarosson, Leon	Painting on cloth	June 7, 1853	IV.
9521	Jenkins, Benj. F., and Luke L. Knight	Lathes for turning irregular forms	Jan. 4, 1853	XIV.
10032	Jenkins, Samuel	Planters, seed	Sept. 20, 1853	I.
9921	Jenkins, John W.	Fences, iron posts for	Aug. 9, 1853	IX.
	Jennison, Wm. H. (See Parker, James M.)			
540	Jewett, S. S., and F. H. Root	Stove, cooking	Jan. 25, 1853	Design.
541	Jewett, S. S., and F. H. Root	Stove, wood	Jan. 25, 1853	Design.
542	Jewett, S. S., and F. H. Root	Stove, cooking	Jan. 25, 1853	Design.
9780	Jewett, S. S., and F. H. Root	Stoves	June 14, 1853; antedated Dec. 14, 1852.	V.
10312	Jinks, Melvin	Turnkeys	Dec. 13, 1853	XX.
570	Johnson, Cox, and Fuller, assignees of Sam. Pierce and J. J. Dulley	Stove, cook	July 12, 1853	Design.
581	Johnson, Cox, and Fuller, assignees of J. J. Dulley	Stove, cooking	July 19, 1853	Design.
	Johnson, Wm. H. (See Bates, Wm. G.)			
9665	Johnson, Wm. H.	Sewing-machines, feeding-clamps for	April 12, 1853	III.
10207	Jones, John, and Alex. Lyle	Straw-cutters, cutting-gear of	Nov. 8, 1853	I.
10110	Jones, Thomas B.	Cob and stalk cutters	Oct. 11, 1853	I.
	Jordan, John, et al. (See Parker, James M.)			
10254	Kain, James R.	Bedstead-rails, cutting screws on, apparatus for	Nov. 22, 1853	XVII.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
10208	Karns, Samuel	Hulling-cylinders, clover, fastening the teeth to	Nov. 8, 1853	I.
9754	Keck, Philip H.	Cultivators	May 31, 1853	I.
10111	Keller, Henry M.	Winnowers of grain	Oct. 11, 1853	I.
10166	Kellogg, Chas. H., assignee of Wm. Wheeler	Curry-combs, cutting the bars and teeth of	Oct. 25, 1853	II.
10186	Kelsey, Christopher P.	Grain-cradles	Nov. 1, 1853	I.
10252	Kelly, Oliver A.	Looms	Nov. 22, 1853	III.
9696	Kendall, George	Candle-mould apparatus	May 3, 1853; in England, Nov. 12, 1852.	IV.
9702	Kent, Joseph, assignee of Samuel R. Wilmot	Water from wells, apparatus for drawing	May 3, 1853	XI.
10072	Ketcham, Richard	Straw-cutters	Oct. 4, 1853	I.
228	Ketcham, Wm. F.	Reaping-machines	July 10, 1847; reissued Oct. 21, 1851; reissued Jan. 11, 1853.	
238	Ketcham, Wm. F.	Reaping-machines	July 10, 1847; reissued April 26, 1853.	
	Ketcham, Wm. F. (See Howard, Rufus L.)			
244	Kidder, Walter	Gas-regulators	Oct. 12, 1852; reissued June 28, 1853.	
	Kidder, Walter, and B. F. Stevens. (See Stevens, B. F.)			
9593	Kimball, Alpheus	Scythe-fastenings	Feb. 22, 1853	I.
9548	Kingsley, John L.	Stereotype plates, compounds for	Jan. 18, 1853	XVIII.
9790	Kingsley, John L.	Stereotype plates, moulding gutta percha	June 14, 1853	XVIII.
9527	Kipp, Charles T., assignee of Walter Hunt	Bottle-stoppers	Jan. 4, 1853	XXII.
9765	Kittle, Samuel P.	Door-fastener	June 7, 1853	II.
	Knight, Luke L., and Benj. F. Jenkins. (See Jenkins and Knight.)			
10209	Knowles, Jonathan	Looms	Nov. 8, 1853	III.
9972	Kranser, John	Mills, cider	Aug. 30, 1853	XIII.
	Kreter, Rudolph. (See Nunns, R., and Clark, John.)			
9594	Lacon, Wm. Sterling	Boats, ships', suspending, lowering, and liberating	Feb. 22, 1853; in England, Feb. 23, 1852.	VII.
	Laird, Joshua. (See Clinton, Thomas G.)			
	Lamb, Joseph. (See Bradley, A.)			
9830	Lancaster, Charles W.	Cannon, and other fire-arms, manufacture of	July 5, 1853; in England, Jan. 16, 1851.	XIX.
610	Lane, John	Sewing butterfly	Nov. 8, 1853	Design.
10197	Lapham, Seneca	Cultivators, devices for steering	Nov. 1, 1853	I.
10210	Lash, Abraham, and Miles Moore	Winnowers, screens of	Nov. 8, 1853	I.
250	Latourette, David L.	Oil-presses	Oct. 28, 1851; reissued Nov. 22, 1853.	
10119	Latta, Alexander B.	Engines, oscillating	Oct. 11, 1853	VI.
	Lawrence and Abbott. (See Sailor, Samuel H.)			
	Lawrence and Abbott. (See Holtzer, J.)			
	Lawrence and Abbott. (See Sailor, S. H.)			
	Lawrence and Abbott. (See Smith and Brown.)			
	Lawrence, John, assignee of Alfred T. Serrell	Mouldings, wood, machines for making	May 16, 1848; disclaimer Mar. 29, 1853.	
	Lazelle, W. H. (See Fenwick, S. E., and H. F. Wilson.)			
9973	Leavitt, O. S.	Hemp and flax breaking machines	Aug. 30, 1853	III.
10033	Leavitt, O. S.	Hemp-brake	Sept. 20, 1853	III.
10034	Leavitt, O. S.	Hemp and flax, drawing-frames for	Sept. 20, 1853	III.
10232	Leeds, Joseph	Ventilators	Nov. 15, 1853	V.
	Leibrandt, Fred., and C. W. Warnick. (See Warnick and Leibrandt.)			

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
	Leibrandt, Fred., and C. W. Warnick. (See Warnick and Leibrandt.)			
	Leibrandt, Fred., and C. W. Warnick. (See Warnick and Leibrandt.)			
	Leibrandt, Fred., and C. W. Warnick. (See Warnick and Leibrandt.)			
9922	Leonard, George	Fire-arms	Aug. 9, 1853	XIX.
10198	Leonard, Wm. B.	Meters, fluid	Nov. 1, 1853	XI.
9581	Le Riemondie, H.	Ear, &c., surgical instruments for examining the eye	Feb. 8, 1853; antedated Oct. 23, 1852.	XX.
9586	Leslie, Richard M.	Books, paging	Feb. 15, 1853	XVIII.
9923	Lewis, John	Printing-presses	Aug. 9, 1853	XVIII.
10233	Lewis, William and William H.	Daguerreotype plates, coating-box for	Nov. 15, 1853	XVIII.
10255	Lewis, Wm. and Wm. H.	Cards, business, boxes for supplying	Nov. 22, 1853	XXII.
9990	Lindner, Joseph R.	Collars, horse	Sept. 6, 1853	XVI.
9647	Lindsay, Wm. H.	Water-meters	April 5, 1853	XI.
10086	Littlefield, Archibald S.	Switches, self-acting	Oct. 4, 1853	IX.
	Locks and Canals, proprietors of, on Merrimack River, assignees of S. L. Dana. (See Dana, Samuel L.)			
	Long, Stephen H.	Bridges, wooden-framed suspension	Nov. 7, 1839; extended Nov. 5, 1853.	
9729	Longley, Abner H.	Machine for cutting wooden screws	May 17, 1853	II.
	Lucas and Shepardson. (See Shepardson and Lucas.)			
9825	Lucas, Napoleon B.	Threshers and separators of grain	June 28, 1853	I.
9961	Lucas, Wm. F., administrator of L. A. B. Walback	Cannon-boring	Aug. 23, 1853	XIX.
9747	Lupton, Lewis	Harrows, the construction of	May 24, 1853	I.
	Lyle and Jones. (See Jones and Lyle.)			
10184	Lynahon, Daniel	Boots, cutting	Oct. 18, 1853	XVI.
9759	Lynde, John D., assignee of Arnold Buffum	Gold-washer and amalgamator	May 31, 1853	II.
10234	Lyon, Sergius P.	Stoves, air-tight, self-acting dampers for	Nov. 15, 1853	V.
10085	Lyon, Warren	Drills, metal	Sept. 20, 1853	II.
10155	Mackey, D. S., and J. R. Smith	Winnowers	Oct. 25, 1853	I.
	MacKennon, et al. (See Mee, John.)			
	MacKennon, et al. (See Mee, John.)			
	Magoun, Snow. (See Moore and Crosby.)			
549	Manigle, E. M., and George Phipps	Water-cooler	April 19, 1853	Design.
9536	Mann, William	Paper, copying, manufacturing	Jan. 11, 1853; antedated July 11, 1852.	III.
10012	Mann, Zadoc H.	Valves, safety, for steam-boilers	Sept. 13, 1853	VI.
10078	Mann, Zadoc H.	Wheels, car	Oct. 4, 1853	X.
9675	Manny, John H.	Harvesters, cutter-fingers of	April 19, 1853; in England, Dec. 9, 1852.	I.
9800	Manny, John H.	Harvesters, cutters to	June 21, 1853; in England, Dec. 9, 1852.	I.
9636	Mansfield, William	Knitting-machines	Mar. 29, 1853	III.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
285	Markham, Larnard F.	Books, machines for trimming the edges of	April 18, 1848; reissued April 19, 1853.	
9692	Marsh, David, and B. Whitney	Hullers, rice	April 26, 1853	I.
9621	Marshall, Moses, W. Aldrick, and L. B. Tyng, assignees of Moses Marshall.	Knitting-machines	Mar. 15, 1853	III.
10067	Maring, Leonard S.	Boring wheel hubs, cutter for	Oct. 4, 1853	XIV.
	Martin, Wm. A. (See Watson, Wm., and Peter Van Zandt.)			
9611	Mascher, J. F.	Daguerreotype cases	Mar. 8, 1853	XVIII.
	Mason, John. (See High-street Furnace Company.)			
10046	Mason, Nicholas	Ranges, cooking	Sept. 27, 1853	V.
10135	Mason, William	Looms, power	Oct. 18, 1853	III.
9929	Massachusetts Arms Company, assignees of Joshua Stevens	Fire-arms, repeating	Aug. 9, 1853	XIX.
9780	Mathesius, Frederick	Furniture, upholstering	May 17, 1853	XVII.
248	Matthew, David	Spark and gas consumers	Feb. 20, 1849; reissued Oct. 4, 1853.	
10295	Matthew, David	Spark-burner and water-heater for locomotives	Dec. 6, 1853	VI.
10156	Matthews, E. G.	Stone-dressing, machines for	Oct. 25, 1853.	XV.
	Mauritz and Demeure. (See Demeure and Mauritz.)			
9637	Maxwell, John	Knitting-machines	Mar. 29, 1853; antedated Sept. 29, 1852.	III.
9537	Mayer, Andrew	Screw-cutting dies, arrangement of	Jan. 11, 1853	II.
	Maynard, R. F., and Robert Sinclair, jr. (See Sinclair and Maynard.)			
9638	McAdams, John	Books, bound, paging	Mar. 29, 1853	XVIII.
10047	McCarty, Henry	Iron, sheet, manufacture of	Sept. 27, 1853	II.
239	McCormick, Cyrus H.	Reaping-machines	Oct. 23, 1847; reissued May 24, 1853.	
9758	McDougall, Duncan E.	Door-fastener	May 31, 1853	II.
10256	McDougall, S. T.	Scales, platform	Nov. 22, 1853	XII.
9600	McKay, James	Engines, rotary steam	Mar. 1, 1853	VI.
9939	McKinley, Arshal H.	Augur-handles and braces, socket for	Aug. 16, 1853	XIV.
9674	McPherson, Alexander	Ranges, cooking	April 19, 1853	V.
9718	Mee, John, John Rourke, and Gilbert MacKennon, assignees of John Mee.	Knitting-looms	May 10, 1853	III.
9719	Mee, John, John Rourke, and Gilbert MacKennon, assignees of John Mee.	Warp-net fabrics	May 10, 1853	III.
9994	Meredith, Stephen	Gas-generators, feed-apparatus to	Sept. 6, 1853	IV.
10211	Merewether, Wm. H.	Fence, wire	Nov. 8, 1853	IX.
9685	Merriam, W. P., N. C. Harris, Wm. Wheeler, and E. N. Merriam	Candlesticks, iron, construction of	April 26, 1853	V.
	Merrill, et al. (See Woodbury, Merrill, and Patten.)			
	Merrill, et al. (See Woodbury, Merrill, and Patten.)			
10313	Merrill, W. E., and F. Tupper	Bedstead-fastenings	Dec. 13, 1853	XVII.
552	Merriman, Julius E.	Sewing-bird	July 26, 1853	Design.
10199	Merritt, Wm. T.	Gates, mode of opening and closing	Nov. 1, 1853	IX.
	Metcalf and Harrison. (See Harrison, Nathan.)			
10339	Meyer, L. O. P.	Caoutchouc compound, process of vulcanizing	Dec. 20, 1853	IV.
9721	Middleton, John W., assignee of James Young	Printing-presses	May 10, 1853; antedated Nov. 10, 1852.	XVIII.
9755	Middleton, Richard H.	Rails, compound	May 31, 1853	IX.
10273	Miller, Benj. F.	Fence, iron	Nov. 29, 1853	IX.
9899	Miller, Joseph R.	Tunnels, submarine	Aug. 2, 1853	IX.
9676	Miller, Samuel	Planters, cotton-seed	April 19, 1853	I.

Alphabetical List.—Continued.

No.	Name of Patentee	Invention or discovery.	Date.	Class.
9748	Millet, Stanislas	Meat-cutters	May 24, 1853	XVII.
	Millington, Charles, et al. (See Parker, James M.)			
10136	Millington, Norman, and Dennis J. George	Squares, carpenters' machines for figuring	Oct. 18, 1853	XIV.
9924	Millis, Eben. L.	Corn-shellers	Aug. 9, 1853	I.
	Mini, John G. (See Child, R. S.)			
9708	Minnis, Thomas S.	Chairs, invalid locomotive	May 10, 1853	XX.
10340	Mitchell, James A.	Looms, hand	Dec. 20, 1853	III.
9831	Mitchell, Sir Thomas L.	Propelling vessels	July 5, 1853; in England, Nov. 25, 1848.	VII.
9974	Mitchell, Wm. H.	Type, distributing and composing machine for	Aug. 30, 1853	XVIII.
9572	Moinier, Jean B., and Pierre H. Boutigny	Fatty materials, purifying	Feb. 8, 1853; in France, Nov. 14, 1849.	IV.
9952	Moinier, Jean B., and Pierre H. Boutigny	Steam, method of generating	Aug. 23, 1853; in France, Jan. 18, 1852.	VI.
9992	Montague, Charles	Printing-presses	Sept. 6, 1853	XVIII.
9993	Montague, Charles	Printing-presses	Sept. 6, 1853	XVIII.
10324	Montgomery, Joseph and James	Winnowers, shoes to	Dec. 20, 1853	I.
9588	Montgomery, Richard	Boilers, steam, method of connecting the sheets of shut-flue and water-space	Jan. 11, 1853	VI.
9738	Montgomery, Elizabeth, assignee of Richard Montgomery	Boilers, steam, &c., corrugated plates for	May 17, 1853; in England, Feb. 17, 1853.	VI.
9842	Montgomery, Elizabeth, assignee of Richard Montgomery	Beams, sheet-metal	July 12, 1853; in England, Oct. 18, 1852.	II.
9964	Moore and Crosby, assignees of Snow Magoun	Printers' rules, machines for cutting and bevelling	Aug. 28, 1853	XVIII.
	Moore, Miles, and Abraham Lash. (See Lash and Moore.)			
611	Moore, Simon F.	Stoves, cooking	Nov. 29, 1853	Design.
9595	Moreland, James	Mortising-machines	Feb. 22, 1853	XIV.
9818	Morewood, E., and G. Rodgers	Zinc, coating, with lead	June 28, 1853; in England, Dec. 12, 1850.	II.
10187	Morewood, Edmund, and George Rodgers	Metal, coating sheets of	Nov. 1, 1853	II.
	Morey, C. (See Blodgett, S. C.)			
9709	Morrill, Jonathan W.	Ditching-machine	May 10, 1853	IX.
10268	Morrison, Enoch R.	Shingle-machine	Nov. 22, 1853	XIV.
10188	Morse, Russell S.	Springs, adjustable, for carriages	Nov. 1, 1853	X.
10004	Morse, Stephen	Brakes, iron car	Sept. 6, 1853	X.
10048	Mott, Jordan L.	Stoves, cooking	Sept. 27, 1853	V.
10049	Mott, Jordan L.	Bathing-tubs	Sept. 27, 1853	XX.
9991	Moyle, John	Straw-cutters	Sept. 6, 1853	I.
9940	Mumma, Jacob	Planters, seed, draught apparatus of	Aug. 16, 1853	I.
9859	Munson, Edmund	Mill-stones, eyes for	July 19, 1853	XIII.
9782	Muntz, George Fred., jr.	Tubes, metal, manufacture of	June 14, 1853; in England, May 8, 1852.	II.
10285	Muntz, William H.	Paddle-wheels	Nov. 15, 1853	VII.

9781	March, Harvey	Mop-heads	June 14, 1853	XVII.
9757	Murphy, Thomas P.	Locks, bank	May 31, 1853	II.
10096	Murrill, James H.	Looms for weaving coach-lace	Oct. 4, 1853	III.
9756	Neer, Charles	Fire-places and stoves	May 31, 1853	V.
9749	Nelson, Thomas	Watches and chronometers	May 24, 1853	VIII.
10325	Nelson, Thomas F.	Manure crushers and sowers	Dec. 20, 1853	I.
10314	Neson, Joseph E.	Harvesters and binders	Dec. 13, 1853; in England, Aug. 27, 1853.	I.
9648	Newbury, Thompson	Screw-machines, apparatus for feeding blanks to	April 5, 1853	II.
9677	Newbury, Thompson	Screw-blanks, machines for threading	April 19, 1853	II.
9801	Newcomb, D. H. B.	Ploughs, hill-side	June 21, 1853	I.
10099	Newell, John	Lamps, camphene	Oct. 4, 1853	V.
9669	New England Screw Company, assignees of Cullen Whipple	Screw-blanks, machinery for shaving the heads of	April 12, 1853; antedated Nov. 30, 1852.	II.
590	Nichols, G. W., assignee of Thomas Ball	Statue of Daniel Webster	Aug. 9, 1853	Design.
10036	Nichols, James R.	Cans, oil or fluid	Sept. 20, 1853	V.
	Nicholson, Frederick. (See Hume, Nelson A.)			
9975	Nishwitz, Frederick	Harvesters, grain	Aug. 30, 1853	I.
10310	Nock, Joseph	Inkstand-covers, hinge for	Dec. 13, 1853	XVIII.
9649	Noll, Henry R.	Sash-fasteners, arrangement of	April 5, 1853	II.
10077	Norcross, Josiah, assignee of Edward Brown	Burglar alarms	Oct. 4, 1853	XXII.
9629	Norfolk, E. S., assignee of S. D. Tripp	Boots and shoes, machines for pegging	April 12, 1853	XVI.
	Norris and Fisher. (See Fisher, M., and John H. Norris.)			
	Norris, Henry Lee. (See Armstrong, S. T.)			
9948	North, Gibson	Stoves, cooking, and ranges, oven-doors for	Aug. 16, 1853	V.
9832	North, John	Trusses	July 5, 1853	XX.
557	North, Chase, and North, assignees of G. Smith and H. Brown	Range, portable	April 26, 1853	Design.
586	North, Chase, and North, assignees of Thomas Barry	Stove, cooking	July 26, 1853	Design.
587	North, Chase, and North, assignees of Reuben H. N. Bates	Range, cooking	July 26, 1853	Design.
588	North, Chase, and North, assignees of Julius Holzer	Stove, cooking	Aug. 2, 1853	Design.
596	North, Chase, and North, assignees of S. W. Gibbs	Stove	Sept. 6, 1853	Design.
599	North, Chase, and North, assignees of Julius Holzer	Stove, cooking	Oct. 4, 1853	Design.
601	North, Chase, and North, assignees of G. Smith and H. Brown	Stoves	Oct. 4, 1853	Design.
600	North, Chase, and North, assignees of G. H. Tryday	Stoves	Oct. 4, 1853	Design.
9809	Norton, Benjamin R.	Pens, metallic-pointed	June 21, 1853	XVIII.
10019	Norton, Frederick Wm.	Fabrics, plain and figured, manufacture of	Sept. 18, 1853	III.
9925	Northrup, Joel G.	Printing-presses	Aug. 9, 1853	XVIII.
10170	Noyes, Daniel	Hammers, machine	Oct. 25, 1853	II.
9526	Nunns, Robert, and John Clark, assignees of Rudolph Kreter	Piano-forte hammers, covering	Jan. 4, 1853	XVIII.
104	Nutting, Rufus, 2d	Pianos, organ	Feb. 8, 1848; additional improvement added Feb. 8, 1853.	
9872	Oerter, H. J., assignee of Frederick Hesse	Paper-cutting machine	July 19, 1853	XVIII.
9612	Orcutt, Lysander A.	Moulding in flasks, machines for	Mar. 8, 1853	II.
9708	O'Reilly, Patrick	Rails for railroads	May 3, 1853; antedated Nov. 3, 1852.	IX.
9710	Osgood, Enoch	Leather beltings, fastening	May 10, 1853	XVI.
	Otis, Elizabeth, administratrix of Wm. S. Otis	Excavator, crane, for excavating and removing earth	Feb. 24, 1839; extended Feb. 23, 1853.	
10257	Owen, J. Parsons	Bedstead-rails, &c., cutting screws on, machine for	Nov. 22, 1853	XVII.
10315	Page, Charles	Bedsteads, sectional	Dec. 13, 1853	XVII.

Alphabetical List.—Continued.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
	Page, Madison. (See Hawes, Samuel W.)			
9556	Palmer, Freeman	Sewing-machines, feed-motion in	Jan. 25, 1853	III.
	Palmer, L. O., and M. Peckham. (See Peckham and Palmer.)			
593	Palmer, P. A.	Milk-stool frame	Aug. 30, 1853	Design.
9687	Palmer, Stephen F.	Towing apparatus for canal-boats	April 26, 1853	VII.
9566	Parker, Elijah F.	Lanterns, frames for	Feb. 1, 1853	V.
10341	Parker, Ephraim	Planing clapboards, machine for sawing and	Dec. 20, 1853	XIV.
9956	Parker, Frederick B.	Rakes, hay	Aug. 23, 1853	I.
10112	Parker, J. J.	Straw-cutters	Oct. 11, 1853	I.
9760	Parker, James M., assignee of John Jordan and Eliza Millington, executrix, and Wm. S. Toole, executor, of Charles Millington; Jordan and Millington being the assignees of Wm. H. Jennison.	Compositions for a filter	May 31, 1853	IV.
	Parry, George T. (See Rice, John.)			
10061	Parrish, Stephen E.	Clamps for laying floors	Sept. 27, 1853	XIV.
	Patten, et al. (See Woodbury, Merrill, and Patten.)			
	Patten, et al. (See Woodbury, Merrill, and Patten.)			
	Patton, James M., and Wm. F. Fergus. (See John C. Da Costa.)			
9926	Patterson, James	Friction-rollers	Aug. 9, 1853	IX.
10296	Payson, Ira F.	Soap ingredients	Dec. 6, 1853	IV.
9577	Peacock, George	Casting-pipes, core-bars for forming cores of	Feb. 8, 1853	II.
9539	Pease, Dan., jr.	Smut-machines	Jan. 11, 1853	XIII.
9731	Pease, Julius A.	Hoes, seeding	May 17, 1853	I.
9522	Peckham, M., and L. O. Palmer	Ore-washer	Jan. 4, 1853	II.
10274	Peer, John W.	Hammer, trip	Nov. 29, 1853	II.
10137	Pender, John	Looms, power	Oct. 18, 1853	III.
10189	Perkins, Howard	Brace and bit-fastener, carpenters'	Nov. 1, 1853	XVI.
9557	Perkins, Samuel M.	Wearing apparel, &c., seamless-felt, manufacture of	Jan. 25, 1853	XXI.
10157	Perley, Charles	Ships' side-lights	Oct. 25, 1853	VII.
10037	Perrin, Henry, and Wm. Ruddock	Planters, seed	Sept. 20, 1853	I.
9578	Peters, Charles	Steel to cast-iron, moulds for uniting	Feb. 8, 1853	II.
10212	Peterson, Abram B.	Threshers and separators, grain	Nov. 8, 1853	I.
10285	Phelps, Charles	Table-leaves, falling, supporting	Nov. 29, 1853	XVII.
10236	Phillips, George	Planting cultivators, seed	Nov. 15, 1853	I.
9843	Phineas, Myer	Pens, metallic	July 12, 1853	XVIII.
	Phipps, George, and E. M. Manigle. (See Manigle, E. M.)			
9862	Pierce, Hiram, and George E. Cady, assignees of Bradford Rowe	Leather, gripes for holding	July 19, 1853	XVI.
	Pierce, Samuel, and J. J. Dulley. (See Johnson, Cox, and Fuller.)			
10258	Pierpont, William	Harvesters, grain and grass, cutters of	Nov. 22, 1853	I.
9559	Piffant, J.	Piano-fortes, frames of	Jan. 25, 1853	XVIII.
	Pindell, Richard. (See Thurman, Wm. J.)			
9888	Pitman, Levi	Theodolite, plotting	July 26, 1853	VIII.
10059	Platt, Charles H.	Blocks, ships'	Sept. 27, 1853	VII.

No.	Name of patentee.	Invention or discovery.	Date.	Class.
	Plummer, Richard H., and Wm. H. Thompson. (See Thompson and Plummer.)			
10286	Poague, John B. and Wm. F.	Pipes of hydraulic cement, forming	Nov. 29, 1853	IV.
240	Pond, Moses	Ranges, cooking	Feb. 25, 1851; reissued June 7, 1853.	
9802	Pope, Rev. Augustus R.	Electro-magnetic alarms	June 21, 1853	VIII.
9698	Poppenhusen, Conrad, assignee of C. S. Gran	Cementing materials for ornamental compounds	April 26, 1853; in Germany, Dec. 18, 1847.	IV.
9833	Porter, Wm., and Edward A. Tuttle	Lanterns	July 5, 1853	V.
9561	Potter, Abiather F.	Gold-washer and amalgamator	Jan. 25, 1853	II.
10013	Potts, George	Mandrel, revolving, for lining cylinder with metal	Sept. 13, 1853	II.
10088	Powers, Hiram	Files and rasps	Oct. 4, 1853	II.
9650	Pownall, Charles J.	Fibre, vegetable, processes for preparing	April 5, 1853; in Ireland, Aug. 11, 1852.	III.
	Pratt, E. L. (See Sargeant, James, and D. P. Foster.)			
	Pratt, Joseph. (See Bowers, Pratt & Co.)			
9860	Pratt, Ralph C.	Ditching, machines for	July 19, 1853	IX.
10171	Pratt, Samuel	Screw-nails	Oct. 25, 1853	II.
9680	Proprietors of Locks and Canals on Merrimack River, assignees of Samuel L. Dana.	Oil, rosin, purifying	April 19, 1853	IV.
9562	Prosser, Thomas	Drills, expanding	Jan. 25, 1853	II.
9571	Pulvermacher, Isaac L.	Voltaic batteries and apparatus for medical and other purposes	Feb. 1, 1853; in Austria, Oct. 9, 1849.	VIII.
9784	Purden, Fergus	Mortising-machines	June 14, 1853	XIV.
9783	Pusey, Lea	Tables, dining, self-waiting	June 14, 1853	XVII.
10158	Quantin, Alphonsé	Bottles, valve-gauge for	Oct. 25, 1853	XXII.
	Radley, et al. (See Grimes, Wm. C.)			
9977	Ralston, Andrew	Saw-mills	Aug. 30, 1853	XIV.
10237	Randlett, Timothy	Mop-heads	Nov. 15, 1853	XVII.
10020	Rankin, James	Saws, mill, hanging	Sept. 13, 1853	XIV.
9889	Rapp, Jackson A., and E. S. Waight	Saws, straining by compressed air	July 26, 1853	XIV.
9567	Read, George B.	Screw-wrench	Feb. 1, 1853	II.
	Read, Joseph R. (See Wm. W. and C. M. Atkins.)			
9878	Redmond, Owen	Lamps	July 26, 1853	V.
9901	Reeder, John M.	Boilers, steam, construction of	Aug. 2, 1853	VI.
	Rees and Carter. (See Carter and Rees.)			
9697	Reid, Daniel	Manure-carts	May 8, 1853	I.
9698	Reid, George W.	Corn-shellers	May 8, 1853	I.
9819	Reynolds, Levi S.	Bran-dusters	June 28, 1853	XIII.
10138	Rice, Benjamin F.	Looms for weaving fancy goods	Oct. 18, 1853	III.
9912	Rice, John, assignee of George T. Parry	Friction, anti, boxes	Aug. 2, 1853	X.
9711	Richards, John W.	Printing-presses, registering apparatus for	May 10, 1853	XVIII.
10160	Richards, Wm. W.	Shovels, spades, &c., making	Oct. 25, 1853	II.
9903	Richardson, Ithiel S.	Telegraph and railway, atmospheric	Aug. 2, 1853; in England, Dec. 7, 1852.	IX.
9902	Richardson, John, R. J. Westerman, and E. Wilder	Spikes, machines for making	Aug. 2, 1853	II.
605	Richardson, N. P.	Stove, cooking	Oct. 25, 1853	Design.
10060	Richardson, Wm.	Draining-machine, centrifugal	Sept. 27, 1853	XI.
	Richmond, et al. (See Wager, Richmond, and Smith.)			
	Richmond, et al. (See Wager, Richmond, and Smith.)			
9627	Riley, James, and Wm. Allen	Oil, rosin, processes for distilling	Mar. 22, 1853	IV.

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
	Ripley, E., and N. S. Vedder. (See Eddy, G. W.)			
	Ritchie, Henry. (See Thompson, S. C., G. W. Westerfield, and H. Ritchie.)			
10190	Ritterband, Henry M.	Gold-washer	Nov. 1, 1853	II.
10014	Robeson, Andrew, jr.	Cloth, bucking	Sept. 13, 1853; in England, Nov. 8, 1852.	III.
9957	Roberts, Milton	Turning, arrangement of cutters for	Aug. 23, 1853	XIV.
10117	Robertson, H. G	Washing-machines	Oct. 11, 1853	XVII.
10213	Robertson, Wm.	Violins, keyed, finger-board for	Nov. 8, 1853	XVIII.
566	Robinson, Edward F	Stove, cooking	May 10, 1853	Design.
9844	Robinson, H. G	Coin-safe and detector	July 12, 1853	XXII.
10056	Robinson, L. F., assignee of Caleb B. Burnap	Veneering, method of	Sept. 27, 1853	XIV.
	Rogers and Morewood. (See Morewood and Rogers.)			
	Rogers, George, and Edw. Morewood. (See Morewood and Rogers.)			
9808	Rohr, George	Planters, seed	June 21, 1853	I.
10259	Rood, Morgan L	Fire-arms, revolving	Nov. 22, 1853	XIX.
	Root and Jewett. (See Jewett and Root.)			
	Root and Jewett. (See Jewett and Root.)			
	Root and Jewett. (See Jewett and Root.)			
9941	Root, E. K.	Hammers, drop	Aug. 16, 1853	II.
10275	Ropes, David N.	Knives, table, attaching handles to the blades of	Nov. 29, 1853	II.
10015	Ross, Hervy S.	Fences	Sept. 13, 1853	IX.
	Roth, J. Augustus	Furnaces for smelting iron ore, construction of	Oct. 31, 1839; extended Oct. 18, 1853.	
10095	Roth, J. Augustus	Fabrics, bleached, processes of dechlorinating	Oct. 4, 1853	III.
9738	Roncout, Marie Louise	Grate-bars	May 31, 1853; in France, Sept. 10, 1851.	V.
	Rourke, et al. (See Mee, John.)			
	Rourke, et al. (See Mee, John.)			
238	Rouse, Wanton	Mules, self-acting, for spinning	Nov. 2, 1852; reissued Mar. 15, 1853.	
	Rouzer and Rutter. (See Rutter and Rouzer.)			
	Rowe, Bradford. (See Pierce, Hiram, and George E. Cady.)			
9982	Roys, Franklin, and Edward Wilcox, assignees of Elliot Savage	Disks, metallic, machinery for cutting and bending	Aug. 30, 1853	II.
	Rudduck, Wm., and Henry Perrin. (See Perrin and Rudduck.)			
10089	Ruger, Philip F.	Turning spiral mouldings, machine for	Oct. 4, 1853	XIV.
9904	Ruggles, Stephen P.	Printing-presses	Aug. 2, 1853; antedated Feb. 2, 1853.	XVIII.
9978	Ruggles, Stephen P.	Metal, sheet, machine for cutting	Aug. 30, 1853	II.
10159	Russell, Henry L.	Packing, piston, metallic	Oct. 25, 1853	VI.
9651	Rust, Samuel	Presses, sector	April 5, 1853	XII.
10074	Rutter, Benjamin, and Henry Rouzer	Smut-machines	Oct. 4, 1853	XIII.
	Saby, John, jr. (See Griffin, Jas. K.)			

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
	Sailor, Samuel H. (See Warnick, C. W., and Fred. Leibrandt.)			
	Sailor, Samuel H. (See Warnick, C. W., and Fred. Leibrandt.)			
	Sailor, Samuel H. (See Abbott, J. G., and A. Lawrence.)			
	Sailor, Samuel H. (See Abbott and Lawrence.)			
9863	Salmon, George B.	Winnowers, grain	July 19, 1853; antedated July 6, 1853.	I.
10075	Salomon, J. C. F.	Engines, rotary steam	Oct. 4, 1853	VI.
9785	Sampson, Alexander H.	Brick-machines	June 14, 1853	XV.
10264	Sampson, Elnathan	Scales, platform	Nov. 22, 1853	XII.
9845	Sanford, Samuel T.	Boring-machines	July 12, 1853	XIV.
10005	Sands, Hiram, and Gary Cummings	Brick-machines	Sept. 6, 1853	XV.
10078	Sargent, James, and D. P. Foster, assignees of E. L. Pratt	Apples, machines for paring	Oct. 4, 1853	XVII.
10161	Sargent, Benjamin P.	Shoes, horse, expanding	Oct. 25, 1853	II.
10162	Sargent, Jacob T.	Hoes, garden and other	Oct. 25, 1853	I.
	Saroni, Adolph S. (See Schenkl and Saroni.)			
9879	Satterlee, Milton	Planters, seed	July 26, 1853	I.
9652	Savage, Elliott	Screws, wood, machine for cutting the threads of	April 5, 1853	II.
	Savage, Elliott. (See Roys and Wilcox.)			
10316	Sawyer, Joseph, and Lyman Clark	Rasps, peg	Dec. 13, 1853	XVI.
9523	Schaffer, Francis C.	Potato-diggers	Jan. 4, 1853	I.
9943	Schenkl, John P., and Adolph S. Saroni, assignees of John P. Schenkl	Fire-arms, breech-loading	Aug. 16, 1853	XIX.
9900	Schoffeld, Jos. A.	Looms, temples for	Aug. 2, 1853	III.
10326	Schnebly, Wm. and Thos.	Harvesters, grain and grass	Dec. 20, 1853	I.
	Schultz, Frederick. (See Gilbert, C. and S.)			
10139	Scott, John	Beds, air	Oct. 18, 1853	XVII.
9965	Sears, Henry B., assignee of Jon. Foreman, administrator of E. W. Foreman.	Diving-bells	Aug. 23, 1853	VII.
9847	Seely, O. W., assignee of J. P. Smith and O. W. Seely	Straw-cutters	July 12, 1853	I.
9736	Seely, Samuel J.	Kilns, lime	May 17, 1853; antedated Nov. 17, 1852.	XV.
10287	Seibert, Frederick	Leather, machines for polishing	Nov. 29, 1853	XVI.
9834	Semple, Amzi C.	Paddles for vessels	July 5, 1853	VII.
9824	Semple, Wm. C., assignee of Amzi C. Semple	Presses	June 28, 1853	XII.
	Serrell, Alfred T. (See Lawrence, John.)			
243	Serrell, Alfred T.	Mouldings, machinery for making	May 16, 1848; reissued Jan. 7, 1851; reissued June 21, 1853.	
9928	Seymour, Alfred B.	Rolling railroad and other iron	Aug. 9, 1853	II.
9804	Shank, J. R.	Lathe-machines	June 21, 1853	XIV.
9820	Sharps, Christian	Percussion pellets	June 28, 1853; in England, April 22, 1852.	XIX.
10041	Shawk, Abel	Generators, steam	Sept. 20, 1853	VI.
9821	Shepardson, E. E., and E. Lucas	Melodeons and other reed instruments, tuning	June 28, 1853	XVIII.
9587	Sheppard, Louis F.	Teeth, artificial	Feb. 15, 1853	XX.
9867	Sherman, Sylvester J.	Levels, spirit, mounting	July 19, 1853	VIII.
9805	Sherrod, Walter	Turning machinery, expanding mandrels for	June 21, 1853	XIV.
9712	Sherwood, John T.	Nails, wrought, machines for making	May 10, 1853	II.
	Shield, George, and R. Griffiths. (See Griffiths, R.)			
9569	Shiverick, Benjamin	Furnaces, glass, mode of feeding rosin to the fires of	Feb. 1, 1853	XV
9717	Sibbald, Charles F.	Paint compounds	May 10, 1853; in England, April 15, 1852.	IV.

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
10353	Sibbald, Charles F.	Boilers, steam	Dec. 20, 1853	VI.
9718	Sickels, Frederick E.	Rudder of steam-vessels, operating and controlling the	May 10, 1853	VII.
9772	Sickels, Gerard	Bridges, ferry, self-adjusting platform for	June 7, 1853	IX.
10260	Silver, William, jr.	Blasting-powder	Nov. 22, 1853	IX.
10342	Simon, Godfrey	Carriages with shifting seats	Dec. 20, 1853; in England, Mar. 4, 1853.	X.
9601	Simmons, Jonas	Axes, machine for making	Mar. 1, 1853	II.
10238	Sinclair, Robert, jr., and R. F. Maynard	Straw-cutters, feed-rollers of	Nov. 15, 1853	I.
10246	Slaughter, Franklin, assignee of Evan H. Branson	Timber, crooked, machinery for dressing	Nov. 15, 1853	XIV.
10050	Sleppy, Christian	Chains, making	Sept. 27, 1853	II.
234	Sloan, Thomas J.	Screw-blanks, machine for arranging and feeding	Feb. 25, 1853; reissued Mar. 29, 1853.	
9688	Sloan, Thomas J.	Screw-blanks, machine for pointing and threading	April 26, 1853	II.
	Smith, et al. (See Wager, Richmond, and Smith.)			
	Smith, et al. (See Wager, Richmond, and Smith.)			
9704	Smith, Charles E., assignee of J. Dutton Steele	Rails for railroads	May 3, 1853; antedated Nov. 3, 1852.	X.
10168	Smith, David M.	Clothes-lines, spring-clamps for	Oct. 25, 1853	XVII.
9786	Smith, E. H.	Presses, copying	June 14, 1853	XVIII.
583	Smith, Elihu	Stove, parlor	July 26, 1853	Design.
10258	Smith, Frederick	Water-wheel	Nov. 22, 1853	XI.
	Smith, G., and H. Brown. (See North, Chase, and North.)			
	Smith, G., and H. Brown. (See Abbott and Lawrence.)			
	Smith, Garrettson, and Henry Brown. (See Warnick, C. W., and F. Leibrandt.			
	Smith, G., and H. Brown. (See North, Chase, and North.)			
9977	Smith, Gideon B.	Coin, counterfeit, detector	Sept. 6, 1853	XXII.
9776	Smith, Hamilton L., Levi Buttles, and Henry A. Swift, assignees of H. L. Smith.	Paper files	June 7, 1853	XVIII.
10261	Smith, Hiram	Bedstead-rails, &c., cutting screws on, apparatus for	Nov. 22, 1853	XVII.
9549	Smith, Jeremiah P.	Corn-shellers	Jan. 18, 1853	I.
	Smith, J. P., and O. W. Seely. (See Seely, O. W.)			
	Smith, J. R., and D. S. Mackey. (See Mackey and Smith.)			
	Smith, John C. (See Warnick, C. W., and Fred. Leibrandt.)			
10017	Smith, Josiah M.	Moulding-machines, cutter-heads for	Sept. 13, 1853	XIV.
	Smith, Leonard	Smut-machines	Oct. 13, 1839; extended Oct. 13, 1853.	
9959	Smith, Lettie A.	Butter-workers	Aug. 23, 1853	XVII.
9613	Smith, Thaddeus A.	Moulding for cast-iron plates with dove-tailed recesses	Mar. 8, 1853	II.
9658	Smith, William	Weaving corded fabrics	April 5, 1853	III.
	Snell and Chilcott. (See Chilcott, J., and R. Snell.)			
	Snell and Chilcott. (See Chilcott, J., and R. Snell.)			
	Snell and Chilcott. (See Chilcott, J., and R. Snell.)			

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
10113	Snow, Samuel, and Alex. Hine	Cultivators, rotary root-digging	Oct. 11, 1853	I.
105	Snyder, Elisha S.	Grain, machine for separating straw from	June 13, 1849; additional improvement added Aug. 23, 1853.	
9714	Snyder, John H.	Spikes, hook-headed, machines for making	May 10, 1853	II.
9570	Solis, Richard	India-rubber, manufacture of	Feb. 1, 1853	IV.
9560	Southmayd, Horace, assignee of Josiah W. Archbald	Sugar-draining machines	Jan. 25, 1853	IV.
9996	Spafford, Wm. W.	Metals, planing-machines for	Sept. 6, 1853	II.
10076	Spence, George S. G.	Ranges, cooking	Oct. 4, 1853	V.
10216	Spencer, George	Ventilator, railroad car	Nov. 8, 1853	V.
10215	Spiller, Thos., and Anthony Crowhurst	Propellers, vibrating, operating	Nov. 8, 1853; antedated Feb. 8, 1853.	VIII.
9995	Spratt, James	Bottle-fastenings	Sept. 6, 1853	XXII.
9602	Spring, Charles A.	Valve, supplemental, in reciprocating steam-engines	Mar. 1, 1853	VI.
9628	Stanbrough, James	Harness	Mar. 22, 1853	XVI.
9950	Stanton, Henry	Fire-arms, discharging breech-loading	Aug. 16, 1853	XIX.
10343	Staples, Solon	Screw for planking ships	Dec. 20, 1853	VII.
	Steele, J. Dutton. (See Smith, Charles E.)			
9699	Steere, Parris J.	Barrel-heads, machine for sawing	May 3, 1853	XIV.
	Stephens, T. W., and O. J. Davie. (See Davy & Stephens)			
10121	Stephens, William	Valve-motion of oscillating engines	Oct. 4, 1853	VI.
10350	Stevens, B. F., and Walter Kidder	Shingle-machine	Dec. 20, 1853	XIV.
	Stevens, Joshua. (See Massachusetts Arms Company.)			
10039	Stickney, Ancil	Blow-pipes for enlarging blasting cavities	Sept. 20, 1853; antedated May 10, 1853.	IX.
10040	Stickney, Ancil	Blow-pipe, compound, for enlarging blasting cavities	Sept. 20, 1853; antedated June 11, 1853.	IX.
10022	Stockwell, Leonard A.	Lamps, lard	Sept. 13, 1853	V.
9654	Storm, Wm. Mt.	Engines, actuating, process for mixing air and steam for	April 5, 1853	VI.
9689	Stout, Thomas B.	Potato-diggers	April 26, 1853	I.
9568	Stratton, Wm. and Matthias	Gas apparatus, portable	Feb. 1, 1853	IV.
10079	Strode, Joseph C.	Ram, hydraulic	Oct. 4, 1853	XI.
10051	Stuart, David	Iron-ware, hollow, annealing	Sept. 27, 1853	II.
9787	Sturgis, John J.	Type-casting machines	June 14, 1853	XVIII.
10214	Sturtevant, Salford E.	Shafts of vehicles to the axles, attaching	Nov. 8, 1853	X.
10319	Sully, James, and John Butter, assignees of John Butter	Brick, machines for moulding	Dec. 13, 1853	XV.
10016	Sumner, Samuel B.	Boot-jacks	Sept. 13, 1853	XVI.
10344	Sweet, Henry L.	Sewing on binding, guides for	Dec. 20, 1853	III.
10172	Sweet, Samuel	Spark-arrester	Oct. 25, 1853	VI.
9639	Swett, James H.	Spike-machines, arrangement of the die-rollers in	Mar. 29, 1853	II.
	Swift, et al. (See Smith, Hamilton L.)			
10038	Sylla, Philo, and Augustus Adams	Harvesters, grain and grass	Sept. 20, 1853	I.
9774	Talbot, Ebenezer	Boring rock, machine for	June 7, 1853	IX.
	Talbot, John G., and Schuyler Briggs. (See Briggs & Schuyler.)			
9563	Taltavul, Peter	Omnibus registers	Jan. 25, 1853	X.
10191	Taplin, John A.	Grain-separators, straw and	Nov. 1, 1853	I.
9596	Taylor, Amos G., and Stephen Wilcox, jr.	Looms, let-off motion for	Feb. 22, 1853	III.
9604	Taylor, E. S.	Bedstead-fastenings	Mar. 1, 1853	XVII.
9700	Taylor, James S.	Hat-bodies, machines for shrinking	May 3, 1853	III.
10276	Taylor, Robert R.	Hammers, steam, arrangement of valves, ports, and passages for operating.	Nov. 29, 1853	II.

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
9620	Ten Eyck, Peter	Chairs, rocking	Mar. 15, 1853	XVII.
10277	Terry, Silas B.	Clocks, balance, new mode of applying the vibrating-spring of	Nov. 29, 1853	VIII.
9949	Tewksbury, Abijah R.	Boat or scow	Aug. 16, 1853	VII.
	Thomas, Samuel T., and Edward Everett. (See Everett & Thomas.)			
10289	Thompson, John H., James M., and Hosea Q.	Boots and shoes, machine for trimming soles of	Nov. 15, 1853	XVI.
9905	Thompson, Nathan, jr.	Boilers, steam, mode of indicating the height of water in	Aug. 2, 1853	VI.
10140	Thompson, Nathan, jr.	Life-preserving bucket	Oct. 18, 1853	VII.
10141	Thompson, Nathan, jr.	Life-preserving seat	Oct. 18, 1853	VII.
9963	Thompson, S. C., G. W. Westerfield, and H. Ritchie, assignees of Henry Ritchie.	Padlock	Aug. 23, 1853	II.
9641	Thompson, Thomas C.	Sewing-machines	Mar. 29, 1853	III.
9865	Thompson, William H., and Richard H. Plummer	Flyers, compressors for	July 19, 1853	III.
9732	Thorn, Wm. J.	Combs, pocket	May 17, 1853	XXI.
9806	Thornton, Wm. McK.	Collars, horse	June 21, 1853	XVI.
10100	Thurman, Wm. J., assignee of Richard H. Pindell	Planing-machine	Oct. 4, 1853	XIV.
9614	Tiffany, Joel	Shingles, machines for dressing	Mar. 8, 1853	XIV.
9835	Tilghman, Noah J.	Crow killer	July 5, 1853	XXII.
9690	Tillman, Samuel D.	Stoves, radiators for	April 26, 1853	V.
10217	Tillman, Samuel D.	Musical scale, revolving	Nov. 8, 1853	XVIII.
10356	Tompkins, D. and D. F., assignees of J. C. Conklin	Axes, pick	Dec. 20, 1853	II.
	Toole, W. S., et al. (See Parker, Jas. M.)			
10192	Towers, Wm. H.	Pens, metallic	Nov. 1, 1853	XVIII.
10240	Towers, Wm. H.	Registers, hot-air	Nov. 15, 1853	V.
10345	Towers, Wm. H.	Shoes, horse	Dec. 20, 1853	II.
10018	Townsend, Richard H.	Valves of steam-engines, working the	Sept. 13, 1853	VI.
9608	Townshend, William	Looms	Mar. 1, 1853	III.
10241	Townshend, William	Looms	Nov. 15, 1853	III.
9640	Traeyser, George	Pianos, vertical	Mar. 29, 1853	XVIII.
9866	Trayser, Philip P.	Spike-machines	July 19, 1853	II.
9864	Treadwell, Ephraim	Ovens	July 19, 1853	V.
10164	Trees, James	Propellers	Oct. 25, 1853	VII.
9655	Trinks, Gregor	Brakes for railroad cars	April 5, 1853	X.
10327	Tripp, Hiram N.	Rakes, power	Dec. 20, 1853	I.
	Tripp, S. D. (See E. L. Norfolk.)			
10288	Trofatter, Samuel J. and Charles H.	Boot-counters, machines for skiving	Nov. 29, 1853	XVI.
	Tryday, G. H. (See North, Chase & North.)			
	Tupper & Merrill. (See Merrill & Tupper.)			
10006	Turner, Samuel H.	Ink, printers'	Sept. 6, 1853	IV.
	Tuttle & Porter. (See Porter & Tuttle.)			
9664	Tuttle, Edward A.	Registers, hot-air	April 12, 1853	V.
9807	Tuttle, J. H.	Saws	June 21, 1853	XIV.
10221	Twining, Alex. C.	Ice, manufacturing	Nov. 8, 1853; in England, July 3, 1850.	XXII.
9701	Tyler, Charles N.	Fire-arms, repeating	May 3, 1853	XIX.
	Tyng, L. B., W. Aldrich, and M. Marshall. (See Marshall, Moses.)			
9810	Tyson, Wm. F.	Propellers for canal-navigation	June 21, 1853; antedated Dec. 21, 1852.	VII.
10346	Unger, Elias	Timber, machine to cut polygonal surfaces in	Dec. 20, 1853	XIV.
9851	Union Patent Sofa Railroad Car-seat Manufacturing Company, assignees of Charles P. Bailey.	Car-seats, railroad	July 12, 1853	X.
9656	Updegraff, John J.	Stoves	April 5, 1853	V.
9665	Upton, Benjamin Franklin	Daguerreotyping, mercury baths for	April 12, 1853	XVIII.
	Valentine, Elijah. (See Bradway, Abel.)			
9906	Van Anden, William	Chairs, railroad, machinery for making	Aug. 2, 1853	IX.
9942	Van Anden, William	Hammer, trip	Aug. 16, 1853	II.
	Van Cleve, Jno. W. (See Greer, James, & Co.)			
10080	Vandewater, Henry	Water-wheel, turbine	Oct. 4, 1853	XI.
9958	Van Syckel, Samuel	Grate-bars	Aug. 23, 1853	V.
10114	Van Valkenburgh, Jacob L.	Winnowers, shaking-shoes for	Oct. 11, 1853	I.
	Van Zant, P., and Wm. Watson. (See Watson & Van Zant.)			
	Vedder & Ripley. (See G. W. Eddy.)			
572	Vedder, N. S.	Stove, cook	June 28, 1853	Design.
609	Vedder, N. S.	Stove, cooking	Nov. 8, 1853	Design.
9890	Vettercke, Frederick G.	Dyeing compounds	July 26, 1853	IV.
10173	Vogle, Kasimir	Looms for making weavers' harness	Oct. 25, 1853	III.
10165	Vose, Albert	Yokes, ox	Oct. 25, 1853; antedated Aug. 10, 1853.	I.
567	Vose, Samuel D.	Stove, parlor	May 24, 1853	Design.
573	Vose, Samuel D.	Stove, cooking	June 28, 1853; antedated May 2, 1853.	Design.
574	Vose, Samuel D.	Stove, cooking	June 28, 1853; antedated May 2, 1853.	Design.
575	Vose, Samuel D.	Stove, cooking	June 28, 1853; antedated May 2, 1853.	Design.
576	Vose, Samuel D.	Stove, parlor	June 28, 1853; antedated May 2, 1853.	Design.
9733	Wade, William Wheaton	Castors for furniture	May 17, 1853	II.
613	Wager, J., V. Richmond, and H. Smith	Stove, parlor	Dec. 20, 1853	Design.
614	Wager, J., V. Richmond, and H. Smith	Stove, coal, cylinder	Dec. 20, 1853	Design.
9750	Wagener, Jeptha A.	Harvesters, clover	May 24, 1853	I.
9615	Wagener, John A.	Cannon-sight	Mar. 8, 1853	XIX.
	Wagoner, J. K., and L. L. Gilliland. (See Gilliland & Wagoner.)			
10193	Waite, Increase S.	Turning cylinders of wood, machine for	Nov. 1, 1853	XIV.
	Walback, L. A. B. (See Wm. F. Lucas, administrator, &c.)			
9734	Walcott, Halsey D.	Cutters, graduated, for cloth and other substances	May 17, 1853	XXI.
9751	Walker, Alexander J.	Lamps, spirit	May 24, 1853	V.
9642	Walker, M., Daniel S., and Matthew, jr.	Fences, wire	Mar. 29, 1853	IX.
10328	Walker, Robert P.	Hulling and scouring coffee, machines for	Dec. 20, 1853	I.
	Ward & Gerould. (See Gerould & Ward.)			
10090	Ward, John H.	Gold-washers	Oct. 4, 1853	II.
9597	Ward, Lauren, administrator of Richard Ward, J. B. Hubbell, and H. C. Hubbell.	Turning irregular forms, machines for	Feb. 22, 1853	XIX.
9822	Ward, Lauren, administrator of Richard Ward, deceased	Turning irregular forms, machines for	June 28, 1853	XIV.
10091	Ware, Charles T. P.	Propellers	Oct. 4, 1853	VII.

Alphabetical List.—Continued.

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
10242	Warner, Jonathan E.	Staves, machine for finishing the ends of	Nov. 15, 1853	XIV.
9999	Warner, Thomas	Gun-barrels, twisted, process for making	Sept. 6, 1853	XIX.
603	Warnick, C. W., and Frederick Leibrandt, assignees of Garretson Smith and Henry Brown.	Stoves	Oct. 4, 1853	Design.
554	Warnick, C. W., and F. Leibrandt, assignees of S. H. Sailor	Stove, cooking	April 19, 1853	Design.
558	Warnick, C. W., and F. Leibrandt, assignees of S. H. Sailor	Stove, cooking	April 26, 1853	Design.
559	Warnick, C. W., and F. Leibrandt, assignees of John C. Smith	Range, portable	April 26, 1853	Design.
10303	Warren, Ira	Syringes, shower	Dec. 6, 1853	XX.
	Warren, Josiah. (See Westbrook, L.)			
10142	Warren, Thomas E.	Car-bodies, iron	Oct. 18, 1853	X.
9880	Warren, William M	Car-seats, railroad	July 26, 1853	X.
9960	Warren, William M	Car-seats, railroad	Aug. 23, 1853	X.
10052	Waskey, Robert	Smut-machines	Sept. 27, 1853	XIII.
546	Waterman, Charles	Sewing-bird	Feb. 15, 1853	Design.
10243	Waterman, Henry	Valves, safety, for locomotive engines	Nov. 15, 1853	VI.
578	Waterman, Nathaniel	Waffle-baker	July 5, 1853	Design.
9907	Waterman, Stephen	Boiler explosions, steam, mode of obviating the danger from	Aug. 2, 1853	VI.
9930	Watson, P. H., and E. S. Renwick	Harvesters and binders, grain	Dec. 6, 1853; antedated June 6, 1853.	I.
10194	Watson, Peter H	Steam, generating and condensing	Nov. 1, 1853; antedated May 2, 1853.	VI.
9524	Watson, William	Tongueing and grooving machines	Jan. 4, 1853	XIV.
10357	Watson, Wm., and P. Van Zant, assignees of Wm. A. Martin	Siedlitz powders, machine for folding	Dec. 20, 1853	XXII.
10297	Watt, James	Hammers, steam-valve, arrangement for	Dec. 6, 1853	II.
9691	Watts, Alfred J	Gold, processes for preparing	April 26, 1853	II.
10143	Weatherby, J. W	Carpet-stretchers	Oct. 18, 1853	XVII.
9735	Weatherhead, Davis L	Dies, block, cleansing and cooling, in rivet-machines	May 17, 1853	II.
	Webb, Joseph W. (See Gould, Benj.)			
	Weeks, Asa, and R. M. Evans. (See R. M. Evans.)			
9998	Weeks, Henry L	Gins, cotton	Sept. 6, 1853	III.
9868	Weldon, Thomas C	Wigs, manufacture of	July 19, 1853	XXI.
10298	Wellman, George	Cards, machine, cleaning	Dec. 6, 1853	III.
9911	Wells, J. G., assignee of Julius Herriet	Type, elastic, for printing on irregular surfaces	Aug. 2, 1853	XVIII.
	Wells, D. G., and H. Allen. (See Allen & Wells.)			
	Wells, D. G., and H. Allen. (See Allen & Wells.)			
9846	Wells, Ephraim B.	Saws, adjusting dishing	July 12, 1853	XIV.
10195	Wemple, J. V. A.	Grain-separators	Nov. 1, 1853	I.
10305	Werner, Carl E.	Stills, condensers for	Dec. 6, 1853	IV.
9870	Westbrook Leonardo	Gutta percha stereotype compositions	July 19, 1853	IV.
246	Westbrook, L., assignee of Josiah Warren	Composition for stereotype plates	April 25, 1846; reissued July 26, 1853.	
	Westerfield, G. W., et al. (See Thompson, S. C., et al.)			
	Westerman, et al. (See Richardson, J. R., et al.)			

No.	Name of Patentee.	Invention or discovery.	Date.	Class.
9990	Weston, Charles	Leather-splitting, machines for	Aug. 30, 1853	XVI.
10054	Wethered, Chas. E., John, and Samuel	Engines, actuating, use of steam for	Sept. 27, 1853; in England, May 25, 1853.	VI.
9605	Wheeler, William	Curry-combs, construction of	Mar. 1, 1853	II.
	Wheeler, William, N. C. Harris, and W. P. and E. N. Merriam. (See Merriam, W. P.)			
	Wheeler, Wm. (See Kellogg, Chas. H.)			
	Whipple, Cullen. (See New England Screw Company.)			
9715	Whipple, Geo. A.	Iron, malleable, directly from the ore, manufacturing	May 10, 1853	II.
	White, et al. (See Brookfield & White.)			
10244	White, Jonathan	Shovel-blades, uniting to handle-straps	Nov. 15, 1853	II.
9588	White, Rand B.	Saw-setting machine	Feb. 15, 1853	II.
10299	Whitemore, John E.	Water-wheels, overshot	Dec. 6, 1853	XI.
	Whitman, L. M. (See Wise, Samuel G.)			
	Whitney, B., and David Marsh. (See Marsh, David.)			
10145	Whittaker, Harry	Propellers, screw, application of high-pressure engines to	Oct. 18, 1853	VII.
10116	Whittemore, D. H.	Vegetable-cutters	Oct. 11, 1853	I.
9679	Wickersham, William	Sewing-machines	April 19, 1853	III.
9773	Wight, George W	Presses, screw, for packing boxes	June 7, 1853	XII.
9981	Wigston, William	Gas, purifying apparatus for	Aug. 30, 1853	IV.
	Wilcox & Roys. (See Roys & Wilcox.)			
	Wilcox, Stephen, jr., and Amos B. Taylor. (See Taylor & Wilcox.)			
	Wilder, et al. (See Richardson, Westerman & Wilder.)			
249	Wilder, Aretus A.	Planing-machines	Dec. 21, 1852; antedated July 17, 1852; reissued Nov. 15, 1853.	
9808	Wilder, J. B.	Ploughs, hill-side	June 21, 1853	I.
9667	Wilgus, Charles	Washing-machines	April 12, 1853	XVII.
9525	Wilkinson, Jeptha A.	Printing-presses	Jan. 4, 1853; in England, Sept. 23, 1842.	XVIII.
9871	Willcox, Austin O.	Engines, air	July 19, 1853	VI.
9909	Willcox, Austin O.	Engines, hot-air	Aug. 2, 1853	VI.
9869	Williams, Charles	Bristles for brushes, preparation of	July 19, 1853	XVII.
	Williams, Daniel, and Thos. Baylis. (See Baylis & Williams.)			
	Williams, David, and Henry L. Cryder. (See Cryder & Williams.)			
10318	Williams, James B., assignee of Joel R. Bassett	Pump-valves	Dec. 13, 1853	XI.
10218	Williams, W. D.	Brakes, wagon	Nov. 8, 1853	X.
10042	Willis, Oscar	Water-wheels, saw for	Sept. 20, 1853	XI.
10200	Williston, George	Rails, machines for straightening or curving	Nov. 1, 1853	IX.
10317	Wilmington, John	Metal, sheet, machines for cutting	Dec. 13, 1853	II.
	Wilmot, Samuel R. (See Kent, Joseph.)			
9558	Wilson, H. F., and S. E. Fenwick, assignees of Wm. H. Lazelle	Apples, machines for paring	Jan. 25, 1853	XVII.
	Wilson, Henry H., and Edmund H. Bard. (See Bard, E. H.)			
	Wilson, J. G., and J. T. Bruen. (See Bruen & Wilson.)			
9716	Winder, D.	Engines, locomotive	May 10, 1853	VI.
9979	Winslow, Daniel, and P. D. Cummings	Paper-files	Aug. 30, 1853	XVIII.
10347	Wisdom, William	Feathers, cleansing hair and, from insects, &c.	Dec. 20, 1853	XVII.
10123	Wise, Samuel G., assignee of L. M. Whitman	Ploughs, cultivating	Oct. 11, 1853	I.
10219	Wisner, Joel	Washing-machines	Nov. 8, 1853	XVII.
9551	Witherow, Samuel, assignee of Wm. H. and Samuel Witherow	Planters, seed	Jan. 18, 1853	I.
9589	Wolf, David and Herman	Planters, seed	Feb. 15, 1853	I.

Alphabetical List.—Continued.

No.	Name of patentee.	Invention or discovery	Date.	Class.
9739	Woodbury, J. A., Joshua Merrill, and George Patten	Engines, air	May 17, 1858; in England, Jan. 5, 1853.	VI.
10081	Woodbury, Jas. A., Joshua Merrill, and George Patten	Engines, air	Oct. 4, 1853; in England, Jan. 5, 1853.	VI.
10115	Woodruff, Horace W.	Metals, treating, while in the molten state	Oct. 11, 1853	II.
9678	Woolson, Amasa	Cloth-dressing, gig-mills for	April 19, 1853	III.
10278	Wrenn, R. C.	Planters, seed	Nov. 29, 1853	I.
10062	Wright, Elizur	Cock, stop	Oct. 4, 1853	XI.
	Wright, E. S., and J. A. Rapp. (See Rapp & Wright.)			
9686	Yale, C. D., assignee of James Bolton, M. D.	Furnaces, hot-air	April 26, 1853	V.
10144	Yale, Linus	Locks, door	Oct. 18, 1853	II.
9850	Yale, Linus, jr.	Locks for banks	July 12, 1853	II.
	Young, James. (See Middleton, John W.)			
9908	Young, Jesse	Furnaces, hot-blast, arrangement of pipes for	Aug. 2, 1853	V.
106	Zimmerman, George F. S.	Winnowers and threshers	Feb. 8, 1853; additional improvement Sept. 13, 1853.	
9579	Zimmerman, G. F. S.	Winnowers and threshers	Feb. 8, 1853	I.
10053	Zimmerman, William	Smut-machines	Sept. 27, 1853	XIII.

DESCRIPTIONS AND CLAIMS OF PATENTS,

ISSUED IN THE YEAR 1853.

ILLUSTRATED WITH CUTS.

No. 9,512.—James P. Arnold, of Louisville, Ky.—*Improvement in Hackling Hemp.*—Patented January 4th, 1853.

The first part of this improvement consists in the method of hackling hemp (after it has been suitably prepared by rotting, breaking, and scutching), by subjecting it to the action of a series of mixed combs D (see fig.) and beaters A; the beaters of uniform radial length, but the teeth of the combs gradually increasing in length, from the point where the fibre is first subjected to their action (between the rests B and C), to the point at which the operation is completed. By this method of operation a larger per centage, and a better quality of hemp is obtained from a given quantity, than by the methods heretofore adopted. The proportion of tow is diminished in the same ratio as the long staple is increased, which is much the most valuable commodity.

The second part consists of a stotted rest, open at one end, and acting in connexion with a projecting concave that holds the fibre in the proper position against the cylinder, and keeps it properly spread. The narrow slotted rest also protects the hand of the attendant.

Claim.—The method of hackling hemp by subjecting it to a series of mixed beaters and combs, the teeth of the combs varying in length; also a rest having a narrow slot open at one end, in combination with a concave projecting beyond the end of the cylinder, at the open end of the rest.

No. 9,513.—John T. Bruen and James G. Wilson, of Hastings, N. Y. —*Improvement in Sawing Marble and other Stone.*—Patented January 4th, 1853.

This invention consists in lifting the saw-frame at, or sufficiently near the middle of its range of motion, to effect the contemplated

purpose, *i. e.* that the sand may be carried under the edge of the saw blade by means of inclined projections on the ways over which the wheels run. Also, in interposing india rubber, or its equivalent, between the ways and the inclined projections, to reduce the concussions which would otherwise take place when the wheels strike the said inclined projections.

"What we claim as our invention is, lifting the saws (in sawing marble and other stone), at or sufficiently near the middle of the stroke to effect the specified purpose. Also, interposing india rubber between the ways and the inclined projections which lift the saw-frame."

No. 9,514.—James J. Clark, of Philadelphia, Pa.—*Improvement in the Construction of Telegraph Registers.*—Patented January 4th, 1853.

This improvement is denominated the "self-winding register," by the inventor, and consists in attaching an adaptation to the ordinary Morse telegraph register, of a second electro-magnet, an armature attached to one extremity of a lever, and a click at the other extremity, this click works into a ratchet wheel. To the lower extremity of the lever, behind the armature, a reacting spring is attached. When the spring is wound up to a certain point, the current through the winding magnet is cut off by establishing a cross connexion. (See figure.)

"I claim as my invention the regulating the current through the coil of the electro-magnet of the self-winding apparatus, by means of the relative motion of the spring shaft and spring box, so that when the spring has been wound up to a certain point, that current shall be cut off—cease to act."

No. 9,515.—John D. Dale, of Philadelphia, Pa.—*Improvement in Machinery for Planing Mouldings.*—Patented January 4th, 1853.

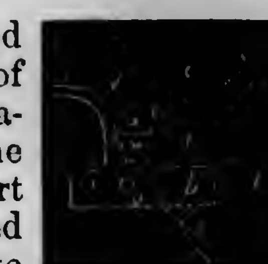
The object of this invention is to plane a plank into a series of mouldings, and separate them from each other at one operation. (See fig.)

The nature of this invention consists in arranging a series of moulding cutters or plane irons, side by side, and along the length of, and around an axis, *a*, of rotation; when this is combined with rotating saws, or their equivalents, for slitting or separating the several mouldings at the same time, whereby the operations are not only simplified, but accurate work insured. In this way any number of sets of moulding plane irons may be arranged side by side. At each end of this stock of plane irons *c c*, and saws *f f*, are arms, and to the outer end of these arms is secured a metal bar, and to the under surface of this bar are secured a series of plates, which

may be shifted at pleasure, for adjustment; there is one of these plates for each set of moulding cutters. Spaces are left between the cutters for the passage of the saws; *d d d d*, screw bolts and nuts.

"I claim as my invention, a method of arranging a series of sets of moulding cutters side by side, along the length of a rotating stock, combined with rotating saws, interposed and projecting beyond the periphery of the cutter, for separating the several mouldings formed on one plank, whereby the operations of planing the several mouldings, and separating them, are performed at one and the same operation, and accuracy of work secured."

No. 9,516.—John D. Dale, of Philadelphia, Pa.—*Improvement in Machinery for "Planing Mouldings."*—Patented January 4th, 1853.



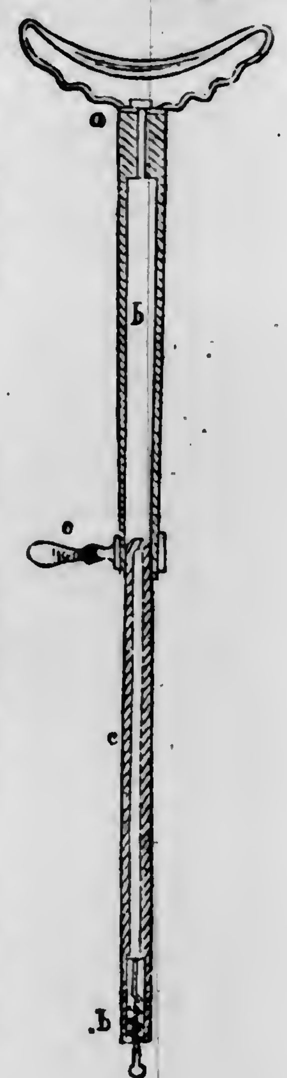
In this improved machine the planing is effected by one planing iron, which, during the passage of the wood under it, is fixed, for each successive operation is moved nearer to the bed, so as to produce the moulding by successive operations. The first part consists in attaching the planing iron to a hinged sliding adjustable stock *v*, so that the plate *b*, to which the planing iron *w* is attached, can be turned up so as to sharpen the planing iron without detaching it, and can be set for each succeeding cut, by an adjusting screw. The second part consists in so connecting the sliding adjustable plane iron with a movable mouthpiece to make pressure on the surface to be planed, directly in front of the plane iron, and of corresponding form, that as the plane iron is adjusted for each succeeding shaving, the said mouth-piece shall receive a corresponding adjustment by a differential movement being imparted to it, that the relative positions of the two may be proportional to the thickness of the shaving to be cut; *i i*, are rollers.

"What I claim as my invention, is attaching the planing iron to a plain stock which is hinged to an adjustable sliding plate, by means of which combination the plane iron can be readily thrown up to be sharpened without the necessity of taking it out of the machine. Also, the adjustable sliding plane, when combined with the separate movable mouthpiece, so that in setting the plane iron a differential motion is given to the mouthpiece in order to vary to any desired thickness the shaving, that when the plane is set to cut a thick or thin shaving, the mouthpiece shall receive a corresponding set."

No. 9,517.—George Feaga & George W. Feaga, of Frederick, Md.—*Improvement in Machinery for Separating Grain from Garlic, Smut and other Impurities.*—Patented January 4th, 1853.

The nature of this invention consists in washing the grain in water, by which means the smut is loosened, and the smut, garlic, and all other light impurities will rise and pass off with the water; and then carrying the washed grain by elevators and passing it through chambers heated by steam or hot air, where it is thoroughly dried,

and thence to the stones for grinding. The trough in which the grain is washed, has a shaft passing through it provided with a series of spirally fixed arms for stirring up and carrying forward the grain. The impurities pass off through an opening in the top of the trough. The elevators are perforated at their bottoms to allow the water to drain off.



"What we claim as new in this method of separating grain from smut and other impurities, is washing it in a trough or reservoir of water where the separation takes place, and then conveying the washed grain to a drying apparatus, where it is thoroughly dried."

No. 9,518.—John S. Gallaher, of Washington City, D. C.—*Improvement on the Crutch or Support for Cripples.*—Patented January 4th, 1853.

This improvement consists in constructing a crutch with a compound corrugated elliptical spring and air cushion top: which top is arranged to revolve horizontally upon the staff (see fig. at *a*) part of the crutch. The staff may be made in one solid piece, or so as to close up or fold. Appertaining to this crutch is also a "sliding joint," an "extension ferrule" and "elastic bulb."

"I claim the revolving plane or corrugated spring top, in combination with an air cushion. Also, in combination with the revolving spring top the sliding joint. And in combination with the *sliding* staff the revolving handle, extension ferrule, and elastic bulb."

No. 9,519.—John C. Bidwell & John Hall, of Pittsburgh, Pa. Executors of Samuel Hall, late of Manchester, Pa.—*Improvement in the "Hill-side Plow."*—Patented January 4th, 1853.

This improved plow is constructed with a land side of the usual form for a double plow, and provided with two plow-shears pointing in opposite directions. Two mould-boards are hinged (at E E and N N) to the land side by projecting ears M M, on the under side of both the mould-boards and land side, so that they will readily turn forward and backward when required. The respective hinges of each mould-board are at a considerable distance from each other, thus allowing free play to either mould-board without disturbing the other. The beam and handles turn upon a pivot, so that its direction can at any time be readily reversed.

"What we claim as the invention of Samuel Hall is the manner of arranging the mould-boards upon the land side, to wit: placing their hinges at such a distance from each other on each side of the centre of the land side, that each mould-board may be supported by the edges as far as practicable from the hinges, and rest upon grooves near the middle of the land side."

No. 9,520.—Richard Hollings, of Boston, Mass.—*Improvement for regulating the spread of Water when discharged from a "Hose-pipe."*—Patented January 4th, 1853.

This invention consists in hanging a flat spreading pan A, to the nose of the hose-pipe B, in such manner as to admit of vibration in combination with adjusting apparatus for varying its position, so that the water, when discharged from the pipe, strikes more or less directly upon said pan, and is spread into a sheet of greater or less expanse. The inventor denominates this improvement the "Regulating Water Spread."

The instrument is made of brass, and is a flat triangular shaped pan, having a handle H, at one angle, and raised lateral edges.

"What I claim is hanging the spread to the hose-pipe by means of pins passing through the collar O, which allow it to vibrate, in combination with adjusting apparatus for varying the position of the spread."

No. 9,521.—Benjamin F. Jenkins and Luke L. Knight, of Barre, Mass—*Improvement in Machinery for turning irregular forms.*—Patented January 4th, 1853.

This invention relates to that description of lathe in which the work and cutters both revolve, and the irregularity of form is produced by the vibration of the axis of the work, and of the whole or part of the cutters. The improvements consist in certain simple and effective means of controlling the vibrations of the said axis.

"What we claim is giving the necessary relative vibrations to the cutter cylinder and work carriage by crank pins or excentrics, upon the axis of a pair of toothed wheels, of which one is toothed all round its periphery and the other upon any suitable portion of its periphery, the latter wheel having a constant rotary motion applied which gives an intermittent rotary motion to the former wheel, whereby the said cutter cylinder and work carriage receive the one a constant vibratory motion, and the other an intermittent vibratory motion."

No. 9,522.—Merritt Peckham and Lucius O. Palmer, of Utica, N.Y.—*Improvement in Machinery for "Washing Gold from the deposits in which it is found."*—Patented January 4th, 1853.

This improvement consists in the arrangement of cylinders revolving

within a trough, the smaller one constructed of sheet iron, within the larger which is made of iron rods. The larger cylinder A (see fig.), is divided into four separate parts by sheet iron wings or partitions, and firmly connected with the smaller cylinder B, both being keyed to a shaft and made to revolve with it. The trough is of sufficient depth to receive the cylinder nearly to its axis. The interior cylinder, which is half the diameter of the larger, has indented ends and wings attached. The rods forming the larger cylinder are one-eighth of an inch apart, forming a fine screen. This description is very general.

"We claim the interior cylinder with indented ends and wings attached to operate as a discharging apparatus, attached to the interior of an inclined revolving screen."

No. 9,523.—Francis C. Schaffer, of Brooklyn, N.Y.—*An improved implement for digging Potatoes.*—Patented January 4th, 1853.

This invention consists in the arrangement and construction of an endless apron E, and scoop D, by the combination of which potatoes are dug and scooped from the hills, and conveyed by the aid of a brush cylinder into a proper receptacle G, or box; the potatoes being thoroughly cleaned from dirt in consequence of passing up the inclined apron. M, N, O, gear wheels; H, cylinder; S, driver's seat; K, regulating lever.

"I claim the arrangement and combination of the scoop and endless apron, by which the potatoes are scooped from the hills, and the dirt separated from them as they pass up the endless apron into the receptacle."

No. 9,524.—William Watson, of Chicago, Ills.—*Improvements for "Tonguing and Grooving Lumber."*—Patented January 4th, 1853.

This improvement consists in the construction and operation of a series of tonguing and grooving knives and chisels which are mounted in two (parallel) stocks. The stocks are stationary when adjusted and secured to a bed or bench. The board to be matched is drawn or forced along stationary ways between the planes; and the knives are secured by screws to the plane stocks, and can be conveniently adjusted or set, to cut different depths: the first set cutting a proportionable part of the required depth, the second deeper, and the third series of knives cutting to the desired, or ordinary depth, upon each side of the tongue. Between each set of knives are gouges or instruments to

remove the surplus wood. The grooving is performed simultaneously upon the opposite edge of the board and in a similar manner, but by one set of knives or gouges. The knives and chisels are set at right angles.

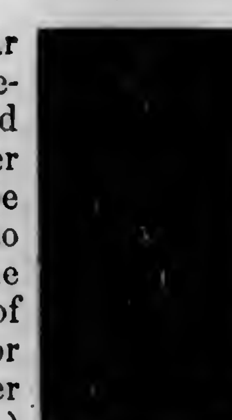
"What I claim is the method of tonguing and grooving boards by means of knives arranged in the sides of the plane of the sides of the tongues or grooves, with their cutting edges inclined towards their rear extremities, so as to cut gradually deeper and deeper as the board passes them, when in combination with cutting instruments arranged between these side knives to reduce or remove the surplus wood which is severed by them."

No. 9,525.—Jeptha A. Wilkinson, of Fireplace, N. Y.—*Improvement in the construction and operation of Printing Presses.*—Patented January 4th, 1853.

This improvement consists in forming cylinders of metal with means to secure type for printing upon their surface, combined with means of folding and cutting the sheets when printed.

The inventor claims as follows: "The application of notches or grooves, and beads or projections on the shafts of type tapered to the radii of a circle, for the purpose of locking said type together on a cylinder. 2d. The mode of forming column lines, rules, rings, and blocking, so that they are adapted to the cylinder and to the type. 3d. The mode of constructing the type cylinder. 4th. The mode of constructing the compositor's stick in the form of a part of a cylinder. 5th. The mode of constructing the galley or proof cylinder. 6th. The mode of constructing the type holder or grab to enclose, and securely lift a mass of type from the galley or proof cylinder. 7th. The application and arrangement of the pulleys, bands, and guide plates for carrying the paper. 8th. The application of the press rollers to compress the folded paper, and lead that out of the folding apparatus, and the combination of the standing roller, revolving shear, standing shear, valve, and cam, to effect the cutting of the folded paper as it issues from the rollers, and guide the first cut edge clear of the standing shear."

No. 9,526.—Rudolph Kreter, of New York, N. Y., Assignor to Robert Nunns and John Clark, of New York aforesaid.—*Improvement in Machinery for Covering the Hammers of Piano-Fortes.*—Patented January 4th, 1853.



This machine is constructed of a clamp, a strong bar made of two plates, a frame or carriage, a vice operated by a series of springs, a series of pulleys and levers, arranged and applied in the covering of hammer heads of piano-fortes. The covering consists of three thicknesses of felt for the base, gradually tapering to two towards the middle, and continuing double to the end. The covering is made to adhere by means of glue. The inventor claims the application of felt or other covering material, to the whole set of hammer heads, at one operation. Also the clamp A (see fig.)

the bar K, levers, pulleys and block B, with the sliding frame F in combination. Also the vice in combination with and inclosing the bar K and block B; the lip pieces in combination with said vice; and the method of varying the pressure of the levers upon the vice by means of a movable bridge X, in combination with a press X, and Y. Also the levers and springs in combination with the vice.

No. 9,527.—WALTER HUNT, of New York, N. Y., Assignor to CHARLES S. KIPP, of New York aforesaid.—*Improvement in Decanter Stoppers.*—Patented January 4th, 1853.

This improvement is denominated by the inventor the "Swivel-Cap Decanter Stopper," and is composed of two parts or species; a tube combining in one piece two flanges C, and a funnel shaped cap F, with a shaft E, upon which said cap is suspended: "I claim the combination of the circular cap and the central shaft upon which the cap is suspended, allowing it to have three principal motions, viz. the swivel, pendulous, and sliding motions."

No. 9,528.—THOMAS BAYLIS and DANIEL WILLIAMS, of Tecumseh, Mich.—*Improvement in the method of cutting and raking grain and cutting grass.*—Patented January 11th, 1853.

This machine consists of two large wheels which run upon the ground (and carry the whole machine), an axle, and a platform, circular in front, under which is a revolving circular knife or sickle; said knife is made to revolve under the platform by means of a wheel attached to the hub of the driving wheel, which runs upon the ground, and mashes into a wheel attached to the lower portion of an upright shaft, the top of which shaft projects up through the platform, and is also the axle of the circular cutter or knife. To this last mentioned shaft or axle is attached a wheel above the platform, which mashes into another wheel also above the platform, causing a rake I, to revolve at the end of an arm H, which gathers the grain into a sheaf, and discharges it at the rear of the platform at R. There are teeth projecting in front of the platform under the cutter, which extend into the grain or grass, somewhat beyond the teeth of the cutter.

The inventors claim, "that by the application of continuous rotary motion the force once acquired, is not lost as in other methods, in which the motion of the cutter is alternately checked and reversed. That the circular wheel to which the knives are attached, becomes an efficient balance wheel. Also that the form and action of the machine renders feasible the gathering of the cut grain by a circular sweep of the rake, and the size of the sheaf is regulated. That it is cheaper of construction, more portable, and less liable to get out of repair than other machines for a similar purpose."

No. 9,529.—NATHAN CHAPIN, of New York, N. Y.—*Improvement in a machine for "Duplicate Turning of Profile Work, &c."*—Patented January 11th, 1853.

The nature of this invention consists in constructing a machine, in which profile work may be executed upon both or one edge of pieces of wood or other material, by securing any desired number in a pair of discs forming a drum or cylinder turning on an axis, which being driven by proper machinery, said pieces may be worked to conform to a pattern by an improved swing rest for the gouge, working against the edge of said pattern, while the inside face or edge is worked at the same time by a swing rest carrying a gouge, which is made to advance or recede agreeably to the edge of the pattern upon the outside of the cylinder, by means of a rod passing along a groove in the axis communicating motion to the cutter and rest.

"What I claim is, constructing the clamping heads, with a projection on the interior face, in combination with orifices cut through said clamps and projection, for the purpose of introducing key slats, to retain the pieces during the operation of turning the interior and exterior surfaces. Also, giving to the sliding and vibrating interior cutter motion corresponding to the pattern."

No. 9,530.—MOSES G. FARMER, of Salem, Mass.—*Improvement in "Porous Cells for Galvanic Batteries."*—Patented January 11th, 1853.

This improvement consists in the method of constructing a vessel to contain the acids used in the operation of *Galvanic Batteries.* These vessels are usually constructed of unglazed earthen or porcelain, or some suitable substance that is porous, so as to allow of the passage through it of the nitric acid or liquid; and in consequence of making the whole vessel porous, so that the electricity can pass through any part of it, a great waste of the liquid necessarily follows; and it attacks the mercury of the amalgamated zinc in the cistern, producing serious injury. This vessel is porous only a part of it, the remainder being impervious to the liquid by being glazed, and the electricity can pass through the unglazed or porous part, and is so arranged as to obviate the loss and injury above referred to; and more power is obtained.

"I claim the improved cell with a part only of it porous, the other part being made by glazing or other means impervious to the passage of electricity or acids or liquid."

No. 9,531.—PINCKNEY FROST, of Springfield, Vt.—*Improved Mode of Fastening Scythes to the Snath.*—Patented January 11th, 1853.

This improvement consists in the peculiar construction of a set

ring B, which has a groove for the passage of the claw of the scythe, and a mortice for the admission of the loop-bolt. The loop-bolt has an opening or loop A, and the groove with a hook or lip which fills the opening in the set ring, on the side of the snath; the inside of the hook is bent firmly against the wood.

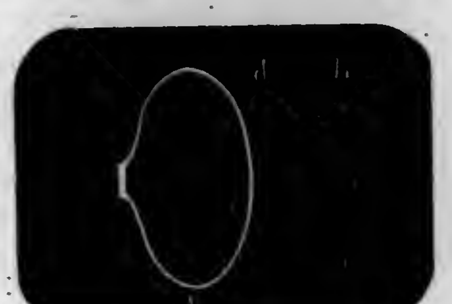
Claim.—"The peculiar construction of the loop and the set ring, with the grooves."

No. 9,532.—AMMI M. GEORGE, of Nashua, N. H.—*Improved Method of Hanging and Operating Circular Saws.*—Patented January 11th, 1853.

This invention consists in supporting and guiding a circular saw L, which is driven by friction applied near its periphery by means of a guard plate, M upon which is placed an arbor fitting a circular opening in the centre of the saw plate, and around which the saw runs, by which means boards or veneers may be sawed off almost equal with the diameter of the saw; H H, K K, are the friction wheels, seen in the figure.

Claim.—"In combination with a circular saw driven by friction near its periphery; the guard plate with its arbor, around which the saw runs, and by which it is held into the wood, and on which the board or veneer being sawed may rest, and relieve the saw from all friction."

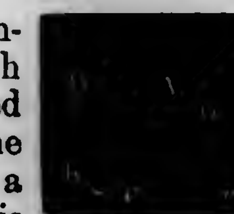
No. 9,533.—JOHN L. GILLILAND, of Brooklyn, N. Y.—*Improvement in Fire-polishing Glass.*—Patented January 11th, 1853.



The method usually pursued in the fire-polishing of glass consists in attaching the article to be polished by means of a piece of glass to the end of the ordinary punta-iron, inserting it in the fire and turning it around. The object of this invention is to obviate the necessity of injuring the surface of the article by attaching it as formerly to the ordinary punta iron. It consists in the use of a horizontal table D (see fig.), on the end of a hollow handle A, through which an arbor or shaft passes, by which rotary motion is communicated to the vertical arbor of the table by gearing (*g* is the crank); by means of which a glass lens or other article can be rotated in the furnace by the workmen, so as to receive the heat equally all over its surface without injury from the ordinary mode of attachment.

Claim.—"The method of fire-polishing glass, by means of a rotating table provided with a hollow handle, or its equivalent, and gear, by means of which the table can be rotated."

No. 9,534.—PETER P. R. HAYDEN, of New York, N. Y.—*Improvement in Buckles.*—Patented January 11th, 1853.



This improvement consists in the manner of connecting the two ends of the buckle, or wire of which the buckle is constructed, by means of a boss *a*, formed at each of the ends of the body A, of the buckle, the bosses being in contact with each other, and forming a bulb around which one end *b*, of the tongue B, is clasped. The end of the tongue which surrounds the bulb to prevent the tongue from slipping off of the bulb and to keep it in its proper place.

Claim.—Uniting the two ends of the body of the buckle by means of a boss formed at each of the two ends of the body, the bosses being in contact, and forming a bulb, around which one end of the tongue (having a recess or groove fitting to the bulb) is clasped.

No. 9,535.—SILAS A. HEDGES, of Lancaster, Ohio.—*Improvement in Carts for Spreading Manures.*—Patented January 11th, 1853.

This improvement consists in constructing a cart with two bodies, the front one of which is capable of being raised so as to discharge the manure into the rear one, by means of throwing a shaft (which is connected with the front end of it by a tackle) into gear with the hind axle at L; and in providing an inclined endless apron C, in the rear body A, which is also actuated by the hind axle, and so arranged with the tail-board that by means of a lever P, it is thrown into gear simultaneously with the raising of the tail-board O.

Claim.—The construction of a cart with two bodies, the front one of which is raised or tilted for the discharge of its contents into the rear one, by the action of the hind axle by means of an axle (to which the halyard is attached, having at one end a ratchet wheel) and tackle, when thrown into gear by means of a hand lever. Also the combination of the endless apron, the tilting body, and raising the tail-board simultaneously, with throwing in gear the endless slotted apron.

No. 9,536.—WILLIAM MANN, of Philadelphia, Pa.—*Improvement in the Manufacture of Copying Paper.*—Patented January 11th, 1853.

This invention or improvement consists in making a paper upon which writing with copying ink upon common paper, by pressure, will make a clear and distinct impression or copy. Manilla and cotton are to be used (instead of the materials hitherto employed in the manufacture of bibulous paper for copying) in equal portions.

Claim.—The copying paper composed of manilla fibre or the equivalent thereof, tempered with cotton or its equivalent.

No. 9,537.—Andrew Mayer, of Philadelphia, Pa.—*Improvement in Apparatus for cutting Screws on Pipes and other articles.*—Patented January 11th, 1853.

The object of this invention is to cut screws upon the ends of pipes or tubes without injuring the dies by twisting; and is attained by having the dies which cut the screws loose laterally between the plates which confine them, but not loose as respects the distance between the two plates which secure the dies. The reason for allowing this movement is to enable the dies to accommodate themselves (as the pipe or other article is turned to screw it) to any bends or irregularities which may occur in it. The lathe is so constructed as to admit of adjustment, and allow different lengths of pipe to be conducted to the dies.

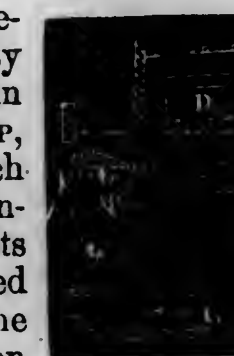
Claim.—Arranging solid dies between the side plates of a stock, in such a manner that they are free to play to a limited distance in a plane perpendicular to the axis of the bolt or pipe to be screwed, while they are at the same time incapable of revolution in the same plane.

No. 9,538.—Richard Montgomery, of New York, N. Y.—*Improvement in Steam Boilers.*—Patented January 11th, 1853.

This improvement consists in the method of constructing certain parts of steam boilers, and connecting the series of flues and water spaces with the roof of the fire-box; also connecting them at their opposite extremities with the smoke-box or the up-take. To accomplish this object, the rear margin of the fire-box is to be slit at right angles to its edge, so as to form a series of tongues which correspond in width with the adjacent water spaces and flues. The tongues, corresponding in width with the water spaces, are bent at right angles to the plane of the roof so as to extend downwards a short distance against the ends of the water spaces; the other alternate tongues are not bent, but project under the tops of the flues, which tops are formed from the sides overlapping. The whole is then secured by rivets.

Claim.—Riveting together the overtopping flanges of the opposite sides of sheet flues in steam boilers, whereby the flues are firmly attached each to each. Also the method of connecting a series of flues and water spaces with the roof or arch of the fire-box, by means of tongues which project from the latter, and are secured alternately to the faces of the water spaces and to the tops of the flues.

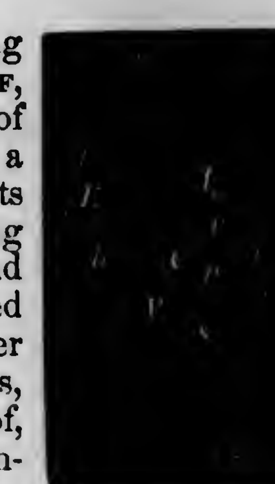
No. 9,539.—Dan Pease, Jr., of Floyd, N. Y.—*Improvement in the Smut Machine.*—Patented January 11th, 1853.



This improvement consists in construction of a receiver of the grain, as it comes with great velocity from the scouring cylinder A (see fig.). As the grain comes into the receiver it strikes upon a deflector F, and against a plane surface of the receiver; which causes it to fly in all directions, until its upward inclination is arrested by an adjustable top, and its downward inclination is arrested by an inclined ribbed bottom, which prevents the further spreading of the grain, and also gives it in an even state of distribution a downward direction towards the discharge head of the scouring cylinder, in which state of distribution it is kept until it passes through the wind-pipe and passes from the machine.

Claim.—The employment of the adjustable deflector (set at an angle to throw the grain in different directions) in combination with the receiver with an adjustable top, and the front piece set in a particular position in relation to the deflector. Also causing the grain to spread by making the top of the receiver adjustable to different heights.

No. 9,540.—Robert W. Andrews, of Stafford, Conn.—*Improvement in Power Looms.*—Patented January 18th, 1853.



The nature of this invention consists in operating each treadle, E (see fig.), by means of a mover F, having two outwardly acting cam surfaces, i, r, of unequal length, combined in one piece, in such a manner, that the position of the mover upon its arbor can be reversed, for the purpose of doubling its capacity for producing different movements and retentions of the treadles. Each treadle is curved so as to embrace its mover, and has on its inner periphery of its curved portion two projections, whose central points are located on opposite sides of, and in the same line with, the centre of the cam-shaft, and against which the cam surfaces of the mover act, in vibrating the treadle. Each mover has a central hub of the required thickness, and two cam plates outside of the same, each being of one-half of the thickness of the hub, and both firmly united. The outer peripheries of the plates are of the same radius, and respectively act against the shoes of the treadle.

Claim.—Operating each treadle by means of a mover having two outwardly acting cam surfaces of unequal length combined in one piece, and producing the movements and retentions. Also the form and arrangement respectively of the treadles and their movers; that the treadles can be reversed in their positions upon their fulcrums, causing a reversal of the movements and retentions of the treadles.

No. 9,541.—Charles S. Bauder, of Cleveland, Ohio.—*Improvement in Fastenings for Bedsteads.*—Patented January 18th, 1853.

This invention consists of the method of connecting (see fig.) the side rails and posts of bedsteads, by fastenings composed of metal bars, with projections on each end, the inner faces of which are sections of screws; these faces work against metal inclined planes, one of which is fastened in the post A, and the other near the end of the rail B; the joint being kept tight by the weight of the bed, which rests on a frame, G, which frame rests upon the iron bars or fastenings, thus forming a self-tightening fastening.

Claim.—The fastening of bedsteads by the use of metal bars, having upon their extremities arms with inner faces formed of sections of screws, which arms work against the faces of castings secured in the bed posts and the ends of the rails—the face of the castings being likewise constructed of sections of screws.

No. 9,542.—Dexter H. Chamberlain, of Boston, Mass.—*Improvement in machinery for reducing metallic bars into the shape of nails or other articles of like character.*—Patented January 18th, 1853.

This machine consists of two horizontal rollers applied (see figs.) respectively upon the ends of two parallel shafts, that are supported, in suitable bearings, by a frame. The end of one of these rollers A, has a grooved cavity, a, formed in it, and on its periphery; the cavity being wider at one end than the other. Against the cavity and the ends of the two rollers A B, a third roller, F, is arranged upon a vertical shaft, the periphery of which roller rests and rotates against the ends of the two rollers. In connexion with the two rollers so applied, is a bolster K, which consists of a block of metal curved to fit into the angularly shaped space between the peripheries of the two first mentioned rollers. This block of metal is fixed upon one end of a slide L, running parallel with the horizontal shafts (to which the two rollers are applied), so as to have a free endwise movement. From this slide an arm is made to project into a cam groove, cut around in the shaft (to which is applied one of the rollers) in such a manner as to keep the front end of the bolster on a plane with the reducing edge of the cavity during the rotary movement of the cavity against it. By means of gearings the three rollers are caused to move or rotate at the same time, with the same velocity.

Claim.—The combination of the bolster with the three rollers, as arranged and made to operate together. The bolster preventing the metal from splaying out, or squeezing between the rollers so as to form a fin.

No. 9,543.—Joseph Contner, of Milroy, Pa.—*Improvement in the Bridge Spring-Seat Saddle.*—Patented January 18th, 1853.

This improvement consists of a semi-oval upright steel or iron plate, fastened with its convex end up, by screws through its legs, to the under and inner part of the pommel; so that the hook on the front end of the centre spring may be fastened to it, to give additional spring. (See figure.)

Claim.—Connecting the bridge spring-seat D, to the pommel of the saddle, A, by hooking or fastening the hook on the front end of the longitudinal centre spring C, of the bridge spring-seat to the semi-oval or circular steel or iron plate or strap J, fastened underneath the pommel by screws or otherwise, through its legs, to the legs of the pommel, to give additional spring to the seat, and allow the seat to be disconnected from the frame when necessary, and also strengthen the pommel.

No. 9,544.—George Cook & David Cook, of New Haven, Conn.—*Improvement in "Working Circular Saws, &c."*—Patented January 18th, 1853.

This improvement consists of a hooked tooth pinion: the hooked teeth or leaves of the pinion *b*, mash into the rubber covering of the wheel E, to which the power is applied, and cause, when in operation, the rubber to fill the hollows of the teeth by reason of its elasticity.

Claim.—The curved or hooked tooth pinion, acting in the manner and for the purposes herein set forth.

No. 9,545.—Edward Everett, of Lawrence, and Thomas T. Thomas, of Lowell, Mass.—*Improvement in Hole-boards for Jacquard Looms.*—Patented January 18th, 1853.

This invention is designed to facilitate the operation of changing the relative position of the mail-cords or heddles in a jacquard loom when the number of threads in a given breadth of the cloth is to be increased or diminished. This improvement is confined to that part of the loom commonly called the hole-board A A.

Claim.—The sectional harness-board in combination with the movable supporting bars placed on each side of the frame, for the purpose of adjusting and retaining the harness-boards in the position required.

No. 9,546.—James S. Hogeland, of Lafayette, Ind.—*Improvement in Wool Condensers.*—Patented January 18th, 1853.

This improvement consists in applying to the delivery side of the ordinary "rub-rollers" of wool condensers "relief and guide rollers," which are so situated on the delivery side of the rub-rollers, as to relieve the slubbing from its tendency to adhere to the latter, and be carried out of the direct line of the spools.

Claim.—The method of detaching the ropings from the rub-roller, and guiding them on their passage to the spools, in such manner as to prevent them from being unequally deflected, and thereby unequally stretched, by means of a relief and guide roller.

No. 9,547.—John Griffiths, of Philadelphia, Pa.—*Improvement in Screw-cutting Machines.*—Patented January 18th, 1853.

This machine consists of a turned shaft, grooved longitudinally, and contained in a hollow mandrel, and made to revolve with the mandrel. The shaft is distinct from the hollow mandrel, in which it slides with ease. To the outer extremity of the shaft a screw collar is keyed, which revolves in two semicircular screw plates: the upper screw plate is keyed to a cap, and the lower to a bed; and both move upon a common joint. A cylindrical die having the same pitch as the screw collar is keyed to the extremity of the shaft. The cap and bed are made to approximate by means of an "elliptical piece," which is moved by a lever: the screw collar and plates are adjustable.

Claim.—The circular die with an offset which makes a cutting edge, which is held in position by a bolt and screw nut; the threads which are cut in its periphery being parallel, instead of having a running pitch.

No. 9,548.—John L. Kingsley, of New York, N. Y.—*Improvement in Metallic Gum Composition.*—Patented January 18th, 1853.

The nature of this invention consists in the process of preparing and using compositions made by grinding metals, earths, and other similar materials, with the raw or uncured gums of gutta percha and caoutchouc (India rubber). The composition to be used in making stereotype moulds and plates, &c.

Claim.—The making of stereotype moulds and plates of the raw or uncured gum combined with the pulverized oxides of iron and antimony, or their equivalents.

No. 9,549.—Jeremiah P. Smith, of Hummelstown, Pa.—*Improvement in Corn Shellers.*—Patented January 18th, 1853.

The shelling bars are made in separate pieces *e e e* (see fig.), and this improvement consists in constructing the second and third bar

with a bevel on the feeding end, to facilitate the discharge of the cobs. The straps are to prevent the shelling bars *e e e*, from coming in contact with the cylinder *d*. There are also springs which press the bars in such a manner as to shell either thick or thin ears. The screws are to regulate the spring.

Claim.—The bevelled spring-blocks or shelling-bars at *i i* in separate pieces, in the manner and for the purposes set forth.

No. 9,550.—Joseph W. Webb, of Aurora, N. Y.—*Improvement in Rotary Steam or Power Engines.*—Patented January 18th, 1853.

This invention consists principally in so constructing, arranging, and operating the steam-chest valves, exhaust chamber, and slides, with reference to each other, and with reference to the ports and cylinders, that steam may be made to operate *expansively* in the cylinders in a more convenient, effective, and economical manner than has hitherto. To accomplish this object a double engine is constructed, having two annular cylinders connected firmly to each other and stationary, but which do not communicate with each other. Each has its ports, strap, and piston, but so arranged that when the steam is exhausting from one cylinder it shall be operating with its greatest power upon the piston of the other, and *vice versâ*. Both cylinders receive steam from the same chest, but through different ports, governed by separate valves; and both exhaust into the same chamber, each through its own valve, and through an aperture in the top of the steam chamber, governed by slides, which are stationary when the engine is in operation, but shifted for reversing at the pleasure of the engineer.

Claim.—Making two exhaust openings, separate and distinct from each other, through each steam and cut-off valve; the valves having seats on the upper as well as lower side of the steam chamber, each of said exhaust openings communicating with the exhaust chamber, through apertures in the upper side of the steam chamber, which are opened and closed at pleasure by slides used in connexion with the valves for governing or reversing the engine.

No. 9,551.—Samuel Witherow, of Gettysburg, Pa.—*Improvement in a Corn Planter.*—Patented January 18th, 1853.

The nature of this invention consists in so arranging the spring-gauge slide as to prevent the breaking of the grains, when received into the cells of the revolving seeding cylinder edgewise, and so that the spring be adjusted to any required pressure, whether the hopper be full or otherwise. And the manner of adjusting the seeding tube, and supporting the drag-bar, to which it is attached, by passing the same through a slot in the neck of the mould-board.

To remedy the practical difficulty above referred to, in the drills heretofore in use, the inventor has constructed a box *g*, in the fore part of the seed-box, at suitable angles reaching down to the cylinder A; at the end of the tube is a roller, J, the bearing of which rests on the block, S. The spring T presses upon the block S, and consequently upon the roller, and that upon the grain. When the roller comes in contact with the grain, the spring allows the roller to rise, and the grain passes down into the furrow; the roller closes down again without injury to the grain.

Claim.—The spring T, slide S, and roller J, within a box or tube forming one end of the hopper, in such manner as to prevent any more seed from leaving the hopper than is required for planting. Also the arrangement of the drag bar under the plow beam, and passing through the adjustable hanger, and a slit in the neck of the mould-board, for the purpose of giving additional lateral support to it, and protecting it from the earth which runs up on the mould-board in turning the furrows.

No. 9,552.—John Bell, of New York, N. Y.—*Improvement in the Mode of Joining the Corners of Boxes, &c.*—Patented January 25th, 1853.

The nature of this invention consists in forming a joint, compounded of a double oblique tenon and corresponding mortises, at the corners of drawers, boxes, &c., as seen in the figure. The corners are prevented from coming apart when the lid or bottom is fastened on, thereby being secured in a manner superior to modes heretofore known. The lines of the tenons are parallel to each other, but drawn from both sides of a vertical line at the corner of the box, at an obtuse angle with the vertical line above the vertex of the angle.

Claim.—Joining the corners of boxes, &c., by means of double oblique mortises and tenons (which are parallel), so that neither the sides nor ends can be separated or displaced without previous removal of the top and bottom of the box.

No. 9,553.—James Black and Orson Beecher, of Philadelphia, Pa.—*Improvement in the Hydraulic Steam Pump.*—Patented January 25th, 1853.

This invention consists in connecting the top of the condenser with the valve box, between the induction and eduction valves, by a pipe with a check valve so arranged as to draw the air, &c., from the condenser. When the water is drawn down in said pipe by the diaphragm, the vessel is filled with water, and the air is driven out of said pipe through another check valve into the discharge pipe or elsewhere, by the water when it is forced up in said pipe as it is expelled from the vessel by the steam above the diaphragm, and thus the air is drawn from the condenser by a column of water, working the equivalent of an air-pump. Also in the arrangement of a pipe with a valve in it

leading from the bottom of the condenser to the chamber of the pump, so constructed and arranged as to draw the water from the condenser, into the chamber of the pump, by the action of the diaphragm or its equivalent, thus causing the water pump to work an exhaust-pump or *its* equivalent to the condenser, at the same time that it does its ordinary work.

Claim.—The pipes and valves, or their equivalents, so constructed and arranged as to draw the air, &c., from the condenser, and drive it into the discharge pipe or elsewhere, by the column of water in said pipe, operating by the working of the diaphragm, which causes said column of water to work the equivalent of an air-pump to the condenser. Also the pipe and valve or their equivalents, so constructed and arranged as to draw the water from the condenser by the raising of the diaphragm, thus causing the water pump to work an exhaust-pump or its equivalent to the condenser, at the same time that it does its ordinary work.

No. 9,554.—Charles Bourgard, of New York, N. Y.—*Machine for manufacturing Wigs.*—Patented January 25th, 1853.

The machine which constitutes this invention consists of a work-frame and its carriage, one or more needles, and the mechanism through which the work-table, carriage, and needle or needles, receive such motions in relation to each other as are necessary for the proper performance of the operation. The carriage is mounted on wheels which run on a suitable railway, and the work-frame is placed upon a double slide-frame, which rests on the carriage, and is adjustable longitudinally and transversely.

The work-frame is provided with means of securing the silk or other material into which the hair is to be inserted, and confining a suitable quantity of hair, which is laid on the face of the silk or other material. The needle is barbed and receives a reciprocating motion in a line perpendicular to the face of the silk, and passes through it from its back side catching one or more hairs as may be required, and drawing the root ends through the back of the silk or material. The carriage receives an intermittent rectilinear motion, which takes place between every two passages of the needle through the silk, so as to bring the silk or material to a proper position for the drawing through of the succeeding hair; by this motion the hair is inserted in rows.

The relative position of the hairs of each row is regulated by the double slide of the frame.

Claim.—"(For the purpose of making the partings or those parts of wigs and all articles of a similar nature where the artificial scalp or skin is visible and the surrounding parts) the employment of two or more adjustable slide-frames, for carrying the silk or other material into which the hair is to be inserted, and the hair to be inserted therein, in combination with a reciprocating hooked or barbed needle, either the frames or needle having such a movement as is necessary to insert the hairs at a proper distance apart."

No. 9,555.—Henry Britney, of Springfield, Ohio.—*Improvement in Tanning Leather.*—Patented January 25th, 1853.

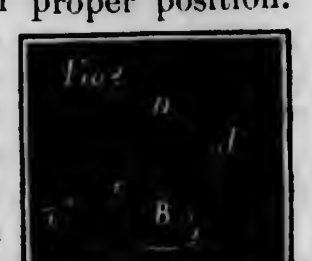
This invention consists of a tin vat (see fig.) in which is placed an upright shaft (which may be turned by horse or other power) with a series of arms projecting from it horizontally, about four inches apart. The hides are secured by one edge to the arms; and when the hides are attached, the vat is filled with liquor. When the shaft is put in motion the hides arrange themselves horizontally and parallel to each other, and the liquor can circulate freely among them, and cause them to be uniformly tanned.

The object of this invention is to expose the entire surfaces of the hides to the liquor simultaneously.

Claim.—Continuously towing the hides in separated layers through the tanning liquor, in such manner, that each hide made fast only at one edge or end to the towing mechanism, will be gently stretched and kept spread out by the resistance of the liquor, which is caused freely to circulate in contact with both sides of the hides, whereby every hide, of a quantity however large, is equally and constantly exposed to the action of the tanning liquor, and the stretching action upon the hides is adjusted.

No. 9,556.—Freeman Palmer, of Conneaut, Ohio.—*Improvement in Sewing Machine.*—Patented January 25th, 1853.

The inventor's improvement is in the feeding apparatus for shuttle sewing machines. Fig. 1 is a side view, showing the feeding-wheel B, with a flange *b*, upon its disk, and the cramp *d*, which grasps the flange *b*, but sliding freely along the same until acted on by the lever *c*, when it instantly binds firmly upon the flange, so that the feed wheel shall be carried forward by the arm *e*; the cramp *d* is kept in its place by a spring: Fig. 2 is a front view, showing these parts in their proper position.



The forward motion of the feed wheel, which gives the length of the stitch, is regulated at pleasure by a screw regulator, which allows the arm a longer or a shorter range. In the returning motion of the shuttle, one of the friction rollers strikes an arm placed on the end of a horizontal shaft, and acts on the feed wheel B, carrying the material to be sewed far enough forward for another stitch, which completes the operation.

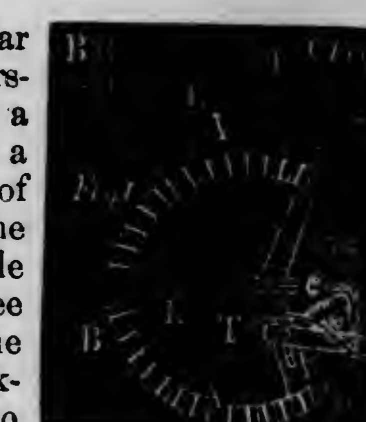
Claim.—The arrangement and combination of parts, by which the material to be sewed is carried under the needle, in a way to secure any required length of stitch; consisting of the shaft C, and the screw regulator Y, together with the lever and cramp *c* and *d*, upon the feed wheel B.

No. 9,557.—Samuel M. Perkins, of Springfield, Pa.—*Improvement in manufacturing Coats, &c.*—Patented January 25th, 1853.

The nature of this invention consists in forming the bat as it comes from the carding machine, on suitable "rollers" or "formers." The bat, as it comes from the machine, is formed into a coat or other wearing articles, by tearing out portions of it for the arm-holes; the arm pieces are torn diagonally across the middle of the bat to have the natural downward inclination of the fibre-like cloth. The arm-pieces and collar are tacked to the body of the coat by a few loose stitches: and the coat is then "shrunk" by a kind of felting process, and shaped, and dried over a block, when it is ready for trimming.

Claim.—The art or method of making seamless felt articles of use, and wearing apparel, by giving the batting of wool or fur the desired shape, and uniting its edges when required, with silk or any other non-shrinking equivalent, or by such shrinking threads or fibre as will resume their original state when dry.

No. 9,558.—William H. Lazelle, of New York, N. Y.—*Improvement in Apple-Paring Machines.*—Patented January 25th, 1853.



This invention consists of a semicircular stationary rack in combination with a traversing lever or handle, on which are mounted a wheel and pinion, and supports, sustaining a revolving fork, having a pinion on the end of its handle, mashing with the wheel on the lever; the prongs of the fork sustain the apple against a stationary, yet yielding knife T (see figs.), fastened to an arm, by which when the traversing lever L is pushed horizontally backward and forward, a rotary motion is given to the fork, thus making the apple rotate against the knife T, which acts upon it to pare or remove the skin in a perfect manner. When the apple is placed on the prongs of the fork, and the handle of the lever is drawn to the end of the rack A, by pushing the lever forward in a horizontal direction, the prongs of the fork will traverse a semicircle, and the knife will act longitudinally from the heel to the toe of the fork, or from the stem to the blossom end of the apple. The stationary spring knife, being made adjustable and flexible, is efficient and accommodating to the different shapes of the fruit.

Claim.—The apple-paring machine constructed with a stationary circular rack or way A, in combination with a traversing lever L, for operating the fork *c*, on which the apple or other article is placed, the handle having a pinion on it, which traverses the rack, and gives rotary motion to the fork, making the apple revolve against the swinging spring knife T, while the handle is pushed forward and backward in a horizontal direction by the operator.

No. 9,559.—J. Piffaut, of New Orleans, La.—*Improvement in Pianofortes.*—Patented January 25th, 1853.

This invention consists in so constructing the metallic frames of Pianofortes, that the inside frame, or that which supports the long bridge of the piano, may be raised or lowered at pleasure, and thus raise or lower the tone of the instrument, and at the same time keep up the general accord of the piano.

The frame to be made of iron or other metal. The movable or adjustable part A (see figs.), which supports what is termed the straight or long bridge, is connected to the frame. By turning the screw N, the rear end of part A will be drawn down, while the front which carries the bridge *a*, will rise: and the tone of the piano is raised or lowered by a reversed operation.

To raise or lower the tone of an instrument, and still preserve its accord, the coarser strings will require more straining than the finer ones. The operation is a constantly varying one, which no non-adjustable apparatus can provide for. For this purpose the inventor arranges besides the centre screw N (see fig. 2), one on each side of it and near the ends of the frame O P, which are similarly connected to the main frame in all respects as that at N. These screws are each provided with curved levers N, O, P, to which they are permanently fixed, so that by the turning of one, the other will move with it. These levers are connected together by connecting bars R, R, which are attached by screw bolts passing through slots in the levers, in which they are made adjustable, so as to make the coarser strings, when the tone of the instrument is to be raised, undergo a greater degree of tension than the finer ones; which may be done by increasing the length of the lever by means of its slot (and vice versâ), and thus preserve the accord. By turning the screw N, motion is given through the levers and contracting bars to the screws O, P; and consequently all three act simultaneously, and in that degree for which they may be set. There is a dial or indicator, upon which a hand on the screw P, marks the degree to which the instrument is raised or lowered. C represents pieces of wood with which the metallic movable part A, may be filled so as to better hold the pins *c c c*, which extend into them. F (fig. 1) represents the crooked bridge. The number of ribs may be increased or diminished, or so arranged as best to support or counteract the strain upon the wires. The movable part A has two motions independent of the frame; one horizontal, so that whilst the bridges cannot approach each other nearer than a given point, they may recede one from the other; the other motion is in the arc of a circle upward for straining up the wires.

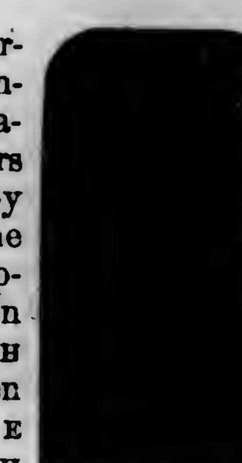
Claim.—In combination with the metallic frame of a piano-forte, the movable part which supports the bridge, and which is raised or lowered at pleasure, by means of a key operating through the screws and levers, or their equivalents, for the purpose of raising or lowering the tone of the instrument, and at the same time preserving its accord.

No. 9,560.—Josiah W. Archibald, Porto Rico, West Indies.—*Improvement in Draining Machine for Sugar.*—Patented January 25th, 1853.

This improvement consists in the use of bags, made of any kind of material, to be filled with sugar, and placed in the "Centrifugal Refining" sugar machine; to keep the sugar from attaching itself to the wire gauze, or perforated cylinder, when the machine is in motion, and is intended to save time, which is occupied (in operating the machine as heretofore) in scraping off the sugar from the wire gauze, or sides of the rotating cylinder, and in removing it from the same, which, by means of the bag, can be effected at once.

Claim.—The employment of a fibrous or flexible bag, made of cotton, linen, hair cloth, or any other substance, placed loosely, or secured by loops, as described in a centrifugal depurating sugar machine, inside of the wire gauze cylinder, and containing the sugar; the bag not being permanently attached to the machine by any screw or clamp, &c., but to be freely placed in and then lifted out of the machine entirely, when the sugar is depurated.

No. 9,561.—Abrather F. Potter, of Boston, Mass.—*Improvement in "Gold Washer."*—Patented January 25th, 1853.



The nature of this invention consists in a water-wheel L, placed in the tube H (see fig. 2), which conducts the water containing the metal into the apparatus; the wheel L being operated by water as it enters and descends the tube, so as to agitate the water by the motion of the wheel and the arms P P, fixed to the vertical shaft. This wheel may work an additional apparatus to wash the ore or metals before they come in contact with the mercury. The outlets of the tube H conduct the water containing the ore into the bath open at or near the bottom, in an oblique direction at E (see fig. 2); so that the water coming from the tube H acts in combination with the water which issues from the oblique and spiral apparatus, O, in a pipe which surrounds the bath, so as to give the mercury in the bath a rotary motion, and thereby brings all the water containing the ores more effectually in contact with the mercury

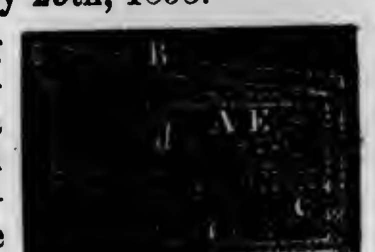
Claim.—A wheel or its equivalent arranged in the tube above mentioned, so as to be operated by the water containing the metals as it descends in the tube, so as to agitate the water by the motion of the wheel, whether it is made to operate some other apparatus or not. Also, the openings E F, or their equivalents, in combination with the openings, T T, or their equivalents.

No. 9,562.—THOMAS PROSSER, of New York, N.Y.—*Improved Expansion Drill.*—Patented January 25th, 1853.

This invention consists in a combination of mechanism for producing a continuous expansion in the cutting part of a chambering drill when in motion, and thereby enabling the operator to enlarge a hole previously made in metallic substances, within the thickness thereof, technically called chambering, without changing the cutter or stopping the drill. The cutter *b* (see fig.) is oblique to the axis of the drill. The cutter is set in motion by the bevel wheels *a* and *c*, which wheels can be worked by hand or otherwise.

Claim.—The combination of the inclined cutter *b*, with a screw cut thereon, bevel screw pinion, or its equivalent, and collar *c*, arranged so that by holding said collar, during the rotation of the drill, a continuous feed motion is communicated to the cutter.

No. 9,563.—PETER TALTAVAL, of Washington, D. C.—*Register for Omnibus Passengers, &c.*—Patented January 25th, 1853.



This invention consists of a shallow, oblong box, secured upon or in the position of the upper step of an omnibus, and is provided with a cover, hinged to it, and made to vibrate up and down. In the central part of the box is a compartment in which the device for operating the machine is arranged.

When a person steps upon the step B (see fig.), it depresses; the shank of the shaft is raised sufficiently to allow the lower ball in the tube to escape and fall into a drawer *c*, the key of which is kept by the owner of the omnibus. Each time the step B is depressed, a single ball is allowed to escape; and for each passenger two balls are dropped, one on entering and one in leaving.

Claim.—The springs, operated and arranged in combination with the inclined plane and escapement tube.

No. 9,564.—AUGUSTUS B. CHILDS, of Rochester, N. Y.—*Improvement in Winnowing Machines.*—Patented January 25th, 1853.

This improvement consists in a method of regulating the blast for

Fig. 1.

the second winnowing of the grain, by combining with the revolving fan, which generates the blast for both the first and second winnowing, a compensation supply valve M (see fig. 1), situate at some point intermediate between the fan and the place at which the grain is winnowed the second time; the operation of this valve being such that it can be opened to admit an increased quantity of air to supply the fan, whenever the fan demands more than could be drawn through the grain, without increasing the strength of the blast to such a degree as would endanger the carrying away of the sound grain with the impurities. Also in a self-regulating delivery valve, which prevents the admission of air while it opens to discharge grain, or impurities separated from the grain, and collected in any receptacle within the machine.

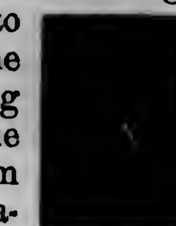


Fig. 2.

The valve box, N, is attached to the casing at the lowest line of the inclined bottom of chamber K. The upper part of the box communicates, by an aperture, with the chamber K; and the seeds which fall upon the bottom of the chamber run into the valve box, where, as a sufficient quantity of the impurities have accumulated in the box, it opens by the weight of its contents, without admitting air.

Claim.—Regulating the blast for the second winnowing of grain, by combining with the revolving fan, which generates both the first and second blast, a compensating supply valve. Also the self-regulating valve, which prevents the admission of air into the machine while it opens to discharge the impurities separated from the grain, and thus prevents an undue accumulation of them at the bottom of the air chamber.

No. 9,565.—CHARLES B. HUCHINSON, of Waterloo, N. Y.—*Improvement in machinery for Cutting Barrel-Heads.*—Patented Feb. 1st, 1853.

This improvement consists in the use of clamp rings to hold the wood for the head, and present it to be cut and dressed by rotating cutters. The wood for the head is placed in the clamp rings N N (see fig.), to present it to the rotating cutters *g g g* and K K K; the cutters being arranged upon a rotating disc and arms, as seen in the figure.

Claim.—The use of clamp rings, N N, to hold the pieces of heading, and hung in pieces on opposite sides, or in any equivalent way so as to be reversible; in combination with the adjustable rotating cutters (*g g g*), to cut and bevel the edge of the head, and with the face cutters, K K K, arranged upon the disc *g*, whereby the opposite sides of the head may be successively presented to the action of the cutting tools, and the head cut out and chamfered and face dressed, or cut out and chamfered only, at one operation.

No. 9,566.—ELIJAH F. PARKER, of Proctorsville, Vt.—*Improvement in the Construction of Frames for Lanterns.*—Patented February 1st, 1853.

The nature of this invention consists in making the corners (of lanterns) or pieces for holding the glass, mica, &c., in one piece, and thereby avoid the necessity of any soldering of these parts. The corner pieces of lantern frames, or those which unite the top and bottom, are made in one piece (see fig); *b* represents the corners, and *a a* the glass.

Claim.—The turning of grooved or sunken flanges upon the frames of lanterns, for holding the glass or its equivalent; so that, when the top and bottom are united, the flanges for holding the glass, &c., shall be already in place to receive it, without any further soldering.

No. 9,567.—GEORGE B. READ, of New York, N. Y.—*Improvement in the Screw Wrench.*—Patented February 1st, 1853.

The nature of this invention consists in having the shank D (see fig.) of the adjustable jaw E pass through a recess in the stationary jaw C, which is attached by a pivot to the end of the wrench stock. The shank D of the adjustable jaw is provided with a rack, into which a pawl, attached to the end of the wrench stock, catches.

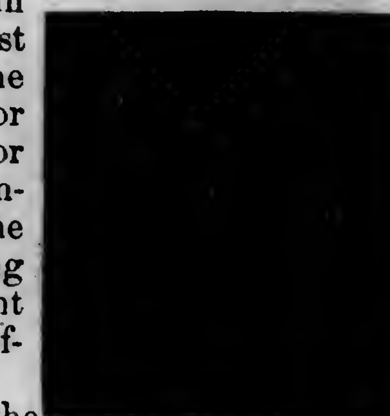
Claim.—The arrangement of the several parts, viz.: the jaw C being attached by a pivot to the stock A, and said jaw C having a recess through it, and through which the shank D of the adjustable jaw E passes, the shank D being provided with a rack, *b*, into which a pawl, F, attached to the end of the stock, catches, the pawl being kept into the rack *b*, by the spring *g*; by which arrangement the two jaws, E C, are forced against the sides of the nut as the handle of the wrench is turned, and the jaws made to bear or bind harder near the corners of the nut, thus preventing the jaws from slipping around it.

No. 9,568.—MATTHIAS STRATTON, of Philadelphia, Pa.—*Improvement in Portable Gas Apparatus.*—Patented February 1st, 1853.

The nature of this improvement consists in constructing a *stove, retort, and cooler*, all arranged so as to be *portable in the strict sense of the term*, which may be used for the manufacture of illuminating gas, from rosin or other suitable material.

Claim.—The construction of the stove with removable gates C C, in the ends B, for the introduction of the retort, and the movable section G, under the rosin holder.

No. 9,569.—BENJAMIN SHIVERICK, of North Sandwich, Mass.—*Improvement in the mode of feeding Rosin to the fires of Glass Furnaces.*—Patented February 1st, 1853.



This improvement relates to furnaces in which rosin is used as fuel. The rosin is first melted in a vessel or pot by the heat of the fire, and allowed to pass into the fireplace or chamber. The pot or vessel H (see fig.), for melting rosin, is in front of the flame chamber and directly over the fireplace; under the bottom of the pot is to be one or two sliding doors, or dampers, K, to regulate the amount of surface against which the fire may be suffered to act.

The interior of the pot is divided by the strainer L; the rosin is to be placed in the rear chamber *f*, and passes through the strainer into chamber *e*, thence through vertical strainer *g*, into chamber M; in which is a discharge tube which opens into the fireplace. This tube may or may not be surrounded by a strainer. In the upper part of tube *h*, there is inserted a long conical-shaped plug J, attached to a rod with a spring on the top of it, which can be regulated by a nut, *n*. The object of this mode of feeding rosin is to regulate the flow of the rosin down the tube, and freeing the tube from glutinous matter that may accumulate in it, which last operation is accomplished by pressing down the rod of the valve J, and is effected by the spring and nut *m n*: by removing the hand from the rod, the spring brings the rod back to its former position.

Claim.—The combining the long conical valve and the discharge tube, by means of a set screw and nut and supporting spring; whereby the flow of the melted rosin may not only be regulated, but when any interruption takes place, the attendant can readily remove it, either by lifting the valve, or pressing on it: the valve being subsequently removed back to its former position by the spring.

No. 9,570.—RICHARD SOLIS, of New Brunswick, N. J.—*Art of re-manufacturing Insoluble Rubber.*—Patented February 1st, 1853.

This invention consists in the art of re-manufacturing what is commonly known and called metallic vulcanized or insoluble rubber. The vulcanized rubber is cut into small pieces, and subjected to mastication by any suitable machinery; when ground to powder, it is in that state mixed with a paste made of ordinary India rubber and spirits of turpentine—equal portions of each. The inventor says that a good fabric may be made by the mixture of equal parts of the vulcanized rubber with the native rubber, and then dried in the sun and air without artificial heat.

Claim.—The manufacture of India rubber fabrics, by the mixture of ground or powdered vulcanized rubber with the ordinary India rubber of commerce.

No. 9,571.—ISAAC L. PULVERMACHER, of Breslau, Prussia.—*Improvement in Hydro-Electric Voltaic Batteries and Chains for medical purposes.*—Patented February 1st, 1853.

The nature of this invention consists in forming galvanic elements of a positive and negative metal, separated from each other, and combined and in contact with porous non-conducting substances, which porous substances will absorb and retain the existing fluid, and impart it to the metals to excite the electric action. Also in constructing various shaped chains. Fig. *a* is a chain composed of a series of elements linked together, each one of which is an electric pile; each link is a positive metal, with a flat plate of negative metal inside, and with a porous non-conducting substance, such as linen, cloth, leather, &c., interposed. The links are formed by placing the negative metal outside, and the positive metal inside. This arrangement presents certain difficulties (to wit: it does not present sufficient surface for producing electric currents), which are overcome (by the inventor) by making a hydro-electric chain, which becomes electric when brought in contact with the human body; when moistened with any diluted acid, it makes a powerful portable pile on a small scale (see fig. *b*). The element is composed of zinc and copper wire, coiled as a helix, and around a cone formed of small pieces of wood and copper wire inverted in a hole inside.

Claim.—Constructing galvanic elements of positive and negative metals, separated from each other by a porous non-conducting substance, when the porous non-conducting substance is surrounded and held by one or both of said metals. Also forming the galvanic elements by coiling, in the form of helices, the positive and negative wires in grooves previously made in the surface of an inner core of wood or other porous substance; so that when the wires are wrapped around in the grooves, they shall both be in contact with the porous substance within and separate from each other. Also forming a chain of a series of elements substantially such as herein described, by means of ties or links. And finally, the methods of interrupting the currents of electricity, by means of the spring vibrating conductor, interposed substantially as herein described for the purpose of breaking and closing the circuit by the movement of the human body, or other like motion.

No. 9,572.—JEAN BAPTISTE MOINIER and PIERRE HIPPOLYTE BOUTIGNY, of Paris, France.—*Improvement in purifying fatty materials.*—Patented February 8th, 1853.

This improvement, or discovery, applies to the treatment of fatty materials with alkalies. It consists in causing to pass through the mixture of fatty materials with alkalies, a strong current of sulphurous acid gas, which frees the mixture from impurities, and hardens it, so that a superior kind of candles or tapers will be produced there-

from. The residue is treated in like manner, successively, till the matter is entirely exhausted.

Claim.—The introduction and mingling of a current or currents of sulphurous acid gas, with mixtures of fatty acids and alkalies, preparatory to the process of being converted into candles, tapers, and other articles for burning; thereby causing them to burn with a stronger, clearer, and brighter light.

No. 9,573.—NATHANIEL A. BOYNTON, of Boston, Mass.—*Improvement in Hot-Air Furnaces.*—Patented February 8th, 1853.

Fig. 1 represents a vertical section of the furnace; and fig. 2 represents a top view of the hollow "wheel radiator." This improvement consists in the construction and the application of the hollow "wheel radiator," and the valve and valve-seat. G is the hollow rim of the wheel, which is provided with hollow spokes, M M′, L L′. H is the hollow hub; S the smoke-pipe; and A the outer casing of the radiator.

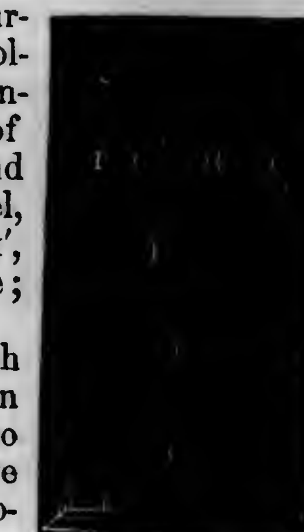


Fig. 1.

Claim.—The hollow wheel radiator, made with a hollow rim, hollow spokes, a hollow hub (open at top and bottom), and a valve and valve seat, so made and applied to the hub, that when the valve is closed it shall cause the heat and volatile products of combustion to pass through one or more of the arms, and into and through the hollow rim, thence out of the rim through the other arm or arms, and into the hub, and over the valve; and also so that when the valve is opened, the heat and volatile products of combustion may pass directly up through the hub, without first circulating through the hollow arms and rim.

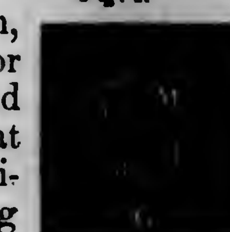


Fig. 2.

No. 9,574.—GEORGE CHASE, of Prudence Island, R. I.—*Improved method of hanging the sliding keel and rudder of vessels.*—Patented February 8th, 1853.

The nature of this improvement consists in providing a vessel with a stern post A (see fig.), which may slide up and down in guides or ways, and in attaching thereto the rudder B, also the rear end of the centre-board or keel (the front end being hinged by a pin D, or otherwise, near the bow); so that when the centre-board strikes in shallow water, or when it is raised or lowered for any purpose whatever, the rudder shall also rise or fall with it.

Claim.—Attaching the rear end of the movable centre-board and the rudder to the sliding stern post, so that the said centre-board, stern post, and rudder may be raised or lowered together. The sliding stern

post serving as an indicator to the positions of both the rudder and the centre-board.

No. 9,576.—John Filson, of Milroy, Pa.—*Improved method of Hanging and Catching Gates.*—Patented February 8th, 1853.

This invention consists in providing a device, by which a gate may be raised or lowered, and detained at any desired height, when obstructed in shutting by coming in contact with the ground, snow, or ice, or other obstructions beneath it; also in a contrivance by which the catch of the latch may be raised or lowered to suit the height of the gate. (See fig.) A, is the hinge post; B, the double-jointed hinge; D, the back post of the gate; E, the elongated rack hinge; F, the ratchet wheel: G, the pawl; R, the cog wheel working in the rack hinge. When the gate is lifted up, the rack forces the cog wheel R to turn with the ratchet, the pawl G preventing the turning back, keeps the gate at the point desired. The catch works up and down in a slot, O, in a metal plate, S, and can be set at the necessary point to suit the height of the gate and of the latch.

Claim.—The lower double jointed hinge, in combination with the apparatus attached to and constituting the upper hinge for the purpose of holding the gate at any inclination required.

No. 9,577.—George Peacock, of West Troy, N. Y.—*Improvement in Pipe Moulding.*—Patented February 8th, 1853.

The nature of this invention consists in providing a lozenge-shaped iron bar having, *a*, semi-circular or other shaped wings or projections on its lower half. The bar is termed *the core-bar*, and is fitted in a core-box *b*, and the sand packed and adjusted around it, the wings or semi-circular projections binding the sand, and causing it to adhere to the lower portion of the bar. The sand is placed over the upper portion of the bar, and rounded or shaped perfectly semi-circular by means of a sweep. The bar, when properly encompassed by the sand, forms the core. The core-bar may be so arranged as to be adapted to form cores for elbows, branch pipes, &c., Fig. *a* represents a perspective view of the core-bar, and *b* a top view of the core-bar in the box.

Claim.—The core-bar, B, having transverse wings or projections *a*, of semi-circular or other shape, corresponding to the shape of the article to be cast; said wings or projections permitting the sand to be rammed for forming the lower half of the core, and holding or binding the sand to the lower part of the bar, and allowing the upper part of the core to be made by the sweep. Also, the manner of anchoring the core-bar by means of the metal strips or bridges fitting in recesses in the upper surface of the core-bar, said bridges resting upon wooden supports, and having anchor rods bearing upon their upper surfaces; the liquid metal burning out the wooden supports, and allowing the core to be withdrawn, by which means the core is prevented from being raised or forced upward by the liquid metal as it is poured into the mould; and thus pipes of any length may be cast. Also, the manner of jointing the core-bars for forming cores for elbows or branch pipes, by means of wooden wedges which hold the bars together while the core is being formed; the wedges being burnt out by the liquid metal, and thus allowing the cores to be withdrawn.

No. 9,578.—Charles Peters, of Trenton, N. J.—*Improvement in Moulds for uniting Steel to Cast Iron.*—Patented February 8th, 1853.

The nature of this invention consists in forming a solid basis of iron, brick, or other hard material, to the mould, with an aperture therein of the shape of the steel or wrought iron sought to be welded; and thus, by means of the said aperture, subjecting the steel or wrought iron while in the mould to the fire, until heated to welding heat.

Claim.—The use of a solid base to moulds in which steel or wrought iron is to be welded to cast iron, with an aperture in the same, so that steel or wrought iron can be subjected to the heat of the furnace while in the mould.

No. 9,579.—J. F. Zimmerman, of Charlestown, Va.—*Threshing and Clearing Grain.*—Patented February 8th, 1853.

An essential advantage in this improved thresher is the straw deliverer, or vibrating table (says the inventor.) There are side pieces *h h* (see fig.), to which a table or straw-platform, *o, o*, is attached, having several saw-like parallel running strips *i*, attached to it at proper distances. The platform or straw-table, *o*, has a number of perforations or holes acting as a riddle or screen. To the table is attached a sloping bottom, S; the table and scoop hang by straps to allow it to move; the vibration is produced by a rod and crank in the ordinary way or manner; through several of the holes of the vibrating table *o*, pass curved prongs *q*, attached to a horizontal axle working underneath the platform. The saw-like teeth *i*, are used for the purpose of pushing the straw forward in its passage from beneath the concave thresher; and the curved prongs *q*, are used to beat the straw and shake out what grain may have been left by the thresher; and they fall through the holes in the table, upon the scoop S, and

from these upon the inclined plane R, into the screen or riddle, where it is acted upon by the current of the fan-blower U.

Claim.—The invention, use, and application of the perforated vibrating table, *o o*, arranged to a sloping bottom or platform *s*, and the parallel saw-like strips or straw-pushers *i*, combined with an oscillating rake, and straw-beaters or curved prongs *q*; the whole combined and working with the oscillating hinged standard and suspending straps, as shown in the figure.

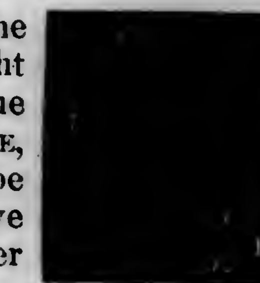
No. 9,580.—E. R. HALLAM and T. B. BARNARD, of New Haven, Conn. —*Improvement in Gas Meters.*—Patented Feb. 8th, 1853.

A is the external cylinder (see fig.), to the bottom of which is fastened an inner cylinder *t*, thereby forming an annular space *u*. B is a cylinder with a hollow ring, *w*, at the bottom, which serves as a float to counterbalance the weight of the cylinder B, the annular space *u* being filled with water or other liquid up to the line *x z*; *l* is the receiving pipe, through which the gas passes into the valve box, and thence into the cylinder B, through the pipe *u*; K is the delivering pipe, through which the gas passes from the space within the cylinder B, through the pipe *f*, or from the space above the cylinder B, through the pipe *m*, to the valve box *y*, and thence to the burners; *h* and *i* are the valves by which the gas is directed in its course through the pipes *g n f* and *m*; *c* is the beam that works the valves *h* and *i*, by means of the rods *a* and *b*; *e* is a hollow tube attached to the beam *c*, by a centre on which it can vibrate; *l′* is a bent wire for the tube *e* to strike against, when it is raised or lowered by the cylinder B, by means of the button *w′*, and cord *v′*; *c′* is a stationary bearer fixed to the cylinder A, and carries the beam *c*; B′ is the centre of the beam, *c*; E is a bracket carrying the end of the pivot B′. The quantity of gas passed through this machine is measured by the cylinder B, which may be made to work an index on the top of the machine.

Claim.—Constructing meters with one cylinder working within another, so that the gas passes alternately into the inner cylinder and out of the space above it, and then out of the inner cylinder, while the supply enters the space above it, the gas being changed in its course or direction by valves.

No. 9,581.—H. LE RIEMONDIE, of New Orleans, La.—*Improvement in Surgical Instruments for examining the Ear, Eye, &c.*—Patented February 8th, 1853.

The nature of this invention consists in the construction of such an instrument that the part to be examined may be seen by light reflected upon it from the interior of the instrument. In using this instrument, the lenses G (see fig.), and the reflectors I, must be

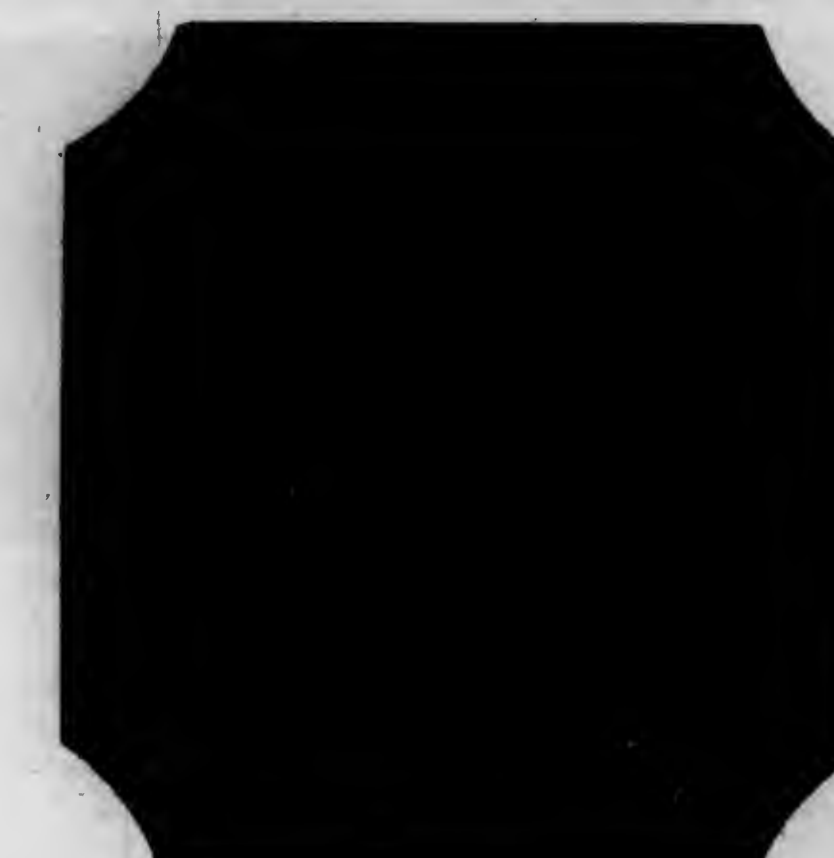


adjusted (which are made of silvered plate). The lamp C is lighted and put into the case A; the light is reflected by the concave reflector I, to the oblique plane reflector D, and from that to the reflector E, thence to the object examined at the end of the tube X, and then through the tube F, and lens G, to the eye of the operator. When the ear or nose, or other part, should be examined, the tube E is inserted.

Claim.—The construction of an instrument for examining the interior of the ear, nose, eye, or other part of the human system, by the combination of the reflectors I D E; the lens F; case A; tubes B H D; and lamp C.

No. 9,582.—HORATIO ALLEN and D. G. WELLS, of New York, N. Y.—*Improvement in Valve Gearing of Steam Engines.*—Patented February 15th, 1853.

This improvement consists in the mode of simplifying the arrangement of cut-off valves. This is accomplished by placing the rock-



shaft which carries the exhaust valve toes in the same plane with the valve stems, about midway between the upper and lower steam chests. To this rock-shaft, so placed, the exhaust valves' toes are permanently attached; under this shaft are placed the loose toes, or secondary toes, by means of which the steam valves are operated. Motion is given to raise the loose toes by means of an arm permanently fixed to the rock-shaft, and to lower them by means of an arm having its centre on the rock-shaft, and deriving its motion from any

part whose motion commences with or slightly precedes the motion of the piston rod.

Claim.—The combination of pawls with the two arms, whereby the valves are lifted and tripped.

Also, the combination of the arms provided with rollers, which, in their action, assist in transferring the pawls from one arm to the other, with the pawls and loose toes.

Also, the making the rollers adjustable, with reference to each other, by means of supporting them on independent arms, and connecting them to each other and the arms by means of a right and a left screw, whereby the point of cut-off may be altered.

Also, the mode of operating the loose toes by means of pawls and rollers.

Also, the mode of working the valves by hand, by means of toes supported on the rock-shaft.

No. 9,583.—John Briggs, of Boston, Mass.—*Improvement in Rail-Road Car Seats.*—Patented February 15th, 1853.

The essential feature of this improvement consists in a curved sliding seat, upon which the back rests, which slides in or out, and can be fastened in any desired position. The annexed figure is a sectional side view of the car seat: *e* is a groove in the side of the frame *a*, in which the bar *c* travels. This bar has notches on its under side; *g g* are foot rests. The curved bar *c*, and consequently the seat *b*, is kept in any desired position by the bent springs *h h*, attached to the top of the foot rests *g g*. The springs enter any of the notches *d d*, and hold the seat firmly. The spring by which the back of the seat is held, when open, enters a metallic socket *i i;* from which it can easily be relieved when the back is to be folded up, on the springs *k k*, attached to the outside of the back, being pressed upon.

Claim.—A seat sliding in an arc formed in the frame-work of the chair, and fastened in any desired position; whereby the back is made to follow the motion of the seat, in such a manner as to preserve a constant or nearly constant connexion and angle therewith.

No. 9,584.—Darius C. Brown, of Lowell, Mass.—*Improvement for knitting Weavers' Harnesses.*—Patented February 15th, 1853.

Claim.—Fliers constructed with a spring-nose or its equivalent, so as to yield the twine when the needles draw the stitches into the rest, and to take up the binding twine, or draw it tight when the stitches slip off of the needles. Also, the apparatus, or its equivalent, for shoving the eyes off of the rod, consisting of the cam, slides, rod,

lever, &c. Also, the revolving spring-nose flier or its equivalent, in combination with the needle or its equivalent.

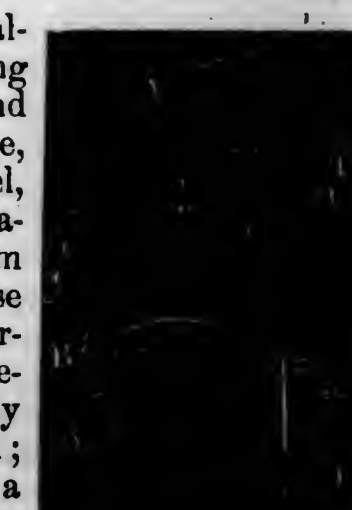
No. 9,585.—Joshua C. Cary, of Richmond, Va.—*Improvement in Spike Machines.*—Patented February 15th, 1853.

The nature of this invention consists in sustaining the heading lever upon a movable fulcrum, so that it shall be capable of a nice adjustment, so as to throw the fulcrum of it to any point inside or outside of a vertical line, drawn touching the plane of the face of the griping dies or at a right angle to the spike rod, whereby the machine is enabled to bend the end of the rod up or down or otherwise, according to the adjustment, and effect the heading of the spike in either direction, in one single motion upon its fulcrum.

The figure shows a section of the machine. F is a heading lever, moving on an axis G, which can be adjusted by set screws I I. If the fulcrum is adjusted inside of the dotted line H H, the machine will effect a heading of the spike upward; and if adjusted outside of said line, the heading will be effected downward. The dotted lines B B represent the lever working the movable jaw.

Claim.—Sustaining the heading lever upon a movable fulcrum, so as to be capable of adjustment to the requisite distance, inside or outside of the vertical line drawn, touching the plane of the face of the griping dies, for effecting the heading of the spike either up or down or otherwise, in one single motion upon its fulcrum.

No. 9,586.—Richard M. Leslie, of Philadelphia, Pa.—*Improvement in Paging Books.*—Patented February 15th, 1853.



This invention consists in two pairs of metallic wheels, each wheel having a flange of spring sheet metal, from one to two inches wide, and cut into slats from the outer edge of the flange, in as far as the outer edge of the solid wheel, thereby cutting the entire flange from the diameter at a tangent into spring slats of uniform size. To the upper surface of each of these slats is cemented a copper type forming permanent numbers from 1 to 1,500, as may be required. The wheels are supported horizontally by two metallic tubes, about six inches high; the lower end of the tubes is attached to a brass plate, which lies on and is secured to a table or bench; these wheels have an axle or rod which passes

through the tube to a ratchet wheel, and is secured to its centre by a nut and screw. This ratchet wheel is propelled under the table which revolves the slat wheels A and B, the distance of the width of one of these slats. Between the two pairs of slat wheels elevated above the table are two upright metallic posts, elevated at an equal distance above the table, with two arms extending from each post to a position immediately under two spring slats of each wheel, which are about to be pressed upon for the purpose of printing the numbers contained thereon, and to which slats they rest as supports. To each of these arms there is a frame T, made of spring sheet metal, for placing the corners of the leaves of books, &c., when about to print the numbers thereon. There is a hole in the bottom of the frame, through which the type protrudes when the frame is pressed down underneath each of these frames; and fastened thereto is a knob which presses upon the slat immediately following the one in use, which prevents the frame from rubbing the ink off of the type to be used. Each of these metallic posts has a pair of sliding arms for the purpose of pressing the corners of the leaves that are in the frame upon the types or numbers about to be printed from. These arms are raised or lowered by means of a rod, S, fastened to them, which, passing down through the table, is secured to and works by a treadle. There are two pairs of inking tables, U U U′, and inking rollers moving thereon located between the two pairs of slat wheels in the rear of the arm posts, each table being level with its opposite flange, and having a ledge underneath each flange for supporting the slats as the inking rollers pass over them when inking the type; on the wheel A B there are four inking rollers, propelled forward and back by means of a rod attached to them running down and secured to the treadle by which it is worked. T is a metallic spring frame for placing the corners of the leaves upon when about to make the impression; it has a hole in the bottom for allowing the type to protrude through, when the leaves and frame are pressed down by one of the arms R. U U are inking tables; W, inking rollers.

Claim.—The spring slat type wheels made after the manner, and operating for the purposes described. Also, the combination and arrangement of the spring slat type wheels, the adjustable posts S, sliding arms R, spring frame T, inking rollers W, with their tables U, and the rod K, with its ratchet and pawls, whereby one side of four pages may be numbered at a single movement of the treadle.

No. 9,587.—Louis F. Sheppard, of Alhambra, Ill.—*Improvement in Artificial Teeth.*—Patented February 15th, 1853.

The nature of this invention consists in the application of a suitable metallic plate to the back and masticating portion of the tooth or teeth, so as to protect them more effectually against injury in use, the plate being so constructed as to cover the ends of the teeth which perform the chewing; and the back of the teeth may be partially or entirely covered, as may be most desirable, to connect the covering of the ends to the plate to which the teeth are fastened, and which

connects them together; the ends of the teeth being fitted to receive the metallic plate by grinding or otherwise. (See fig.)

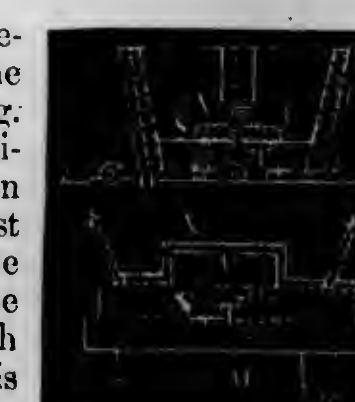
Claim.—Extending a suitable metallic plate over the masticating portion of artificial teeth, to protect them more effectually against injury from use.

No. 9,588.—Rand B. White, of Mendon, N. Y.—*Improved Saw-Setting Machine.*—Patented February 15th, 1853.

This improvement consists in the construction of a machine for setting saw-teeth to any required angle, and with uniformity of angle, by means of a spring hammer *c* (see fig.), attached to the handle or spring D, so that the blow of the hammer is regulated by the spring, and strikes each tooth with equal force. The spring D is operated upon by a cam on the shaft N. The tooth-gauge O P Q, or spring, takes hold of every other tooth, and draws the saw back into the required position to receive the blow from the hammer, striking against the upright F; the tooth-gauge being operated by a cam L, on the same shaft N by which the hammer is drawn back, the teeth of the saw are always brought into the required position by means of the set screw H, and the wheels S S S S, so as to receive the blow of the hammer, and thus the teeth are all set even and alike.

Claim.—The combination of the spring hammer *c* and D with the tooth-gauge O, P, and Q, operating in the manner and for the purpose described.

No. 9,589.—David Wolf and Herman Wolf, of Lebanon, Pa.—*Improvement in Seed Planters.*—Patented February 15th, 1853.



This improvement appertains to the arrangement of clearers T (see fig.), for keeping the openings in the slide or slides O from choking. The clearer T moves up and down in a vertical opening in the bridge S, being held down upon the side by a flat spring U, bearing against the upper end of the pin; so that as the slide reciprocates, or moves back and forth, the clearer rises and falls, forcing the seed through and keeping the apertures from choking. This spring is covered with a cap V, which prevents the seed in the hopper from coming in contact with it. The lower end of the clearer is rounded so that it rises out of the seed aperture, whilst the spring U will again force it down; and in this way the clearer is made to serve an important office in the machine.

Claim.—The movable clearer T, arranged and operating in the manner and for the purpose described.

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No. 9,590.—Hezekiah Bradford and Elisha Fitzgerald, of New York, N. Y.—*Improvement in Apparatus for Separating Ores, or other substances, of different specific gravity.*—Patented February 22d, 1853.

This improvement consists in giving (by machinery) to a pan (suspended, and slightly inclined or curved upwards) a motion resembling that given by hand, in separating copper ore on a shovel, in the operation called vanning. The pan is suspended to pendulous rods, and caused to have a vibrating motion. Its backward motion or movement is made in a shorter space of time than its forward motion. A current of water is caused to flow into the pan. (See fig.) *w*, *g*, and *r* are the rods for vibrating the pan *m*. The substances are raised by the endless belt and buckets *b*, and carried through funnel *f*, provided with a whirl *h*, into trough *k*, and from that upon the pan *m*. The water passes through r, and carries back those substances which have less momentum than the particles of the greatest specific gravity, which overcome the current and are discharged over the front end. The lighter particles, which are overcome and carried back by the current, are discharged through a series of holes *i* in the bottom of the pan. Besides the vibrating horizontal motion, the pan has also an upward and downward motion at the same time.

Claim.—Giving to the reciprocating pan the peculiar motion above described. Also giving to the pan the back movement in a less period of time than the forward movement, by means of a crank or cranks, whose axis of motion is below or above the plane of motion of the rear end of said pan, or by equivalent means. Also, in combination with the pan having the motions or either of the motions specified, and on which the ore, &c., mixed in water, is supplied at some point towards the middle or back, the employment of a current or currents of water, descending the inclined or curved surface of the pan. Also, making the rear end of the pan with an inclination, or curve upwards. Also, making the pan (operated as specified) with apertures back of the place where the substances to be separated are supplied. Finally, making the front and rear ends, or either, of the pan (having the vibrating motion) with a gradual curve downwards, substantially as specified, when the same is employed in combination with currents of water.

No. 9,591.—Alexander A. Croll, of London, England.—*Improvements in Gas Meters.*—Patented February 22d, 1853.

The object of these improvements (in the gas meters known as "dry gas meters") is to prevent the flickering of the light, so commonly resulting from the use of this kind of meter; and the production of an accurately registering apparatus. This meter has two movable partitions B (see fig.), giving motion to two axes *e e*, which

work the valves and the registering wheels. Accuracy in measuring gas is obtained by employing as large a disk of metal, and surrounded by as narrow a margin of flexible material, as possible.

Claim.—The mode of arranging movable partitions or plates B, so that the flexible material at the circumference of the plates shall not be bent, but in one direction. Also, the arrangement of the arms, with the valves and movable plates B of a dry meter, as set forth.

No. 9,592.—William H. Johnson, of Granville, Mass.—*Improvement in Sewing Machines.*—Patented February 22d, 1853.

This invention consists in making a seam, or uniting two pieces of cloth, by means of the peculiar double loop-stitch; the loops of the stitch being made upon one side of the cloth, formed from two continuous threads, by the use of two needles with eyes near their points, one of the needles carrying its thread through the cloth, and the other working entirely on one side, the needles passing alternately into loops formed in their threads, thus forming the double loop-stitch on one side of the cloth. The needles and feeding arrangement being moved by cams driven by suitable mechanical devices. The figure shows the double loop-stitch produced in the manner above described.

Claim.—Making the double loop-stitch, having the loops upon one side of the cloth, by means of two needles combined, &c. Also, making a seam, or uniting two pieces of cloth, by means of the double loop-stitch from a single thread on one side, and on the other of a continuous chain, formed of a succession of double loops from the threads.

No. 9,593.—Alpheus Kimball, of Fitchburg, Mass.—*Improvement in Scythe Fastenings.*—Patented February 22d, 1853.

This invention consists of a small metallic plate (with two or more openings for the claw of the scythe) fastened on to the snath near the end of it: the snath being first made flat upon one side in a suitable manner; and of a ring with an opening at the end of the snath to admit the shank. The ring, which is also attached to the snath by screws, has a projection on the lower part of it with a screw in it, which may, by means of a wrench, be raised or lowered. When the claw of the scythe is introduced, the screw is raised against the lower side of the shank, and this secures it in a substantial manner.

Claim.—The method of securing the blade of the scythe to the snath, by passing the shank of the scythe through the end of the stationary metal cap B, and securing it by means of the upward pressure of the screw K, in combination with the claw *r*, and bush piece *m*.

No. 9,594.—William Sterling Lacon, Yarmouth, Eng.—*Improvement in Suspending, Lowering, and Liberating Ships' Boats.*—Patented February 22d, 1853.

The object of this invention is to suspend ships' boats at the sides or stern of the vessel, that, in case of any sudden emergency, they may be readily lowered and put to sea without the risk of the tackles which connect the boats to the ship retarding the operations of lowering and floating them clear of the ship. In lowering the boat the lever *l* is first pulled forward (see fig.), in order to make the friction strap *k* retain its hold of the friction pulley *h*, and thus prevent the premature revolution of the shaft *f*; on loosening the friction strap *k*, the boat will descend; and by means of this strap the boat can be prevented running down too fast.

Claim.—Suspending ships' boats by having the chains or ropes so connected with drums or barrels, that the two ends of the boat shall descend together, and with equal or nearly equal velocity; and so that the chains or ropes shall be free to disengage themselves from the barrels; in combination with the mode of controlling the turning of the barrels by the weight of the boat.

No. 9,595.—James Moreland, of Adrian, Mich.—*Improvement in Mortising Machines.*—Patented February 22d, 1853.

The pitman rod *d* (see fig.) is made to extend down, and is jointed to a noddle iron *e*. The pitman has a strap, *o*, extending down from the upper part, by means of which it can be elongated, whereby the chisels can be used for several inches longer before they are worn down and must be removed: below the point *o*, the pitman divides into three branches. The cross-heads slide up and down on V-shaped ways *f f*. It has a bar *e* across its front; to this bar the slides working the chisels are connected; on either side is a guide frame *h*; *i* is a projection at the upper end of the slide, which causes the slide to move to a certain point.

Claim.—The combination of the cross bar *e* on the cross head, with the projecting dog *i* on the movable way, for the purpose of withdrawing the chisel from the wood, on the back motion of the cross head.

No. 9,596.—Amos B. Taylor, of Mystic, Conn., and Stephen Wilcox, Jr., of Westerly, R. I.—*Improvement in "Let-off and Take-up" motions for Looms.*—Patented February 22d, 1853.

The object of this improvement is to keep the warp and cloth at a uniform tension, and make the cloth of even thickness.

Claim.—Effecting and regulating the let-off motion, by the variable counterpoise lever in combination with the sliding-worm pinion, when the worm pinion is acted on by the yarn-beam through a direct strain communicated to it by the tension of the warp; the whole arranged and combined in the manner specified.

No. 9,597.—Lauren Ward (*Admr. of Richard Ward, dec.*), Jerome B. Hubbell, and Hart C. Hubbell, all of Naugatuck, Conn.—*Improvement in Machinery for Turning Irregular forms.*—Patented February 22d, 1853.

The cutter wheel B is made of a series of separate metal rings, and secured on a shaft; the cutters *b*, *b*, *b*, *b*, are attached to the periphery of the circle, and are adjustable. The pattern developed on the surface of the wheel will be the reverse of the pattern to be turned.

Claim.—The use of a cutter wheel for turning irregular forms, the cutters being so arranged that the pattern may be disclosed in reverse on its surface, when combined with the feed-motion, so that in turning the cutter wheel the desired irregular shape will be given to the article, without using guides or patterns; when the whole is constructed, arranged, combined, and made to operate substantially as herein described.

No. 9,598.—A. N. and A. Case, of Gustavus, Ohio.—*Improvement in Bedstead Fastenings.*—Patented March 1st, 1853.

The posts and rails of the bedstead are secured together by fastenings as represented in fig. *y*, A representing the rail, A' the post, and B the tenon; on the end of the rail is screwed the ratchet D (fig. *x*). Any degree of tension (says the inventor) can be given the cord, by turning the side or end rails A in the proper direction. The tension of the cord is retained by the pawl K. When the bedstead is disjointed, the rails

are raised so as to allow the head of the tenon to be withdrawn through the hole J of the piece G (see fig. 2), and fastened into the post A.

Claim.—The combination of the inclined plane H and head J with the pawl and ratchet D and K, for the purpose of fastening bedsteads and tightening the cord.

No. 9,599.—AUGUSTUS C. HARIG, of Louisville, Ky.—*Improvement in Swivel-Nibbed Keys for Door-Locks.*—Patented March 1st, 1853.

The object of this invention is the arrangement and construction of the key in such a manner as that the key proper by which the lock bit is moved is not presented on the outside of the lock, and consequently no opportunity is afforded for the application of pick-lock instruments to outsiders.

Figure 1, side view of the key, with shaft and bits *e* and *d*.

Figure 2, side view of the main bit *c*, and guard bit *d*, with the latter revolved half round on its axis or tenon, and showing the position of the grooves in the latter for the reception of the annular collar.

Figure 3, transverse section through the main bit, safety guard partially revolved.

Claim.—The guard-nib *d*, attached to the swivel-nib, in combination with the ordinary bit and shank of the key.

No. 9,600.—JAMES MCKAY, of Philadelphia, Pa.—*Improvement in Rotary Steam Engines.*—Patented March 1st, 1853.

This improvement consists in having the exhaust passages for the steam entirely encircling the cylinder, so that it is kept hot by the exhaust steam. Also, in having additional exhaust passages which act in conjunction with the usual exhaust passages. Also, in the combination of the sliding pistons, and self-adjusting valves and steam ways, which admit the steam behind the piston, to act as a spring to press the piston into the steam space. Also, in having the two cylinders in radial axial journals, arranged at right angles, so that the cylinders accommodate themselves to each other.

The above description substantially sets forth the claims of the inventor.

No. 9,601.—JONAS SIMMONS, of Cohoes, N. Y.—*Improved Machine for making Axes.*—Patented March 1st, 1853.

The object of this improvement is to accomplish the most difficult part of the process by machinery at one operation. A bar of iron is forged (of the shape shown by figure 1) of the proper width for

the axe, but somewhat thicker than would be necessary if the work was to be completed under the hammer.

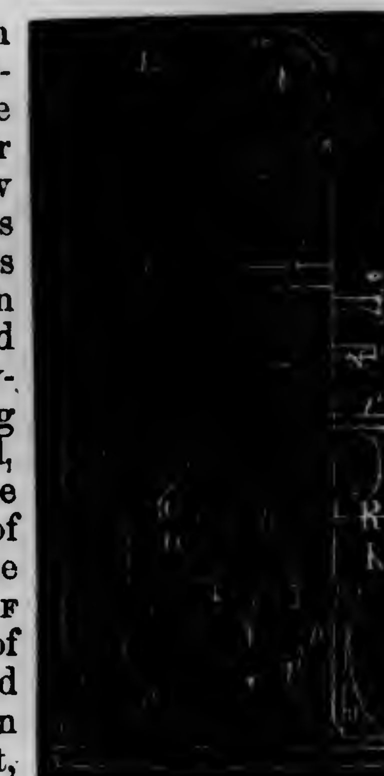


Fig. 1.

The rolls being placed in the position shown by fig. 2, the bar *p'*, heated to a welding heat, is laid on the rolls, with its centre supported by the rest-bar *f*, with the eye-bar N lying above it. The machine being now put into operation, the frame F (fig. 1) moves downwards, turning the rolls inwardly towards each other: the bars *f* and N carrying down between them the bar, the iron closing around the eye bar (as shown in fig. 2, No. 2), and having its edges kept separate by the scarfing bar *r*. As the frame progresses downward, the bottom *c* of lever O tripping against the stop *d*, draws the eye bar out from the eye of the axe (as shown in No. 4), when the axe falls from the rest bar, just as the frame F ceases to move downward. The motion of the frame is now reversed, and it goes upward until the rest bar *f* has reached its position again. When the frame reaches this point, the detent *n*, which has been kept back by the pressure of the lower extremity of the frame at *p*, drops into its notch in *h* and holds the rest bar *f* still, whilst the eye bar N goes up with the frame and then descends with the frame again. The object in permitting the eye bar to move up whilst the rest bar stands still, is to allow time and space to lay a fresh axe bar in place of the one just made into an axe. As soon as the frame descends low enough to bring the bars into position, in which they grip the axe bar as in a vice between them, the lower point of the frame *f*, pressing at *r*, throws the detent *m* out of the notch at *n*, when the spring *j* forces the bar *h* forward with the stops K K into the side necks *t t*, so that the frame in its further downward course carries the rest bar and eye bar down together with the axe bar between them through the rolls, till the axe is dropped from the rest bar. As the lever O ascends with the frame F, and its lower extremity is released from the stop *d*, the spring *e* forces the eye bar out for service.

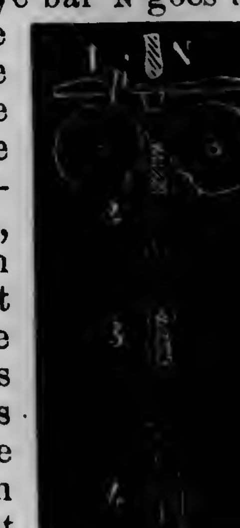


Fig. 2.

Claim.—The arrangement of the several devices above mentioned for making axes, viz., rolling dies, with a rest-bar to support the iron whilst being rolled, and an eye-bar, arranged not only to serve as a mandrel to shape the eye of the axe, but with the rest bar to hold the iron firmly during the process of rolling, the rest bar and eye bar being connected with the machinery to give them appropriate movements to cause them to co-operate with the rolls in shaping the axe, and these parts further in combination with a *scarfing-bar* for the purpose of shaping the blades to receive the steel point, in order to complete the axe.

No. 9,602.—Charles A. Spring, of Kensington, Pa.—*Improved Supplement Valve in Reciprocating Steam Engines.*—Patented March 1st, 1853.

The object of this improvement is to equalize the pressure of the steam in the cylinder and boiler, and protect the engine against strains, and insure a more equable motion, &c. *g* (see fig.) is the valve which opens towards the cylinder (see arrow), in such position in the steam boiler lid, that it will open by the pressure of the steam in the boiler, to permit the steam to pass from the latter into the cylinder; but whenever the pressure on the side next the cylinder becomes greatest, and steam begins to return to the boiler, then this valve *g* will close, and arrest the reflux, so that whatever force is exerted in compressing the steam in the cylinder before the piston, as it approaches the end of the stroke, will be given out again on the return of the piston, to aid in accelerating its motion; so that the force required to arrest the momentum of the moving parts at one stroke is borrowed from that stroke and added to the next.

Claim.—The arrangement of a valve in the lid of the steam chest, between the cylinder of a steam engine and the boiler, in such a manner that it will prevent the reflux of the lead-steam, by closing whenever the pressure of the steam in the engine exceeds that in the boiler, and opening again whenever the pressure in the boiler is greater.

No. 9,603.—William Townshend, of Hinsdale, Mass.—*Improvement in the Construction of Looms.*—Patented March 1st, 1853.

This improvement consists in an arrangement "whereby the harness and treadles are moved with greater certainty in all kinds of figured weaving, and with less machinery than heretofore employed; also the picking motion for throwing the shuttles is simplified, the warp is allowed to be drawn off the yarn-beam with more certainty and regularity, and the take-up motion for the cloth is more effective, simple, and cheap. The selvages of the cloth are formed by a peculiar arrangement of levers to work the sheds of the warp."

Claim.—The cam wheel on the chain shaft, right angle lever, and staples or side bolts combined and acting as described, to bring the picking motion into operation alternately on each side by the backward motion of the lay. Also, actuating the picker-staff by the lay, on its backward motion, by means of the vibrating studs, when combined with levers attached to the swords of the lay and the bent levers, the whole arranged and combined. Also, the levers connected together by the adjustable pin, so as to give greater or less motion to the selvage warp, when actuated by the cam. Also, the apron or straps connected to the bar, and kept to the cloth by the proper weight or power, so as to cause sufficient friction to wind the cloth on the

cloth-beam, when said apron and bar are moved or actuated from the lay, or otherwise, so as to produce the effect.

No. 9,604.—E. Sumner Taylor, of Cleveland, Ohio.—*Improvement in Bedstead Fastenings.*—Patented March 1st, 1853.

By reference to the figure, the claim will explain the operation and arrangement of this improvement.

Claim.—The combination of the pawl and ratchet with the spiral grooved section H I attached to the tenon G, arranged and applied as follows, to wit: the tenons of one side rail and one end rail being furnished with the plates having the spiral groove turning to the right and left, in the direction of the arrows, and making a tight joint with the post, the other side and end rails having on their tenons a groove passing around the tenon at right angles to the axis, and fitting the pins, so as, by having one side of the tenon on each end flattened, to enable it to pass the pin in order to allow it to enter the groove; when, by turning in either direction less than a complete revolution, the pin fitting into the groove prevents the posts and rails from separating; and by attaching the ratchets to the end of this side rail, and one end of the end-rail with the pawl attached to the posts, by tightening the cord the whole frame of the bedstead is held firmly together, by the combined action of all the parts described; one end-rail and one side-rail turning, as described, to tighten the cord, both being secured by the pawl and ratchet.

No. 9,605.—William Wheeler, of Troy, N. Y.—*Improvement in the Construction of Curry-combs.*—Patented March 1st, 1853.

This improvement consists in substituting "thumb-loops" instead of handles as they have hitherto been made. The drawing represents a top view, and a side view.

Claim.—The application of a ring-loop, or fixture on curry-combs, for the insertion of the thumb as a guard and rest therefor, the ring or loop being made in one piece with the back strap.

No. 9,606.—Seth Adams, of Boston, Mass.—*Improvement in Printing Presses.*—Patented March 8th, 1853.

The figure represents a longitudinal section of the press. The pinion 29 on the fly-wheel shaft gives motion to wheel 28; on the shaft of which there are two impression-cams 15, 15, one of which is shown in the section. On the same shaft is fixed also cam 16 for moving the

inking rollers over the type. On the inking cylinder is placed the vibrating ink-distributing roller *h*, and the feed inking roller *z*. From roller *i* the ink is taken to ink rollers *g g*. These rolls are moved up and down over the type *s*. The rolls *g* give direction to the paper into box K, as it comes from the platen and passes between rollers *g*. 7 is a gauge, against which the paper is placed for the purpose of registering it. This guage is put upon a rod, and rests upon the platen *b*, during the time platen *b* is at rest and while *b* is going up to give the impression to the sheet; but when this platen returns to its place of rest, this gauge is caught by a catch, and held suspended

till the paper which has been printed on the platen *b* is carried downward by the motion of the tympan-cloth to the two rollers *g*, when it is taken between them and carried to the box K. In order to carry the sheet down to the rolls *g*, the tympan-cloth 30 on the platen *b* is moved downward as follows, viz.: The tympan-cloth 30 is connected by belts to the segment *a* on shaft M. When the impression has been given and the platen *b* is returned to its place, the catch catches into a ratchet, thus turning shaft M and segment *a* and giving motion downward to the tympan-cloth 30, which carries the sheets with it to the "take-off" rolls *g*, between which rolls the sheet is taken and conveyed to box K. *c* is a gauge against which to put the paper to register it. This gauge is held to the platen *b* by a screw, and can be moved in the slot, to conform to different sized sheets, by turning the screw, and then moving the gauge as required. The chase in which the type is locked is keyed to bed *p* by a key; *s* is type, *p* the bed. The bed is screwed to the cross piece *o o*. In order to adjust the bed and give more or less impression, set screws 26, 26 are screwed into the cross pieces *o o*, the ends of which screws set back against the bed. 38 is a table on which to put the paper; it is screwed to each of the arms of the frame, 31. 18 is a treadle, 17 connecting rods which are attached to fly wheel and pulley by crank pins and treadle. 11 is a hand-lever for stopping the impression of the press. This lever has on it a fork, which fits into the groove on a clutch; said clutch is fitted to the driving shaft of pulley 29, with a spline to prevent it from turning on the shaft. When the lever is moved to the right, it disengages the clutch from a corresponding clutch or pinion 29, and leaves the pinion on driving shaft free or loose, so that the spur-gear and cams can stop.

Claim.—The combination of the vibrating platen with the sheet-holders arranged so as to be kept up a little distance from the platen, when in position to receive the sheet, and moving with said platen to

the form, in order to hold the sheets thereon, and draw them from the types; also the gauges for registering the sheets.

Also, the mode or means for keeping the sheet-holders up from the platen when the sheet is to be placed; said means consisting of an arm on each end of the rod (on which the holders are fixed, and with which they turn), and stops against which said arms strike.

Also, the apparatus for delivering or taking off the sheet from the platen after it is printed, consisting of the moving or sliding tympan-cloth, in combination with the turning segment *a*, to which an intermittent and reciprocating rotary motion is imparted by catch 47, and ratchet *e*, and spiral spring 48.

No. 9,607.—Henry Bessemer, of Baxter House, England.—*Improvement in Cane-Juice Evaporators.*—Patented March 8th, 1853.

This contrivance avails itself of the endless screw threads to carry along the liquid from end to end of the evaporator. The screw thread consists of a series of wide flat disks arranged helically around a hollow perforated shaft, and having its broad screw thread wings stand out nearly at right angles to the hollow shaft so as to form an extended surface for evaporation. The cylinder is arranged horizontally in its proper basin, and the lower portion of it dips into the heated liquid. The blast of air forced through the holes in the hollow shaft, rapidly carries off the vapor of the syrup at a temperature below the boiling point. (See figs.)

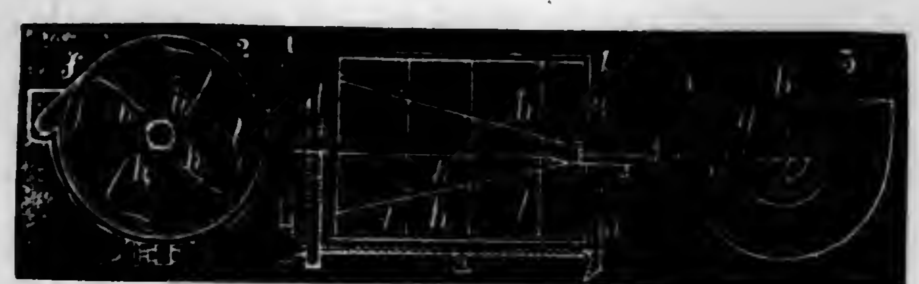
Claim.—The combination of a hollow and perforated shaft, connected with an air-blast apparatus, a series of plates or a screw plate (placed around and on the shaft), and a reservoir, trough, or basin, for holding the liquor to be evaporated.

Also, the combination of a hot-water vessel and its heating apparatus, the cistern for holding the saccharine liquor, and the apparatus for effecting its evaporation by means of hot air blown on thin or extended surfaces, a screw or plates as specified.

No. 9,608.—Henry Bessemer, of Baxter House, England.—*Improvement in Filters for Cane Juice.*—Patented March 8th, 1853.

This invention is confined to the drum which is immersed in the liquid to be filtered, and receives the same through its perforated periphery, and, by means of inclined scoops and troughs within, discharges it at its axis through its hollow construction. A scraper arranged on its upper part constantly clears and cleans the perforate periphery.

Claim.—The combination of the receiving vessel *a* (see fig.), the



rotary filtering drum (placed within the said vessel), the gutters *h* (within the drum), the hollow axle or shaft (connected with said gutters), and the scraper applied to the outer surface of the revolving drum; the whole being arranged and made to operate together.

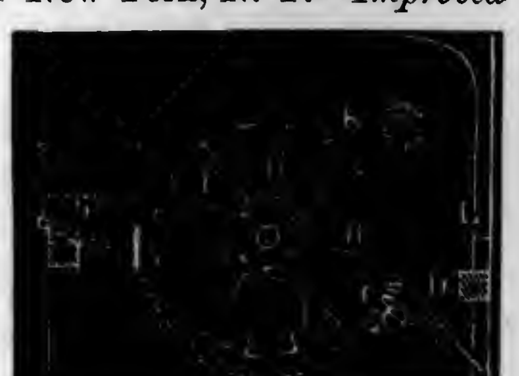
No. 9,609.—STILLMAN A. CLEMENS, of Springfield, Mass.—*Improvement in Machines for Dressing Flax.*—Patented March 8th, 1853.

In the annexed figure, the flax is placed upon the endless apron *b*, which presents it to the bite of feed rollers *d d*; it passes between the rests *m m*, to the beater *n*, composed of two flat faces with a space between. The beater is worked by a connecting rod and crank, to give it vibratory motion.

On the other side of the beater are another set of rests, *o o*, through which the fibres separated from the woody parts pass between the rollers *d′ d′*; these are grooved, and the upper has also a longitudinal motion. From the rollers the article passes on to the endless belt *b*. Below the beater *n* is a fan blower surrounded by a casing; the spout *h* discharges the current of air between the faces of the beaters, to blow away the woody parts.

Claim.—The method of breaking and dressing flax, or other fibrous substances, by a beater (as described) vibrating on a central axis, between the faces of which the flax passes; combined with rests placed in close proximity to the edges of the beaters, between which the flax passes. Also, in combination with the beater and rest, the employment of a pair of rollers, each of which is grooved in the direction of its periphery, and one of which is made to vibrate in the direction of its axis, for the purpose of opening and softening the fibres.

No. 9,610.—SAMUEL GARDINER, Jr., of New York, N. Y.—*Improved Magnetic Machine for Washing and Separating Gold.*—Patented March 8th, 1853.



This invention is more particularly designed for the separation of gold from the black sand with which it is frequently found mixed in the beds of rivers; this sand contains oxide of iron, which is difficult to separate from gold by the operation of washing alone, owing to its great specific gravity.

The annexed figure represents a section of the machine. The gold is placed in the box *c* (mixed with the oxide of iron), and washed down in the trough, there to be separated from the iron, by means of the revolving magnets I I. The oxide is brushed off by the brush K, and thrown upon the inclined plane D. Outside of the opening C is placed a cylinder valve, which turns in suitable journal boxes, and has a slot of corresponding size with C. This cylinder valve has a handle, by which it is turned to regulate the width of the opening C.

Claim.—Separating gold or other metals from earthy or other magnetic particles, by means of a rotary cylinder of magnets F H, which magnets, at the same time they collect the magnetic particles, serve as agitators of the water and metal, &c.; the cylinder being constructed in relation to a trough B, substantially as set forth.

No. 9,611.—J. F. MASCHER, of Philadelphia, Pa.—*Improvement in Daguerreotype Cases.*—Patented March 8th, 1853.

The nature of this invention consists in constructing the case with an adjustable flap or supplementary lid, which is within the case, and having two ordinary lenses in it. A Daguerreotype is placed opposite each of the lenses, in the lid. By this arrangement a perfect stereoscope is obtained, and the Daguerreotypes, by binocular vision, are apparently formed into a solid figure like life.

Claim.—Constructing a Daguerreotype case with an adjustable flap or supplementary lid C, within the case, and having two ordinary lenses D D placed in it, by which, upon adjusting the flap or lid, a stereoscope is formed of the case; and the two Daguerreotypes E E, by binocular vision, are apparently formed into a life-like figure.

No. 9,612.—LYSANDER A. ORCUTT, of Albany, N. Y.—*Improvement in Machines for Moulding Hollow-Ware.*—Patented March 8th, 1853.

The nature of this invention consists in combining with a moulding machine, so constructed as to give the flask a continuous rotary or reciprocating rotary motion, under the rammers P P (see fig.), as the character of the work to be moulded may require. The rammers have both *vertical* and *horizontal* adjustment (the first being automatic, the latter at the will of the operator), and can be made to operate in any portion of the flask without stopping the machine.

Claim.—In combination with a flask,

having a continuous or reciprocating rotary motion, the rammer or rammers so arranged as to be made, at any time during their operation, to work in any portion of the flask; whilst at the same time they have an automatical adjustment, so as to rise in the flask as it is filled and rammed, and adjust themselves vertically in regard to the flask.

No. 9,613.—Thaddeus A. Smith, of Albany, N. Y.—*Improvement in Moulding for Cast-iron Plates with dovetailed recesses.*—Patented March 8th, 1853.

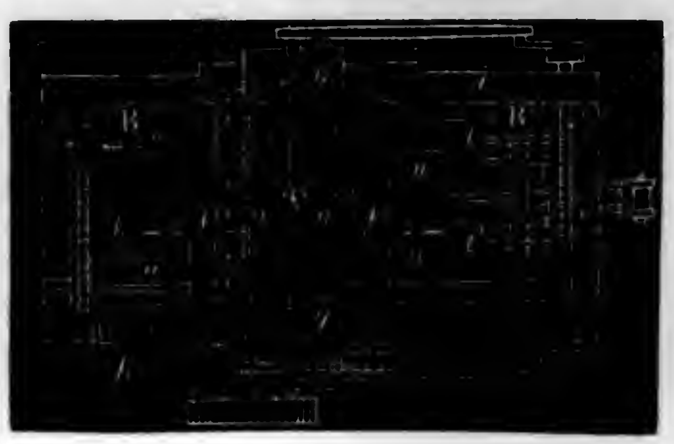
Figure 1 represents a pattern of a pot-hole cover, top upwards, with a square hole in it towards one edge, for the admission of the cup pattern, the sides of the hole being bevelled upwards.

Fig. 2, the cup pattern face upwards.
Fig. 3, reverse.
Fig. 4, cross section.
Fig. 5, lifter or handle.

In using the pattern-cup in moulding, the top pattern is laid down in the flask (with the cup in its place), with the upper face uppermost, and is then properly rammed up; then the flask and pattern are reversed in the usual way, and the under-side sanded and rammed up in the core; the core is then removed, and the cover pattern carefully taken off, leaving the cup pattern on the sand; then each half of the cup pattern is moved carefully to the right or left as the case may require, so as to have the dovetailed core of sand complete.

Claim.—The process of moulding the recesses in the tops of stove-plates, intended for the reception of the lifters (which recesses are required to be dovetailed), by employing pattern cups, shaped to form such recesses, divided by a vertical cut into two parts, so that the cups can be removed from the core, by moving each division of it horizontally from the core before raising it off the sand; and by fitting the cup patterns into the pattern of the stove plate, so that the plate pattern can be lifted from the sand, leaving the cup behind it.

No. 9,614.—Joel Tiffany, of Cleveland, Ohio.—*Improvement in Machines for Dressing Shingles.*—Patented March 8th, 1853.



This machine operates in the following manner. After the shingles are rived out, they are first placed on the table beds *u u'* (see fig.), alternately as the table passes from one end of the frame to the other; the bed or table rises and falls by the action of cams, so that the knife in the cross head will not shave the shingle against the grain in passing from B to B'; but as the table returns from B' to B it is elevated, and thereby the shingle is shaved from butt to point, the points being always in the direction of the arrows. By the raising and lowering of the table, as described, the proper taper is given to the shingle. The knives are in the cross-head T, and always move in an adverse direction to the table. The shingles are shaved on one side at a time: the first side is shaved in the bed *u'*; they are then turned from the bed *u'* to *u*, and from *w'* to *w*. As the table passes from B to B' the shingle passes in between the forks of the arms *k*; and the instant the table moves from B' to B, the shingle is conveyed from the bed *w'* to *w*, the arms taking the place marked *h*, which was occupied by the arms *h'*; and at the instant the arms *h''* begin to pass to *h*, the arms *h'*, which then occupied the place *h*, pass to the position indicated at *h'*, which throws the shingle from the bed *w* to the floor, completed. The arms *i'* convey the shingles from the bed *u'* to *u*, and the arm *i* gives place to it, passing to the position *i''*, and at the same time taking a finished shingle with it from the bed *u'*. The rollers *a a* and *f f* are for the purpose of keeping the shingle in place when it is being shaved. The gear wheels are hung on journals. The springs *y y* are for the purpose of allowing the rollers to adjust easily to shingles of various thicknesses. The ends of the springs rest on the journal caps.

Claim.—The combination of parts consisting of the pinions *l l'* and *k k'*, with the intermediate gears *m m'*; the levers *n'* and joint levers *o* and *o'*, and sections *u''*, with the connecting rods *p* and *s*, and cam *o*, for the purpose of operating the arms *h h'*, *i i'*, as described.

No. 9,615.—John A. Wagener, of Charleston, S. C.—*Improved Cannon Sight.*—Patented March 8th, 1853.

The nature of this invention consists of an "easy and correct" mode of determining the highest point of the surface of a cannon, regardless of any position the wheels may occupy upon the ground; and of affording the gunner at the same time a perfect sight to direct and elevate the piece by, capable of regulation for any distance less than point blank, as well as to extreme range, according to degrees.

Figure 1, front sight.

Figure 2, rear sight, attached by means of spring clasps to the cannon.

Claim.—The sighting apparatus, consisting of the corresponding pendula E, hung between the graduated side-pieces or uprights C C, in connexion with the protecting and regulating slide F, with its rifle sights *r r'*; the pendula having free sway, by means of the rotary mounting of the uprights, and upper part of the apparatus, on the screws and pivots *s s*; and the whole being attached and shifted into horizontal position on the cannon, by means of the movable spring clasps A A and A' A', all combined.

No. 9,616.—Warren Aldrich, of Lowell, Mass.—*Improvements in Turning Lathes.*—Patented March 15th, 1853.

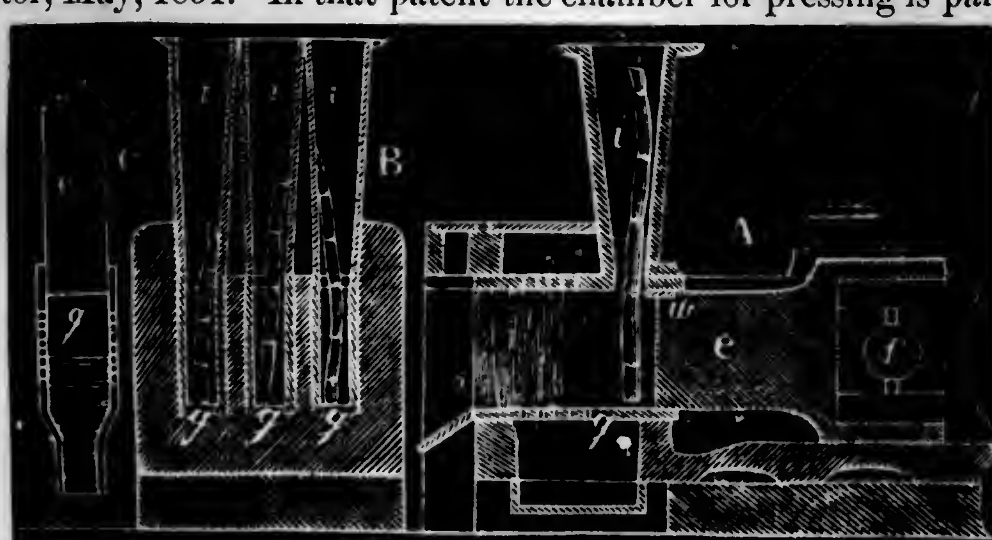
The object of this invention is to accurately turn a variety of forms, such as globes, ovals, &c. To effect this result the tool carriage H H is made susceptible of a variety of motions and adjustments. (See fig.) The letter E shows the tool carriage without the lathe; B B is a slide moving on the bed of the lathe, and sustaining the whole apparatus of the tool carriage; *c c* is a circular plate movable by a screw D, which is shown in dotted lines.

On the circular plate *c c* is placed a revolving slide E′; on this slide is placed the tool carriage H H, which is moved by screw I, revolving worm shaft X, and revolving plate *c c*.

Claim.—The improvement which consists in giving an automatic motion to the upper slide or tool rest, when set at any angle to the bed-piece of the lathe, instead of moving it by hand; so as to turn with ease and accuracy solid or hollow cones, by means substantially of the screw I I′, revolving worm shaft X, and revolving plate *c c*, as above set forth.

No. 9,617.—Henry Bessemer, of Baxter House, England.—*Improvement in Sugar-Cane Presses.*—Patented March 15th, 1853.

This invention is a modification of that patented by the same inventor, May, 1851. In that patent the chamber for pressing is parallel



on its sides; but in the present case it is parallel for some distance, but contracted somewhat at the mouth, so as to wedge the cane in while the juice is being expressed. This change makes it unnecessary to have as long a chamber, and so prevents a re-absorption of the juice once forced to the outer surface of the mass. This improvement also embraces the arrangement of devices for sustaining the parallelism of the motion of the pistons; *g g g* are tubes, having pistons *c*, as seen at A; *i i i* are hoppers; *w* is the cutter attached to the piston *c*.

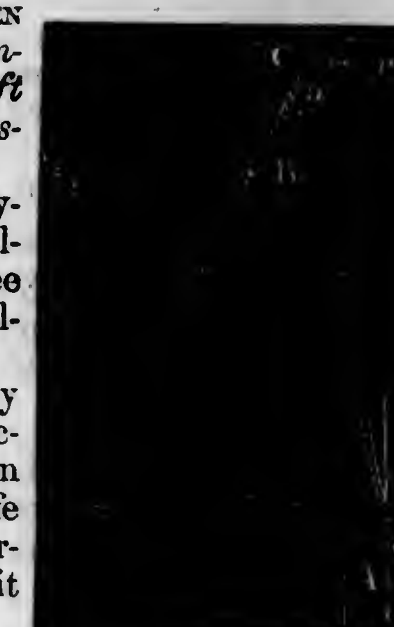
Claim.—The improvement in the construction of the cane-pressing tubes, with sides made parallel some distance, for the working of the piston against, and to approach one another towards the mouth of discharge of the pressed cane. Also, the combination of the compresses, or pressing tubes B C, and two conjoined pistons D E, with one revolving actuating shaft and its mechanism, to give to the plungers or pistons a *simultaneous* reciprocating rectilinear motion.

No. 9,618.—Henry Bessemer, of Baxter House, England.—"*Improved Heater" for Sugar Syrup.*—Patented March 15th, 1853.

This device is designed to heat the syrup discharged from the vacuum pan, just before it is poured to fill the moulds, and consists of a vertical drum of tubes, in a case acting as steam jacket; the syrup is poured by means of a hopper into the top, and, falling by gravity through the same, is heated by the steam which surrounds the tubes. Figure A is a vertical section, and B a plan of the apparatus; R is a copper heater open on the top, T is a chamber, U a spout; X is a steam pipe for admitting, and Y a pipe for passing the steam off.

Claim.—The above description substantially embraces the claim of the inventor.

No. 9,619.—William Coleman and Stephen G. Coleman, of Providence, R. I.—*Improvement in Supporting the Topping-Lift and the Peak-Halyard Block of Sail Vessels.*—Patented March 15th, 1853.



This invention relates to a mode of applying the topping-lift shackle and the peak-halyard block to the upper part of a mast. (See fig.) A represents the mast, B the peak-halyard block, and C the topping-lift shackle.

Claim.—Supporting the topping-lift by means of a crane, of such form and construction, that when the topping-lift sags (when the sail is hoisted), it shall not foul, or chafe against the peak-halyard block. Also, so arranging and constructing the crane, that it may also support the peak-halyard block.

No. 9,620.—Peter Ten Eyck, of New York.—*Improvement in Rocking Chairs.*—Patented March 15th, 1853.

The nature of this invention consists in combining with a chair (so arranged that the top or seat shall rock upon the bottom part, while the legs remain stationary) a safety guard to prevent the chair from going back too far, and also to prevent it from going suddenly backward when a person seats himself in it. The bar *c* reaches across the chair, and works on pivots in projections *l*, permanently fixed to the chair; in the centre of bar *c* is a cam *f*, which works on a pivot, and rests against the spring *g*, for preventing the top part of the chair from rocking too suddenly.

Claim.—The guard or safety piece, and the spring *g*, combined and arranged with a sitting chair, so that the seat may rock upon the legs, or support, and as above set forth.

No. 9,621.—Moses Marshall, of Lowell, Mass.—*Improvement in Knitting Machines.*—Patented March 15th, 1853.

To fully illustrate this improvement would require extensive drawings and descriptions; therefore reference is made to the principal features of the invention only, with the claim.

In the figure, *c d* represents the needles; *e f* the needle rests; *g* the levers working the needles; and *s s* the rotary depressers.

Claim.—Connecting the rotary depressers and the feeder which carries the thread with the arm which connects the reciprocating cam boxes. Also, dividing the plates which support the needles, and cast the stitches, at the angle of intersection of the two sets of needles, so that the fabric knit may pass between them. Also, forming the stitches alternately on each side of the needle rests, by two sets of needles placed at an angle to each other, and operating one needle at a time.

No. 9,622.—Horatio N. Black, of Philadelphia, Pa.—*Improvement in Hydraulic Steam Pumps.*—Patented March 22d, 1853.

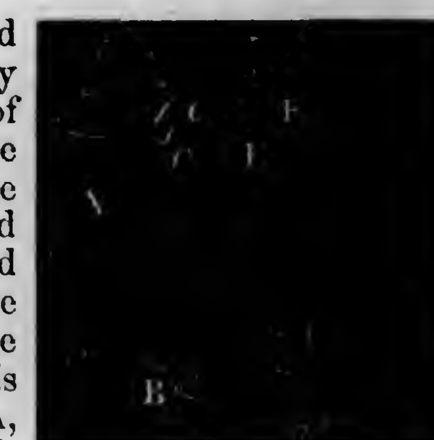
The nature of this invention consists in placing at the juncture of a double cylinder A, B, a piston rod E, united to and carrying two pistons working, the one C, in the steam cylinder, and

the other D, in the water or pump cylinder; both pistons are united by a bar at F, which bar moves in grooves on each side of the rod. There are openings in the piston rod *e e*, and the juncture of the double cylinder, whereby at the proper time communication of the cylinders is effected; for the purpose of causing a small quantity of cold water to pass into the steam cylinder, and thereby effect the partial condensation of the exhaust steam in the cylinder itself. This improvement relates also to the combination of the double cylinder with the intermediate piston rod and connected or twin pistons, having a movement simultaneous with the piston rod.

Claim.—The combination of the double slotted water and steam cylinder A and B, double pistons C and D, and slotted piston rod E, arranged and operating as described, &c.

No. 9,623.—John P. Comly, of Dayton, Ohio.—*Improvement in the mode of Separating Paper by the single sheet.*—Patented March 22d, 1853.

This improvement consists in the method of feeding or supplying paper sheet by sheet from a heap, through the agency of atmospheric pressure, having reference especially to the instances in which the sheet has to be raised and drawn forward by one edge as in the case of printing, and is intended to supersede the services of the attendant, now found necessary to feed the machine. The principal features of this improvement are an exhaust pump A, attached by a flexible tube to a horizontal tube C, provided at the under side with small tubes X, X, X. The paper is placed upon the elevating table E, which presses the paper in its upward motion against the roller F. This runs out the top sheet of paper, which is sucked up by the exhaust tube C and X, X, X. By means of proper gearing, the paper is regularly fed and removed.



Claim.—The above description substantially embraces the claim of the inventor.

No. 9,624.—Roswell Enos and Bela T. Hunt, of St. Charles, Ill.—*Improvement in the art of Tanning.*—Patented March 22d, 1853.

This mode of tanning consists, in the first place, of liming the hides in the usual way to remove the hair, and then placing them in cold water for one day (not subjecting them to the usual bating process); then working them twice on the grain; then placing them in liquor, made of 200 gallons of water, 200 lbs. of domestic sumach, 20 lbs. of salt, 30 lbs. of wheat bran, at the temperature of forty-five degrees: handle for ten or twelve hours on the first day. The second day liquor is added made of 30 lbs. of sumach, 36 lbs. of extract of hemlock bark, 20 lbs. of salt, and 30 lbs. of bran. Third day, handle four times. Fourth day, add to the liquor as on the second day,

and handle well; and so continue to strengthen every day until tanned, which will take from twelve to fourteen days. The inventors regard this process of tanning as superior to any other known mode.

Claim.—The process of tanning, with the use of lime, salt, bran, sumach, and cutch, or any other tanning in room of cutch, whereby we commence the tanning at the same time we commence reducing; as the salt and bran overpower the lime, the tan takes the place of the lime, and converts the hide into more perfect leather, and in less time, than in any other way. The claim is based upon the *application* of the materials, as set forth.

No. 9,625.—MILLS A. HACKLEY, of Belleville, N. Y.—*Improved Cheese Press.*—Patented March 22d, 1853.

The frame R is to be used in turning the table on which the cheese is placed, and acts in connection with the roller y, so as to raise or depress it as may be required. This turn-table is constructed of iron and bent in a square form, as represented in the figure, and securely attached to the bed-piece by means of screws Q, upon which it works, and which forms its fulcrum. The extremities of the turn-table are sufficiently curved, so as to pass beneath the shaft upon which the roller y works; which shaft extends through the bed-piece, and projects on both sides, sufficiently to receive the bearings of the turn-table; thus the turn-table becomes a powerful lever, by means of which the roller is raised and the withdrawing of the cheese made easy, and its turning speedily and easily accomplished.

Claim.—The turn-table R, or its equivalent, in combination with the roller, in such manner that whenever the table is adjusted for turning the cheese, there will be a corresponding adjustment of the roller for facilitating the process of turning the same.

No. 9,626.—WILLIAM MANSFIELD, of Dracut, Mass.—*Improvement in Knitting Machines.*—Patented March 22d, 1853.

By the aid of this improvement, the operation of knitting a piece of goods is performed by means of a single thread or yarn taken from a bobbin, and two sets or series of hooked needles. The principal feature of this improvement consists in the manner of operating one set of needles with respect to the other set. To fully explain this machine, would require large drawings.

Claim.—The manner of forming the loops in knitting ribbed fabrics, viz.: by the combination of two sets of needles, made to operate together; which affords important advantages in constructing and operating the loom.

No. 9,627.—JAMES RILEY and WILLIAM ALLEN, of Southfield, N. Y.—*Distilling Rosin Oil.*—Patented March 22d, 1853.

The nature of this invention consists in the distillation of oil from rosin, by passing it in an expanded state from the alembic, where it is first heated, through one, two, or more worms, or other suitable vessels, encased in fire-brick, cement, or clay, so as to be heated by conduction, in contradistinction from actual contact with the fire; and with pitch-receivers, flow-backs, and other necessary connecting pipes, stop-cocks, or valves. The alembic is charged up to about two thirds of its capacity with rosin, and a saturated solution of nitrate of soda or potassa—equal to about one per cent. of the rosin used—is added, and the heat raised to 500 degrees Fahrenheit. The heat in the worms F and J is kept from 10 to 20 degrees higher than that of the alembic. A, is the alembic; B, the man-hole; D, acid and spirit pipe and valve; F, heated worm; G, gas escape pipe; H, pitch receiver; J, heated worm; K, gas escape pipe; N, pitch receiver; O, cold worm.

Claim.—The process of manufacturing oil from rosin by passing it from an alembic through expanding worms, or their equivalents, surrounded by a jacket of fire-brick or clay; whereby we prevent destructive distillation and carbonization, and greatly economize time.

No. 9,628.—JAMES STANBROUGH, of Newark, N. Y.—*Improvement in Harness.*—Patented March 22d, 1853.

This improvement consists in the mode of forming on any part of a harness "rounds," "raises," or "rolls," as they are termed by leather workers; by doubling and sticking together a strap of leather at its edges, or laying a welt or secondary strap upon a principal strap and stitching them together at their corresponding edges, and then binding these edges with a separate piece; and in depressing the raises or rolls so as to conceal the stitching upon their binding, by drawing up and fastening by their sides a fold of the principal strap.

Claim.—The above description embraces the claim of the inventor.

No. 9,629.—SETH D. TRIPP, of Rochester, Mass., Assignor to EDWARD L. NORFOLK, of Salem, Mass.—*Improvement in Machines for Pegging Boots and Shoes.*—Patented April 12th, 1853.

The principal parts of this machine are the following, viz.: Machinery for supporting the shoe, and moving it under the pegging mechanism.

Machinery for sustaining the pegging mechanism, and regulating the direction of the pegging awl, so that it shall pass into the sole at the proper angle, under any change in the curvature in the sole.

Machinery for operating the pegging awl and driver.

Machinery for sustaining the peg-wood, and forcing it forward towards the shoe.

Machinery for splitting the pegs from the wood.

Machinery for operating the charger that contains the peg-wood.

Claim.—The inventor's claims embrace the construction, combination, and operations of the machinery or mechanism above referred to, for the purposes fully set forth in his specifications and drawings, and therein described.

No. 9,630.—Luther Atwood, of Boston, Mass.—*Improvement in Preparing Lubricating Oils.*—Patented March 29th, 1853.

To prepare this oil, denominated *coup oil* by the inventor, crude coal tar is placed into a retort, connected with a condenser. By means of heat, vapors of fluids are condensed in the condenser, until the temperature in the retort rises to 700 degrees Fahr. The temperature during distillation should be 150 to 175 degrees Fahr. To 100 gallons of distillate add 200 lbs. caustic soda, marking 25 degrees Beaumé, which is agitated for two hours. The clear distillate is placed in a leaden vessel, where it is mixed with 50 lbs. sulphuric acid, and agitated for four hours. The clear oil is then removed to an iron vessel and mixed with 100 lbs. of solution of caustic soda marking about 25 degrees Beaumé, stirred for two hours, and left to repose for six hours. The clear oil which separates is now ready for distillation, which is done in an iron retort at a temperature of 150 degrees. The impure oil thus obtained is put in a leaden vessel and mixed with 25 lbs. of sulphuric acid to 100 lbs. of oil. The acid being allowed to subside, the clear oil is finally purified by agitation with solution of caustic soda 25 degrees Beaumé, and again distilled in an iron retort, mixed with 12 lbs. of hydrate of soda and one gallon of water for every hundred gallons of oil. This oil is then ready for use, and may be mixed with other oils for lubricating.

Claim.—The "coup oil," or combination of paranapthaline and fixed oils derived from coal tar and boiling from 450 degrees to 675 Fahr., as produced by the process described, the manufacture being useful as a lubricating composition, either alone or combined with oils or fatty matter.

Also, the combination of this product so made with concrete or thick fatty matter or oils, for the purpose of liquefying them, or rendering them more mobile, &c.

No. 9,631.—Schuyler Briggs and John G. Talbot, of Sloansville, N. Y.—*Improvement in Fanning Mills.*—Patented March 29th, 1853.

The nature of this invention consists in causing the upper sieve to vibrate at a greater speed than the screens below, for the purpose of more effectually separating the impurities from the grain, thus causing the chaff and light matter to be separated and blown from the riddle. This is effected by making an additional gearing to the fan-axle, having crank and connecting-rod.

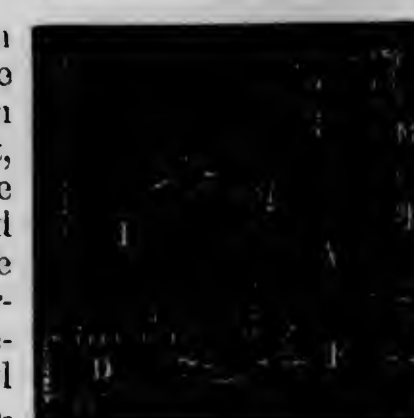
Claim.—Causing the upper sieve or riddle to vibrate at a greater speed than the lower screens.

No. 9,632.—Lewis W. Colver, of Louisville, Ky.—*Improvement in Machines for Breaking Hemp.*—Patented March 29th, 1853.

The nature of this invention consists in the combination of the oscillating beater U (see fig.) and bars J J J J, above and below it, hung upon springs, so that the recoil of the springs after the beater passes the bars shall shake out the hemp, and clear it of its woody fibre. The breaker U is to break down the material, at the breaking point resting on the fixed bar X: it passes between spring bars J J J J, where it is finished by the beaters e e. By means of feeding-rollers, hand-wheel, and treadles, the operator has perfect control over the hemp.

Claim.—The combination of the oscillating beaters U, and the spring bars J J J J, placed above and below the beaters, so that the recoil of the springs, after the beater leaves the bars, shall shake out the hemp and clear it of its woody portions.

No. 9,633.—William Ennis, of New York, N. Y.—*Improvement in Hot-Air Furnaces.*—Patented March 29th, 1853.



The nature of this invention consists in the employment of an inverted hollow cone A, placed in a cylinder or radiating drum B, which communicates with the ash-pit, and is connected with the fire-chamber (see fig.); the cone A having its smaller end inserted into and through the side of the drum B, for the purpose of admitting a current of cold air into the drum, which is designed to operate upon the direct and heated draft from the fire chamber I, and cool it before it reaches the exit pipe, M, and consequently cause the gas which rises from the fire with the smoke to descend upon the outside of the cone, and pass into the ash-pit D, and up through the fire into the fire chamber, &c.

Claim.—The employment of an inverted cone A, within a drum or cylinder B, in whose side the taper end of said cone is inserted and allowed to communicate with the "atmospheric reversing shaft," to cool the direct heated current from the fire; the cylinder B communicating with the fire chamber I and ash-pit D, in the manner and for the purposes as described.

No. 9,634.—Moses G. Farmer, of Salem, Mass.—*Improvement in Electric Telegraphs.*—Patented March 29th, 1853.

The object of this invention is to enable a common telegraphic

circuit extending between any two places to be used by two or more operators at the same time, instead of but one, as at present.

Claim.—The method of bringing any number of telegraphic signalizing and recording instruments into successive electric connexion with the common communicating wire; and more particularly the combination of the writing and working, or primary and secondary circuits, the electro-magnets and their movable armatures of the primary circuit, the local magnets and their movable armatures and pallets, or equivalents therefor, and local battery, and battery connexions of each terminus, and connexions leading to the armatures of the local magnet, the escapement wheels, and wheels on the arbor of each, the two series of springs of said wheels and branch connexions, and the branch connexions of the main writing circuit at its two termini; the whole being connected and made to operate together.

No. 9,635.—Benjamin Fenn, of Hartford, Ohio.—*Improved Machine for Weighing.*—Patented March 29th, 1853.

In the annexed cut, A and B represent standards; C and D semicircles, D having a catch K; M another catch which holds the frame still. When the catch M is dropped from the pin, the circular frame moves. E T G H is a movable frame attached to the semicircle D. The semicircles move on arms on pivots.

Claim.—The machine for ascertaining instantly the weight of bodies, by means of a scale, dish, or plate, supported by pivots upon a heavy or weighted semicircular frame or its equivalent, in the manner of a pendulum, and operated by catches.

No. 9,636.—Isaac H. Garretson, of Clay, Iowa.—*Improvement in Seed Planters.*—Patented March 29th, 1853.

The figure is a perspective view of the planter. T is a section of the hopper and slide. The hoppers D are attached centrally over the cultivators B to the frame A for containing the corn. These hoppers are fitted with vertical slides E, each of which has a notch to receive the corn at suitable intervals from the hoppers, and discharge it, at the proper periods, in the wake of the cultivator. Both slides E are operated upon by the bar F, which is raised or lowered, as required, from the back, by handles G, pivoted to the bar F, at *g*. When the handles G are elevated or depressed, at suitable intervals, the slides E are raised so that the notches *e* enter the grain hoppers to receive the necessary number of kernels for a hill of corn.

Claim.—Planting corn in check rows, by means of the planting slides E, worked on the cross-bar F.

No. 9,637.—John Maxwell, of Galesville, N. Y.—*Improvement in Knitting Machines.*—Patented March 29th, 1853.

This improvement pertaining to knitting looms, consists in the erection of two standards upon the back ends of the half jacks; these standards rising high enough to carry, between their upper bent ends and the bar, springs, strong enough to keep the bar firmly down upon the tail ends of the jacks; and is termed by the inventor the *locking-apparatus.* (To fully illustrate the whole machine would require extensive drawings.)

Claim.—The construction of the locking apparatus by placing standards upon the back ends of the half jacks; to carry springs, which regulate the pressure of the bar upon the jacks; in combination with an apparatus for raising said bar, &c.

No. 9,638.—John McAdams, of Boston, Mass.—*Improvement in Machinery for Paging Books.*—Patented March 29th, 1853.

The operation of this machine is as follows: Before commencing to page a book, both the type chains are inked with a hand inking-roller, and the chains are carried along until the fig. 2 of the upper chain and the number next preceding, 1, of the lower chain are brought opposite each other ready for the impression. The book is then laid upon the table B, with the covers turned back. It is placed in such a position that when the leaves are extended naturally, they will be in proper relation to the types which are to give the impression, so as to print the number in the right place on the page. The operator sitting in front of the machine leans his right arm upon the book to hold it, and seizes the whole mass of leaves with the right hand, by the corner next the printing apparatus, and bends them up out of the way, as seen at A. The first leaf then to be paged is detached by the left hand, and placed between the tongue F and the upper chain E carrying the even figures, the leaf being extended to its natural position. The impression is then given by the foot, which prints upon the upper side of the leaf the number 2. The foot is then raised, which permits the jaws to open, and, by the operation of the ratchets and their appendages, each of the shafts D is turned one fourth of a revolution, which brings the next number in each chain to the proper position to be printed. The leaf printed by the above operation is then passed below the tongue, to receive an impression from the lower chain carrying the odd figures.

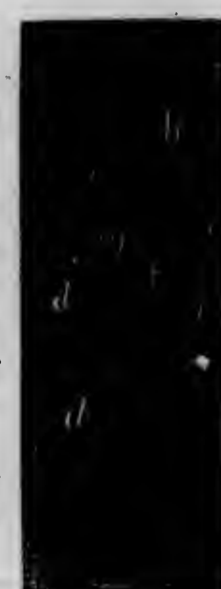
Claim.—The employment of a square rotating shaft D as a bed for the odd numbers, and the shaft D′ as a bed for the even numbers of the types, in combination with tongue F as a platen to both sets of types, the same being operated by the treadle, ratchet, and pawls, so as to enable the operator to print the odd and even numbers of a book by a single movement of the treadle.

No. 9,639.—James H. Swett, of Boston, Mass.—*Improvement of the Die Rollers in Spike Machines.*—Patented March 29th, 1853.

The nature of this invention consists in skewing the shafts or axes of the rotary pointing-dies, so that they shall stand obliquely towards each other in their vertical lines; and bevelling off the faces of the dies at or about the same inclination at which the shafts stand to each other, for the purpose of forming a square close-fitting space in front of the dies, or where the blank is fed in, and spreading the dies in the rear or behind where the spike is pointed, to relieve it, and allow the nippers to take it from the dies without injury to the spike. and with certainty of action. See fig.: A and B are the shafts; C, permanent flange; D, ring; E, die holder; F, dies of steel; G, ring to hold the whole in place.

Claim.—The above description contains all that the inventor claims.

No. 9,640.—George Traeyser, of Cincinnati, Ohio.—*Improvement in Vertical Piano Fortes.*—Patented March 29th, 1853.



This improvement consists in changing the tuning-pins to a different position from that occupied by them hitherto, to wit: below the lower edge of the sounding-board, as shown in the figure, representing a section of the improved piano: *d*, is the position of the tuning pins; *i*, the sounding-board; *g*, the string; *j*, the hammer; *k*, the damper.

Claim.—The construction of a vertical piano, having the tuning pins placed below the lower edge of the sounding-board.

No. 9,641.—Thomas C. Thompson, of Ithaca, N. Y.—*Improvement in Sewing Machines.*—Patented March 29th, 1853.

The nature of this invention consists, first, in charging the race or shuttle with magnetism, for the purpose of keeping the shuttle in perfect contact with the face of the shuttle race, without the use of springs, or holders of any kind, whilst at the same time "I insure the taking up of every stitch." Also in making the shuttle with a hinged cap, for the more readily placing therein and retaining of the bobbin or cop which is used without a spindle or spool, the thread being drawn from the inside of the cop or bobbin, by which means a uniform strain or tension is preserved on the bobbin or cop thread.

Claim.—The magnetic shuttle and race, one or both, for the purpose of keeping the shuttle in perfect contact with the face of the shuttle race, without the use of springs or any other device, and thereby insuring the securing of every stitch.

Also, the curved and hinged cap, in combination with the shuttle, to confine the cop in the shuttle.

Also, the use of a cop without a spindle or spooler, in combination with a shuttle or its equivalent, when the thread is drawn from the inside of the cop, by which means a uniform draught on the cop thread is retained, as it is drawn out from the shuttle.

No. 9,642.—Matthew Walker, Matthew Walker, Jr., & Daniel S. Walker, of Philadelphia, Pa.—*Improvement in Wire Fences.*—Patented March 29th, 1853.

This invention consists chiefly in so arranging the loop-fastenings B for wire fences, that the hook A shall be within, and sustained by the mortise in the post, as shown in the figure, in such manner that a great strain upon the wire shall not cause the wire to open out or spread, as is frequently the case with the hook and eye under other arrangements. Also an improvement in the form of the iron posts for such purposes, making the line posts of wrought iron in a concavo-convex form, for the purpose of steadiness, strength, and comparative lightness, and the corner posts of angle iron, for similar purposes. The swivel screws for tightening the fence and other parts are well known.

Claim.—The arrangement of the hooks within the mortises, so that the parts of the hook shall be sustained and kept from spreading by the mortise, while a strain upon the wires tends to steady the posts.

No. 9,643.—John H. Bloodgood, of Rahway, N. J.—*Improvement in the process of forming Yarn, by Felting.*—Patented April 5th, 1853.

The nature of this invention consists in the production of a strong felted roving or untwisted thread of wool, capable of being employed for warp or weft in making woven cloth, or for knitting, sewing, and other purposes. The object of this improvement is the making of woollen thread suitable for the above purposes, at less expense than by the process hitherto in use for the purpose, and of greater strength. This is effected by passing the rovings through steam, and giving a rolling rubbing motion to the thread, whereby the rovings are felted.

Claim.—The formation of thread or yarn from woollen rovings, by the process of felting, instead of spinning or twisting.

No. 9,644.—Thomas D. Burrall, of Geneva, N. Y.—*Improvement in the Grain Reaper.*—Patented April 5th, 1853.

This invention is confined to that part of the harvester called the apron or platform, and consists of a device for enlarging the platform, so as to rake off the grain from the side, instead of the rear of the machine, by splicing it with a sort of triangular piece; and to a pecu-

liar device for gearing and ungearing the connexion of the cutter and driving wheel.

Claim.—The additional apron to convert the usual rear discharge into a side discharge of the cut grain. Also, the combination of the curved supports and the adjustable journal-box piece, to preserve the relative positions of the cogs in the mitre gearing, and at the same time allow of raising and depressing the driving wheel.

No. 9,645.—John E. Crane, of Lowell, Mass.—*Improved Self-acting Chain Stopper.*—Patented April 5th, 1853.

This improvement consists of a metallic ridge secured to the deck of a vessel, near the hause-hole; and a pawl secured to the bulwark, or knight-head (or other suitable support), in such a position that its acting end will fall upon the top of said ridge. The ridge is placed in such a position that the cable in its passage from the hause-hole to the windlass must pass over it. Ears rise from the extremities of the ridge to prevent the escape of the cable therefrom; and the operating end of the pawl extends the whole distance between the ears, to insure its action upon every link of the cable.

Claim.—The ridge rising from the deck of a vessel between the hause-hole and the windlass, combined with a heavy pawl placed above it, whereby each moving link of the cable is turned flatwise in passing over the ridge, and each link is acted upon by the pawl.

No. 9,646.—Solomon Horney, Jr., of Richmond, Ind.—*Improvement in Ploughs.*—Patented April 5th, 1853.

This improvement in ploughs pertains to the construction of the standard, or shank, and the method of securing the same to the beam and share. The object is to attain greater strength and durability. The ends of the bolts and the nuts are sheathed within the shank, thus leaving a smooth unincumbered surface on the outside.

Claim.—Constructing the shank A hollow, with two closed ends, and securing the same to and with the share B and beam, by means of the master bolts and the short bolt passing through the slot in the top end of the hollow shank A, for varying the position of the shank with the beam, and giving additional security to the fastening of the same.

No. 9,647.—William H. Lindsay, of New York, N. Y.—*Improvement in "Fluid Meters and Hydraulic Engines,"* &c.—Patented April 5th, 1853.

The principle or character which distinguishes this invention from others, in a machine or apparatus acted upon by a fluid, consists in, first, the peculiar combination of devices and the method of operation, by which the secondary engine with its valves is actuated and governed, combined with the same of the main or working engine and its valves, "whereby certainty of action, smoothness of working, durability, and accuracy are more perfectly attained and combined, than in any other engine operated by water, or other non-elastic fluid, in an analogous manner." Secondly. In the means whereby the engine and valves are protected against an undue amount of travel. Thirdly. "In the peculiar construction of the sluice or gridiron valves, by which they are relieved of the pressure they would otherwise be subject to; which decreases the power necessary to put them in motion."

Claim.—Operating the valves of the secondary engine by the main engine, through a portion of their movement, and completing the same through the medium of the secondary engine. Also, connecting the cross head of the main cylinder with its valves, so that these valves will close the ports of the main cylinder, in case the working parts of the secondary engine should fail to do their duty. Also, forming a recess or recesses in the under or working side of the slide valve, in combination with the secondary openings, through the seat, or in the side of the port or ports, for the purpose and in the manner described. Also, the combination of the bridge in the cylinder with the openings in the plunger.

No. 9,648.—Thompson Newbury, of Taunton, Mass.—*Improvement in the Mode of Feeding Blanks to Screw Machines.*—Patented April 5th, 1853.

This improvement consists of a hopper *a* in the bottom of which is an oblong opening, extending nearly its whole length. This opening is surrounded by a flange forming a spout, into which is fitted a slide or piston, corresponding with the size of the interior of the spout. A sufficient number of screw blanks are put into the hopper; and when the slide is pushed upwards, the screw blanks fall upon it, a number falling with their shanks down in slot *a* in the top of the slide, and are thus supported perpendicularly by their heads; the slide is then forced gradually up by the bar or rod *g*, till the flange *c* strikes the bottom of the spout in which it works, and by the continued motion of the rod *g* the upper portion is canted on its hinge over towards a permanent spout or guide *h* affixed to the side of the hopper, into which it deposits the blank, by sliding it out of its recess or slot. As the rod again descends, the upper part of the slide is closed back to its place by the spring *i*, and then the whole slide descends again for a fresh supply from the hopper.

Claim.—The slide as herein described, passing up through the bottom of the hopper in the manner set forth.

No. 9,649.—Henry R. Noll, of Lewisburg, Pa.—*Improved arrangement of Sash Fastenings.*—Patented April 5th, 1853.

This invention consists, says the inventor, in so arranging the spring catch fastenings for window sashes, that the spring for the upper sash may be commanded, without interference from the lower sash. If the lower sash is raised, the spring of the upper sash can be managed without dropping the lower sash. *a a'* are thumb pieces; *p*, the plate; *s*, the stem; *g g'*, the gallows frames. The strap *b* is hinged at *h*, in order to insure steadiness of motion. In the upper sash is a spring, consisting of a common flat spring, at the upper end of which is a friction roller.

Claim.—Arranging the spring catch fastenings for the upper and lower sash about the middle of the frame, in such manner that the upper sash can be managed without interference from the lower sash. Also, the particular arrangement of the attachments, on the *one plate* of the two spring fastenings, consisting in the spring bar *b'* (through which the spring bolt *k'* of the upper sash is operated), with its hinge joint in rear of the spring bolt *k*, and the bar *b*, and bolt *k* of the lower sash, by which I gain economy of room and a cheap and efficient action upon the two sashes.

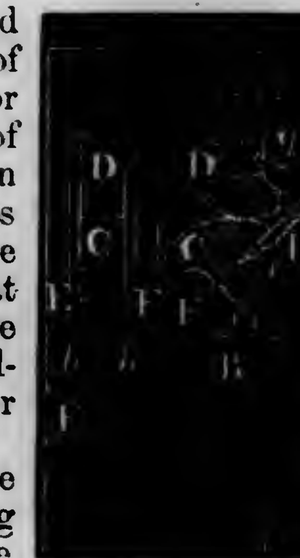
No. 9,650.—Charles James Pownall, of Addison Road, England.—*Improvement in the Process for preparing Vegetable Fibre.*—Patented April 5th, 1853.

The object of this invention is to deprive fibrous vegetable substances of their resinous and gummy matters, in order that they may be separated into fine fibres. This is accomplished by subjecting the ordinary filaments of these substances to the action of a machine constructed upon the well known principle of the tuck or fulling mill which removes the gummy matter, and then to the carding machine, to separate the flax or other fibrous filament into finer fibres.

Claim.—The mode of subjecting fibrous vegetable substances to repeated mechanical pressure and the action of a stream of water for the purpose of depriving them of resinous or gummy matters, and also resolving them into finer fibres, in the manner above described.

No. 9,651.—Samuel Rust, of New York, N. Y.—*Improvement in Sector Presses.*—Patented April 5th, 1853.

This press consists in the employment of two sectors, D C, working face to face, C only being eccentric, and the other an arc of a circle, the concentric sector working on a centre or axis which is fixed during the pressing operation, and the eccentric sector having the punch B, or other appendage, to which the motion is given to obtain



the pressure, hinged to it at its centre or axis, and having one or more bearing pieces F F attached, of such form, and in such position, that as the sector is returned to relieve the punch, or equivalent of the pressure, the said pieces will be brought in contact with a suitable rest, at *h h*, upon the press frame; and by causing the axis of the sector to be drawn up, or back in the opposite direction to that in which it moves to give the pressure, it will raise or draw back the punch, or other pressing appendage. The power is applied to the eccentric sector C by the lever H.

Claim.—One or more bearing pieces F F, at the sides or in front of the eccentric sector C, acting upon any fixed point or rest, as at *h h*, on the press frame, for the purpose of raising or withdrawing the punch or pressing appendage, by power applied to the sector, in the reverse direction to that by which the pressure is given. Also, allowing the eccentric sector a sufficient amount of motion, directly in the line of the pressure, to enable it to follow and always keep in contact and in proper relation to the eccentric sector.

No. 9,652.—Elliot Savage, of Berlin, Conn.—*Improved Machine for Cutting the Threads of Wood Screws.*—Patented April 5th, 1853.

[Extensive drawings, and a very lengthy description would be necessary to convey an intelligible idea of the construction and operation of this invention.]

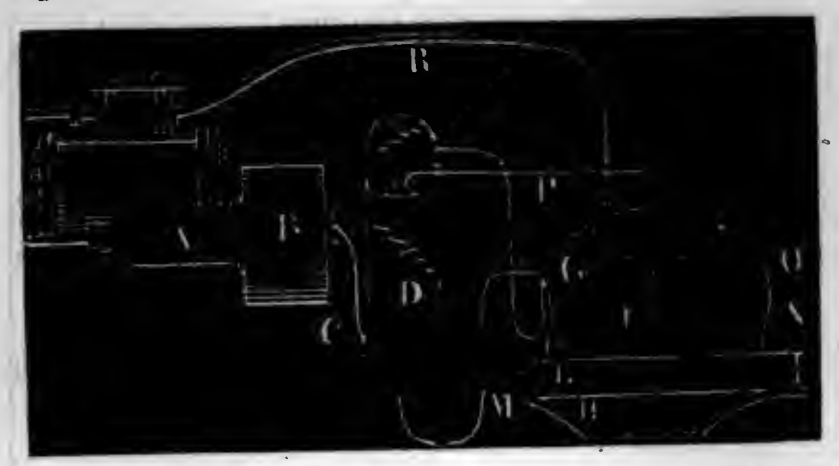
Claim.—The endless elongated chaser, as constructed, and made to turn and move on a pin or its equivalent, and to act against a screw blank, while in rotation and movement, as specified. Also, the feeding cam or apparatus, as applied, so as to be operated by the chaser, and feed it forward against the screw blank. Also, the movable rail and groove, together with mechanism for elevating and depressing the rail; the mechanism for such purpose being the two grooves, and their inclined planes, and the studs, and the springs of the rail. Also, mechanism for withdrawing the driver from the head of the screw, or releasing the screw from the machinery by which it is put in rotation; mechanism for removing the cut screw from the endless chaser, and presenting another screw blank to the operation of it as described. The mechanism for restoring the driver and other parts to their correct position, to again set in motion the screw cutting machinery; the machinery as described for actuating the driver, being a cam, a pitman, a rocker shaft, bent arm, and forked lever; that for removing the cut screw from the chaser and presenting it to a fresh screw blank, being the rotary blank holder, the gear wheel, and the arms; that for restoring the parts to their correct position, to again set in motion the screw cutting machinery, being the pitman and the spring, the whole being applied and made to rate together.

No. 9,653.—WILLIAM SMITH, of New York, N. Y.—*Improvement in Weaving Corded Fabrics.*—Patented April 5th, 1853.

The object of this invention is to furnish means for weaving fabrics formed by a centre warp of India rubber, for corrugated elastic goods, or any similar warp, which is inclosed by a fabric formed on each side of it, by filling from two shuttles, one passing above and the other below the centre warp, which is stationary, the sheds being formed by upper and lower warps, worked in any usual manner.

Claim.—The process of forming a fabric, by the combination of stationary and movable warps, with two weft threads, passed simultaneously through the two sheds, formed above and below said stationary warps; the wept threads being held in place in the manufacture of stationary warps by the movable warps.

No. 9,654.—WILLIAM MT. STORM, of New York, N. Y.—*Improved Process for Mixing Air and Steam for Actuating Engines.*—Patented April 5th, 1853.



The improvement in this method consists in generating the steam from graduated quantities of water, in a comparatively dry vessel or "heater," by which plan the amount of steam formed in a given time may be controlled sufficiently, so that the quantities of air and steam admixed may be more constantly and closely proportioned. In the fig. A is the air-pump; B, small receiver; C, pipe leading to water charger D, stuffed with fine tangled wires, in which the air is charged with the necessary moisture; E, charge pipe to the air and steam chamber G, also stuffed with wire mattress; H, furnace; I, fire dome, with chimney; L, heating chamber of supply water; M, supply pipe; N, pressure valve; O, steam escape pipe. The jet pipe P leads the heated water into chamber D, to the rose in the charger; R, the closed pipe leading to the engine cylinder.

Claim.—Generating the steam for intermixing with the air or other gaseous body, in contact with the latter, the air or gas not being the hot product of combustion, nor to arrive at the place of admixture from direct contact with any body of fuel undergoing combustion. Also, the plan of generating the steam for such purpose in some (comparatively) dry vessel or heater; the water from which the steam is so generated being mainly held, while evaporating, *in suspension in the air*, for the objects specified; and the air and water, to that end,

being caused by some adequate means to meet with an extensive surface of mutual contact, as explained, &c.

No. 9,655.—GREGOR TRINKS, of Jersey City, N. J.—*Improvement in Car Brakes.*—Patented April 5th, 1853.

The nature of this invention consists in the providing and manner of operating a shoe or brake frame, the sides and ends of which are parallel to the truck frame, and placed either inside or outside of it, the frame being provided with shoes, which stand over the line of the track; and so arranging the two frames that their entire weight may be transferred from one to the other, and so that when the train is in motion the truck frame shall carry the shoe frame, and when the train is to be stopped the shoe frame shall support the truck and its frame, or such portions thereof as the emergency shall require, raising the wheels from the track, and allowing the shoes on the brake frame to slide on the rails, and thus retard the speed of the cars, and that without any sudden jar. The shoe frame K is made of iron; O O are stationary catches, into which the hooks *a a* on the ends of the oscillating shafts catch, and support the shoe frame. When the brake is at rest, a lever *d* extends down from each shaft *b*, and is hinged to the rack bar *e*, so that the rack bar *e* is moved backward or forward by means of the lever *f*, an oscillating motion will be given to the shafts *b b*, which motion throws the cam hooks *a a* into or out of connexion or operation, and raises or lowers the shoe frame, so that the shoes *i i* thereon shall come in contact with or slide on the rails.

Claim.—So combining the shoe frame with the ordinary truck or car, as that it may be raised or lowered by the operation of the brake lever, so as to be carried by the truck, or to receive the weight of the car to aid in applying the brakes, and so that the wheels shall not come in contact with the shoes but be free to turn. Also, giving the truck or car a motion independent of the shoe or brake frame, by means of the curved inclined planes, or their equivalents, on the shoe frame, up which the axles of the trucks may roll, by an easy, swinging motion, whilst its entire weight continues to aid in applying the shoe or brake to the surface of the rails.

No. 9,656.—JOHN J. UPDEGRAFF, of Selins Grove, Pa.—*Improvement in Stoves.*—Patented April 5th, 1853.

This improvement consists chiefly in arrangements of the parts of the stove, so as to combine an extensive radiating surface with an extensive air-heating surface. Also, other arrangements or combinations for the economizing of heat. (See fig.) A is a central air-heating tube, extending from the base of the stove through the fire-pot to the top of the stove; between this tube and the fire-pot an annular

space is left, or fire chamber E for the coal. The pot is so cast as that a part of the tubes are without the fire chamber, and so as to be joined firmly by their continuous sides. The air enters the bottom of these tubes, and ascends into the passage C.

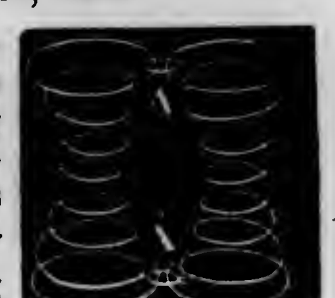
Claim.—The combination of the central hot-air passage, the annular fire chamber, and tubular fire pot, for the full economy of heat. Also, the combination of the outer casing P, the tubular fire pot, and central hot-air passage, so that the currents of each may all unite and co-operate.

No. 9,657.—WILLIAM BERLIN, of Berryville, Va.—*Improvement in Harrows.*—Patented April 12th, 1853.

This invention (or improved harrow) is constructed of two frames, made of bars or straps of iron from three to five feet long, and one to one and a half inches wide, and half an inch thick. The lower frame B (see fig.) is attached to the upper frame A by studs or adjusting bolts C, whereby the lower frame can be elevated or depressed, so as to lengthen or shorten the drag or dip of the teeth D.

Claim.—Constructing a double frame-work of iron bars or straps of metal, and *arranging* and *combining* the two together, by graduating bolts, or adjustable screws and taps C (fig. 1), by which means the lower frame B can be elevated or depressed, and the teeth lengthened or shortened in their drag or dip.

No. 9,658.—EDWIN L. BUSHNELL, of Poughkeepsie, N. Y.—*Improvement in Spring Mattresses.*—Patented April 12th, 1853.



This improvement consists in connecting the top and bottom coil of each spring firmly to its fellows, at each point of contact, with strong twine A A; the coils at the angles of the parallelograms having two, those in the outer rows three, and those in the interior each four ligatures, so that the whole cluster is firmly united. The springs thus united mutually support and keep each other in place.

Claim.—The mode or principle of securing the springs by attaching the free extremities of each spring to the terminal coil of the adjacent spring, so that they mutually support each other without the use of any inflexible frame of wood or other material; at the same time that in rolling or folding up the mattress, the outside ends of the springs are exposed or open, while the inside ends contract or close, and thus it may be rolled or folded upon itself, or compressed.

No. 9,659.—H. L. FULTON, of Chicago, Ill.—*Improvement in Smut Machines.*—Patented April 12th, 1853.

The nature of this invention consists in the employment of a circular collar, or prism-shaped concentrator, secured to and round the inner periphery of the concave or outer casing. The concentrator being placed between each pair of revolving scouring plates, and inclining towards the centre of the machine, for the purpose of throwing the grain (as it is thrown against the inner periphery of the casing) back towards the centre of the machine upon the inclined fans and second scouring plate; and thus the grain is prevented from passing down between the inner periphery of the case, and the outer periphery of the revolving dish-shaped plates, before it is perfectly cleaned. Also, in the employment of the revolving dish-shaped scouring plates, in combination with the prismatic ring, or the case, for the purpose of concentrating and directing the grain from one beater to the other.

Claim.—The circular prismatic shaped brace and concentrator, arranged between each pair of revolving scouring-plates, and secured to the inner periphery of the case, for the purpose of concentrating the grain, and throwing it upon the second scouring plate, and preventing its escape, as above mentioned. Also, in combination with the revolving dish-shaped plates or beaters, the prismatic ring for the purpose of concentrating and directing the grain from one beater to the other.

No. 9,660.—REUBEN F. GUSTINE, of Chicago, Ill.—*Improvement in Match Splint Machines.*—Patented April 12th, 1853.

The nature of this invention consists in splitting the block for matches while supported on a convex surface or rest *i* (see fig.), by means of a reciprocating knife C, acting in the line of the radii of the convex rest *i*; the grain of the wood in the line in which the split is required to be made coinciding with the radii of the rest in which the knife works; the curvature of the rest permitting the free ends of the splints to separate without obstruction whenever the knife penetrates the block, so that the splitting will be effected with facility, and with expenditure of a small amount of power. C represents the reciprocating knife; D, the belt; E E′, pressure rollers; *i*, the rest roller, with a feeding ratchet; *g*, the block to be split.

Claim.—The combination of the reciprocating knife with a convex or protuberant rest and feeding and holding mechanism, and the pressure roller E′, or any equivalent therefor, for the purpose described.

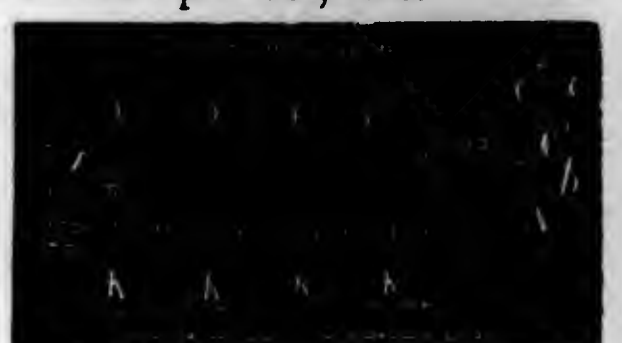
No. 9,661.—JACOB J. HATCHER, of the District of Spring Garden, Pa.—*Improvement in the Apparatus for testing the Genuineness of Coins.*—Patented April 12th, 1853.

The nature of this invention consists in providing a case or chamber in which the coins may be permanently held between a movable

spring bar D (see fig.) and the top of the case, in such manner that when one coin is drawn out the next will rise in its place, and so on until all are raised and drawn out; and in furnishing a coin-case with a weighing or gauging apparatus, so arranged as to be slid within, and be entirely protected by the case, when not in use, by which means it is easily kept in order, and conveniently drawn out when required for testing coins. A represents the case; B, spiral spring; D, metallic movable pad; E, metallic pad; F, coin; G, slide which forces out the coin. In the lower case, between plate C and bottom plate J, is a sliding, weighing, or gauging apparatus K M, which is retained by the screw connected with the bottom plate.

Claim.—A coin safe or receptacle, consisting of the arrangement of the outer case A; spring B, with its pad for holding the coin up against the top of the case; and slide G, with its projection, or their equivalents, for forcing out the coin through the slot provided for the purpose.

No. 9,662.—Samuel W. Hawes, of Boston, Mass.—*Improvement in Manufacturing Rosin Oil.*—Patented April 12th, 1853.

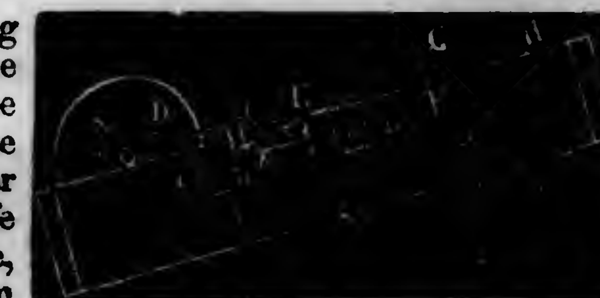


This improvement consists in the arrangement of the pipes *f f f f*, so as to discharge the oil during the process of distillation, and to separate it from the spirits, acid, and naphtha. The object in part is to free the oil from smell, and make it of a better color and quality than when manufactured in the common way. A represents the cast-iron still; *e*, a rosin reservoir; *c'*, the long branch extending to the bottom of the still, and serving to blow off the residuum; branch *c''* to charge the still with rosin; *b*, steam pipe; *f f f f*, pipes connecting with the alembic, of about 7 inches diameter; K K K K, are small coolers containing worms; X, is the large worm.

Claim.—In the process of making rosin oil, the charging and discharging the still, by means the same in principle as set forth, whereby the necessity of unluting is saved, and the incrustation of the still is prevented. Also the separating of the oil from the more volatile products, at different and distinct points, remote from the still, instead of discharging them all together as heretofore done, by means of the series of recurved pipes, in combination with the series of condensers attached thereto, as set forth.

No. 9,663.—Simon Ingersoll, of New York, N. Y.—*Improvement in Shingle Machines.*—Patented April 12th, 1853.

This invention relates to an improved machine for cutting shin-



gles from the block, and giving them the requisite bevel, at one operation, and with the same machine, by means of a frame having a reciprocal rectilinear motion, the frame having a knife on its upper board or surface, which splits or cuts a strip from the under surface of the block; the strip, after being cut from the block, is thrown, by means of a clasp acted upon by a spring, upon the lower board of the frame, when it, under a stationary knife or cutter, is given the desired bevel, and thus formed to the proper shape for a shingle.

The employment or use of the spring clipper K, in combination with the riving knife, constitutes this invention. G, is the block from which the shingles are cut; F the bed; H, the stop; B, the frame, to which the motion is communicated by the crank C; E, the knife; K, the clamp or clipper, upon which the strip cut from the block G falls and is thrown upon the bottom board *d*.

Claim.—The spring clipper K, operated as described, in combination with the riving knife, for the purpose of insuring the complete separation of the shingle from the block, and at the same time throwing it on the lower bed, in position to be carried to the dressing knives, by the next advance of the driver.

No. 9,664.—Edward A. Tuttle, of Williamsburgh, N. Y.—*Improvement in Hot Air Registers and Ventilators.*—Patented April 12th, 1853.

This improvement consists in ornamenting the leaves of ventilators or registers; and in so arranging the leaves as to dispense entirely with the ornamental top plate, now employed. (See fig.) *a*, a leaf.

Claim.—Constructing the leaves of a register or ventilator with projections on their surfaces, to form an ornamental open or fret work between the leaves, when they are turned with their edges uppermost or partially so, for the purpose of dispensing with the separate front or top plate of ornamental open work now employed on registers and ventilators.

No. 9,665.—William H. Johnson, of Granville, Mass.—*Improvement in Sewing Machines.*—Patented April 12th, 1853.

This improvement consists in the construction of a hollow rotary clamp composed of two skeleton disks or shells, meeting closely at their perimeters, so that the cloth can be folded in the interior of the clamp while the seam is arranged around the edge; this clamp being so operated as to render the machine self-feeding.

Claim.—The use of a hollow rotary clamp, for holding and feeding cloth or other material to be sewed.

No. 9,666.—Benjamin Franklin Upton, of Bath, Me.—*Improvement in Mercury Baths for Daguerreotyping.*—Patented April 12th, 1853.

In this improvement, the heat of the lamp is received by the cast iron bottom A, which is made in the form of a hopper. B is a wooden box secured to A; the bottom of the latter has a projection *w*, through which a screw passes, and secures it to the wooden stand C; and from projection *v* extends a knife-edge lip downwards into a recess or notch made into the upper side of metallic rod F, resting upon a knife-edge or lip *g*. G is a movable platform regulated by screw *k*, upon which the lamp E is placed. The lamp has a tube allowed to play freely, and suspended to the end of rod or lever F. The heat received by the bottom A and the mercury in the bath will cause the bottom to expand lengthwise, and thereby press the upper knife-edge against the outer side of the upper notch of the lever F, and so as to tilt or cause the inner arm of the lever to rise and lift the slide tube on the wick and diminish the flame. Should any sudden current of air reach the bath, or any diminution of heat take place, a contraction of the bottom will follow, which will cause a depression of the lever and tube whereby the flame will be increased.

Claim.—The improvement of combining with the mercury bath and the lamp for heating it, the slide tube L and the lever F (or their equivalent), so that by the expansion of the bath the lever may be moved, so as to elevate the slide tube on the wick, and decrease the flame and consequently the heat thereof, and thus maintain, or nearly maintain, equality of evaporation.

No. 9,667.—Charles Wilgus, of West Troy, N. Y.—*Improvement in Clothes Washing Machines.*—Patented April 12th, 1853.

This improvement consists of a drum or net cylinder G, which is supported by rollers geared together F F F F, working a centre cog wheel I; the pressure rollers L L L L L L, are made to yield by means of springs; the cloth to be operated upon is brought between the revolving net cylinder G and pressure rollers L L L L.

Claim.—The employment of the revolving feeding net cylinder G, in combination with the two sets or circles of rollers F F, and L L, one set of said rollers being allowed to yield when the clothes are drawn round the net cylinder, and between the two sets of rollers, as described; for the purpose of washing clothes, and fulling and flocking cloths.

No. 9,668.—Charles Goodyear, of New Haven, Conn.—*Improvement in manufacturing Articles composed of Gutta Percha, &c.*—Patented April 12th, 1853.

This invention consists in using or employing sand, pulverized soapstone, plaster, or some similar granular or pulverized or porous matter, or moulds made of porous substances, to sustain and keep the form of moulded or modelled articles composed of caoutchouc or its compounds, and other gums, during the process of vulcanization, in proper shape and form. The caoutchouc or other gums are taken in a green state, and formed into the exact shapes desired, then covered with pulverized soapstone, or other similar granular adhesive powder; they are placed in a box and heated to 200° or 300° Fahr. from 3 to 7 hours, when the articles are vulcanized.

Claim.—The above description sets forth the claim of the inventor substantially.

No. 9,669.—Cullen Whipple, of Providence, R. I.—*Improvement in Shaving the Heads of Screw Blanks.*—Patented April 12th, 1853. Antedated November 30th, 1852.

This invention relates to the method of shaving the heads of screw blanks, and consists in moving the cutter that performs this operation against the head of the blank, in either a curved or straight line, but always in a direction oblique to the axis of rotation of the blank, and in or nearly in a line with the under side of its head, so that the pressure of the cutter against the blank may be mainly in the direction of its length, thus avoiding the great tendency to force it out of the jaws by lateral pressure, which always exists, when the tool approaches it at right angles to its axis of rotation; by which arrangement the use of a rest is dispensed with, which insures the production of a round head on the blank, whether the wire of which the blank is made be round or otherwise.

Claim.—The method of shaving the heads of screw blanks by causing the cutter to approach the blank obliquely, and in or nearly in a line with the under side of the head, whereby the use of a rest to support the blank against the pressure of the cutter is dispensed with.

No. 9,670.—Francis A. Calvert, of Lowell, Mass.—*Improvement in the Feed Motion to Willowers.*—Patented April 19th, 1853.

The distinguishing feature of this improvement consists in using, in connexion with what is usually known as the Oldham Willower, a set of feed rollers, to which an intermittent motion is imparted, so as to feed the cotton to the cleaning cylinder in allotted quantities, from time to time, and distribute it evenly over the cylinder; by which it becomes more quickly and thoroughly cleaned than when the said allotted quantities are fed in by hand, in the manner now practised.

Claim.—The combination of a set of feeding aprons having an in-

termittent motion imparted to them, with the cleaning cylinder, for the purpose above set forth.

No. 9,671.—James M. Cook, of Taunton, Mass.—*Improvement fot Excluding Dust from Railroad Cars.*—Patented April 19th, 1853.

This improvement consists in the construction and application of a deflector, made to extend vertically up against the outside of the window, and horizontally underneath the window; the vertical part being seen at *a*, the horizontal at *b*. The guard projects about six inches from the side of the car.

Claim.—The above description and cut fully set forth the claim of the inventor.

No. 9,672.—Phineas Emmons, of New York City.—*Improvement in Machines for Planking Hat Bodies.*—Patented April 19th, 1853.

This improved machine is constructed of a box or trough, in which two rollers (see fig.) are placed, and over which passes an elastic endless apron F; and combining the same with a circular faced rubber G, arranged on a rock-shaft, so as to produce a rolling and pressing of the hat body as it passes through the machine, in consequence of a revolving and vibrating motion being given to the endless apron, by pawls working from a cross-head on the rock-shaft, and operating ratchet wheels C C on the carrying rollers of the endless apron F; thereby producing an effect analogous to that obtained by shrinking or sizing wet bodies by hand.

Claim.—The combination of a reciprocating rotary rubber or presser, with an endless elastic apron, so that by vibrating the rubber, a reciprocating, intermittent, *differential* movement is given to the apron, thereby operating on both sides of the body, and working it forward at the *same* time.

No. 9,673.—James S. Hartupee and Abram Alexander, of Pittsburg, Pa.—*Improvement in Machines for Rolling Bar-Iron.*—Patented April 19th, 1853.

This invention or machine consists in the application of four rollers for expanding bar-iron, the rollers having their axles movable, so as to expand or contract the space comprised between their faces, and thus render it equally appropriate for the fabrication of different sized bar-iron. The rollers are combined or applied as seen in the figure; S and T are horizontal, and G and M are the vertical rollers.

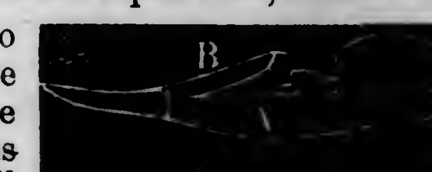
Claim.—The combination of the four rollers in such a manner that by raising or lowering the upper roller S (to form a thick or thinner bar), one of the vertical rollers will be raised or lowered with it, and at the same time the peripheries of all the rollers be kept in contact, and in their proper relative positions to each other; and also by moving the lower roller T endwise in its bearings, to make a narrower or broader bar, the vertical roller will be moved laterally with it, and all the rollers be kept in contact.

No. 9,674.—Alexander McPherson, of New York City.—*Improvement in Stoves and Ranges.*—Patented April 19th, 1853.

The nature of this invention consists in combining the construction of the grate with the mode of carrying the flues down the ends of the range and under the oven.

Claim.—The arrangement of the vertical end flues, and diagonal cross-plate under the oven, for causing the gas to traverse the entire surface of the oven of the cooking range.

No. 9,675.—John H. Manny, of Waddam's Grove, Ill.—*Improvement in Cutter-Fingers of Harvesters.*—Patented April 19th, 1853.



The cutter-finger is made of two pieces distinct, A and B, one above the other. The cutter plays between these two parts. The object of this invention is to keep the cutter and fingers clear of all impediments, as wire-grass, straw, grain, or grit, in the openings through the fingers which form the race or guide of the reciprocating cutter.

Claim.—Constructing the lower part of the finger, or the upper, or both, with a recess on either side in front of the finger-bar, and an angular ridge between the two recesses, to cut entangled fibres, whereby the clogging of the cutting apparatus is effectually prevented. Also, constructing the fingers so that the sides of the upper half will overhang those of the lower half, the cutter playing between the two.

No. 9,676.—Samuel Miller, of Washington College, Tenn.—*Improvement in Cotton-seed Planters.*—Patented April 19th, 1853.

The annexed figure represents a section of this planter. The wheels A are attached to axle B; in the hopper D are ribs or slats E, through which the teeth or spikes G of the cylinder B pass, for the purpose of forcing the seed out of the hopper or seed box. After the seeds are forced out they fall upon a guide or hopper H, and then into the furrow opened by plough I. Two shovel ploughs L, which straddle the furrow, throw the earth back into the furrow, covering the seed.

Claim.—The combination of the open or latticed bottom of the seed hopper, with the teeth on the axle passing through them into the hopper for the purpose of drawing or forcing out the seed, so that they may be drilled into the ground.

No. 9,677.—THOMPSON NEWBURY, of Taunton, Mass.—*Improved Machine for Pointing and Threading Wood-Screws.*—Patented April 19th, 1853.

This machine is too complicated to permit of a concise description. A full description would be too voluminous for this Report.

Claim.—The detached tool posts, combined and arranged with the comb-arm and arm for carrying the threading tool.

No. 9,678.—AMASA WOOLSON, of Springfield, Vt.—*Improvement in Gig Mills, for Dressing Cloth.*—Patented April 19th, 1853.

The operation of this machine is as follows: At the commencement, one end of the cloth is secured to the roller *b*; it is then passed over the rollers *a*, as indicated by the dotted line in the figure, coming twice in contact with the surface of the main drum c, and passing beneath the rollers *a'*, is wound upon the other roller *b'*. The machine being now set in motion, the lever w is moved so as to bring the wheel s into gear with the wheel *d*, the latter is revolved in the direction indicated by the arrow, and the cloth is wound upon the beam *b*, and unwound from *b'*; the main drum c in the meantime, revolving rapidly, comes in contact with the cloth as it passes at the points *b b''*, and the teaselling is effected. In order to the more perfect performance of this operation, it is necessary that the surface of the cloth be operated upon by the teasels longitudinally in both directions. For this purpose the cloth is detached from one of the rollers *b* or *b'*, and entirely wound upon the other; the auxiliary carriage is then revolved, reversing the positions of the cloth rollers *b*, *b'*, and the cog gearing *d*, *e*. The operation is thus reversed.

Claim.—A gig-mill or other machine for dressing cloth, with the cloth rollers hung in a revolving carriage, or its equivalent, by means of which the cloth is run in a reversed direction through the machine without the necessity of unwinding it from and rewinding it upon the cloth rollers, as herein before practised.

No. 9,679.—WILLIAM WICKERSHAM, of Lowell, Mass.—*Improvement in Sewing Machines.*—Patented April 19th, 1853.

The claim of the inventor will enable those acquainted with sewing machines to understand this improvement.

Claim.—The combination of a single needle and two thread guides (carrying separate threads), so operated that during one passage of the needle through and out of the cloth or other material to be sewed, one of the guides shall lay its thread in the hook of the needle, each guide acting alternately. Also, making one of the guides with a long slot, for receiving the thread in its passage to and through the other guide.

Also, the peculiar mode of sewing cloth or other material by combining two threads with the fabric, by drawing them through each other's loops, interlooping them in plegma stitches, so that the threads alternately bind each other. Also, the improved arrangement of applying the closing slide of the hooked needle to the same side as the barb or hook, so that it may slide in a groove in the needle or carrier, parallel to the motion of the needle, in the manner and for the purpose as specified.

No. 9,680.—SAMUEL L. DANA, of Lowell, Mass.—*Improvement in the Mode of Purifying Rosin Oil.*—Patented April 19th, 1853.

The oil is combined with an alkaline, earthy, or metallic base, by heating in an open kettle with constant stirring (one pound of lime to one gallon of the oily product of rosin). This mixture begins to thicken at a temperature of about 230° Fahr., and is thickest at 260° Fahr. It then gradually becomes thin and liquid, and after being kept heated about eight hours, a glutinous mass is formed, at a temperature of about 360° Fahr., which when cooled becomes a plastic substance; this is distilled, and the oil is freed from its peculiar odor and fit to be combined with sperm or other oil for the purpose of lubrication.

Claim.—The above described operation (for the purpose therein set forth) fully covers the claim of the discoverer.

No. 9,681.—HENRY BESSEMER, of Baxter House, England.—*Improvement in Sugar Drainers.*—Patented April 26th, 1853.

The annexed figure represents a section of the apparatus for carrying into practice this mode of cleansing sugar; *b*, *b*, hollow table; *l*, the pipe for the air pump to form a vacuum; *n*, a pipe connected with the suction pump to carry off the fluid; *h*, wire-gauze surface;

v, shaft with pulleys and cog wheel on the other end for the purpose of revolving the hollow table.

Claim.—The combination of the revolving and hollow spreading table, formed with a wire gauze or perforated top (and connected with an air-exhausting apparatus), the spreading mechanism, the water sprinkling pipe or its equivalent, the means of discharging the water and molasses, and that of removing the cured sugar.

No. 9,682.—SAMUEL COOK, of Brockport, N. Y.—*Improvement in Smut Machines.*—Patented April 26th, 1853.

The cylinder and screening and scouring plates in this smut machine are provided with holes, through which a draught of air is drawn into the machine by fan-blowers J and L, which passes through the holes and brush, and so that, whilst the brush wheels H and I are agitating the wheat or grain on the plates, the draught through the plates will carry off all the finer particles, separating the full wheat from the shrunken, and both from the smaller seeds, such as cockle, chess, &c., and by the same operation divest and separate the wheat from smut and other impurities.

Claim.—The construction, combination, and operation of the fan, screening plate, and brush in the cylinder, and the openings and tubes or pipes leading therefrom; when the fan is placed below and the brush above the plate, so that the blast created by the fan shall be drawn through the plate, and also when the cylinder is provided with discharge openings and tubes for conveying off the full wheat, the lighter grain, and the dust, in separate directions. And this is claimed whether the same be effected in a single cylinder or in two or more, if the construction and operation are substantially the same.

No. 9,683.—EZRA COLEMAN, of Philadelphia, Pa.—*Improvement in Machines for Folding Envelopes.*—Patented April 26th, 1853.

The claim of the inventor will enable those acquainted with similar machines to understand this improvement.

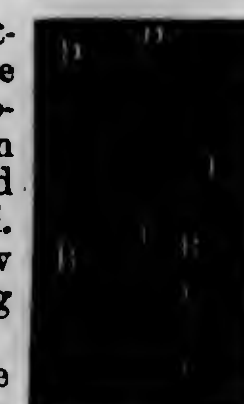
Claim.—The lifter, which acts in the double capacity of taking the paper from the package to the folders, and holding it while the ends are being folded. Also the folders in combination with the pedals, in such a manner as to hold the paper by the end folders pressing it upon the bed while the sides are being folded, the connexion between the pedals being through the medium of racks and pinions, and pulleys, or other analogous devices. Also, the arrangement of a roller in combination with the handle, by means of arms, rock-shafts, and levers, or other analogous device; so arranged that the simple action of raising and lowering the handle distributes the paste. Also, the roller for the purpose of removing the paper, after it has been folded.

No. 9,684.—REUBEN DANIELS, of Woodstock, Vt.—*Improvement in Straw-Cutters.*—Patented April 26th, 1853.

The object of this improvement is to adapt this machine to the cutting of brush wood and twigs, with a view to reduce them to a granular state. D represents the straight rotating plates, with set screw; C, the feeding apparatus; E, the adjustable bottom edge.

Claim.—The combination of a series of straight rotating blades, whose cutting edges are equi-distant from and parallel to a common axis of rotation, and hence describe a cylinder when they rotate, with a fixed blade having a curved edge given to it, and corresponding to a line drawn obliquely on the cylinder generated by the rotating blades, and set in a position coinciding with that line; whereby a series of straight knives on a cylinder are made to cut obliquely, or with a shearing cut, by the oblique adjustment of the fixed blade only.

No. 9,685.—WILLIAM P. MERRIAM, NORMAN C. HARRIS, WILLIAM WHEELER, and EDWIN N. MERRIAM, of Poultney, Vt.—*Improvement in the construction of Candlesticks.*—Patented April 26th, 1853.



The nature of this invention consists in so constructing candlesticks made of sheet metal as to save the labor and cost of brazing or soldering the parts together, as has heretofore been the mode. Also, in saving the cost and labor of the bolt and nut, used heretofore in attaching the bottom parts to the barrel. Also, in saving the cost and labor of cutting a screw on the stem of the thumb piece, and in the spring and lifter, as formerly.

The barrel is placed in a disk *c* (as shown in the figure), secured by ring B; to prevent the barrel from being forced in there s a plate F, inserted at the bottom of the barrel; the lifter *i* is made with a spring. The top of the barrel is held together by the heading, which is provided with a handle.

Claim.—The mode of constructing candlesticks of sheet metal substantially as described.

No. 9,686.—JAMES BOLTON, of Richmond, Va.—*Improvement in Hot Air Furnaces.*—Patented April 26th, 1853.

The nature of this invention consists in packing the space called

the air chamber, between the stove, furnace, or other heating contrivance, and the wall which incloses said chamber, with metallic scraps twisted into a spiral form, or bent into other shapes, so as to allow a space between these scraps for the passage of air, these scraps possessing the property of conducting heat, and absorbing that which is radiated, and of imparting the heat to the air within the chamber.

Claim.—The claim of the inventor embraces the above description.

No. 9,687.—STEPHEN F. PALMER, of New York, N. Y.—*Improvement in Towing Apparatus for Canal Boats.*—Patented April 26th, 1853.

The nature of this invention consists in arranging a drum or wheel with a winding spring upon its axle, placed in the rear of the usual position of the towing post; the perimeter of the wheel being grooved so as to admit of the tow line being wound upon it, with a brake operated by a lever; whereby the taking in and letting out of the line, and the slacking of the line in passing boats and to assist the team in starting, are regulated, causing the boat to move moderately forward as the line unwinds by the forward movement of the team.

Claim.—The arrangement of the wheel, and the spring wound upon its axle and fastened to the frame, with the brake and the tow line.

No. 9,688.—THOMAS J. SLOAN, of New York, N. Y.—*Improvement in Machines for Pointing and Threading Screw-Blanks.*—Patented April 26th, 1853.

This invention consists in combining in an organized machine a cutter and its appendages, for forming the point on screw blanks, with the chaser or cutter, which cuts the thread over the shank and pointed part thereof, down to the point.

Claim.—The above literally sets forth the claim of the inventor.

No. 9,689.—THOMAS B. STOUT, of Keyport, N. J.—*Improved Potato Digger.*—Patented April 26th, 1853.

This potato digger consists of a cylinder B (see fig.), having teeth *a a a*, so arranged as to take out the potatoes from the hills or drills. G is an inclined apron which conveys the potatoes into the box H. The apron has a shaking motion, which is given to it by the cam I attached to the side of the cylinder. To the cylinder, also, cog wheels are attached on both sides, which gear into another set of such wheels attached to the axle D, which is provided with teeth *g g*, which mash into teeth *h* on a shaft J placed at right angles to the axle D, and running longitudinally with the frame. This shaft has beaters *i* upon it, which revolve over a forked cutter K; the beaters force the vines, weeds, or grass against cutting edges at *j* of the forked cutter K.

Claim.—The cylinder B with the teeth *a* attached to its periphery, in combination with the beater *i* and forked cutter K; the cylinder, beaters, and cutter being constructed and arranged in the manner described.

No. 9,690.—SAMUEL D. TILLMAN, of Seneca Falls, N. Y.—*Improvement in Radiators for Stoves.*—Patented April 26th, 1853.

The figure represents three of these radiators differently constructed, and showing the position and shape of the tubes. In radiator *a*, *f f f* represent a series of flattened tubes or pipes arranged within a case *e*, which may be of sheet or cast iron, of cylindrical, square, or other form. These pipes must be made of sheet iron or other metal and extend from the bottom to the upper head of the radiator, and have their edges rounded for the twofold purpose of allowing an unobstructed passage to the smoke draught around one edge, while the other edge presents but a single line of contact with the case *e*, giving the largest surface for exposure to the heating influence.

In the radiator *b*, which is a modification, involving the feature of the sheet iron tubes with the cast iron heads and flanges, these tubes are arranged concentrically, each leaving a vertical space or opening *m m* from top to bottom.

In radiator *c* there is a spiral smoke-flue *h*, and a diminishing air-space *f*, as in *a* and *b*.

Claim.—Having the entrance and exit passages on the same horizontal line with the radiator, or nearly so, and at or about the position of the line of the middle horizontal section of the radiator, when such arrangement of these passages is combined with a series of flattened tubes or air-passages, and horizontally winding smoke-passages. Also, in combination with the vertical air-spaces and smoke-passages formed by the flattened tubes, the successive contraction of the air-spaces; that is to say, the air-spaces varying in thickness, or in the width of their cross-section, as they recede from the source of heat; each tube being of uniform width or thickness throughout, but narrower or thinner than that which precedes it.

No. 9,691.—ALFRED J. WATTS, of Utica, N. Y.—*Improvement in Process for Preparing Gold for Filling Teeth.*—Patented April 26th, 1853.

The nature of this invention consists in dissolving gold in mercury,

and, after treatment by heat or otherwise, dissolving out the mercury by nitric acid, and then subjecting the now conditioned but as yet unfinished gold to the action of a particular heat, whereby it is rendered coherent, soft, and malleable, thus fitting it for the purpose of filling teeth.

Claim.—The processes, as described, of preparing or crystallizing gold for the purpose of filling teeth.

No. 9,692.—David Marsh and Bennet Whitney, of Fairfield, Conn.—*Improvement in Rice Hullers.*—Patented April 26th, 1853.

The grain is put into the screen 1, which separates the coarser parts, passing through into Nos. 2 and 3, and into the runner v. When the grain has passed the stones, it falls into the dentated cylinder O D. When it is sufficiently beaten, it is discharged through an orifice, and passes off through spout *p*, which carries it through a current of air from the blower F, and finally falls into the receiver R.

Claim.—The two dentated cylinders and the dentated beating-arms running between them, to be used in connexion with the above described machinery.

No. 9,693.—Carl Ludwig Gran, of Hamburg, Germany.—*Improvement in Cementing Materials for Ornamental Compounds.*—Patented April 26th, 1853.

This compound is made of the curd of milk mixed with 30 per cent. of slaked lime. When in a semi-liquid state, the materials which are to give the character or color are mixed with the preparation of curd and lime. To produce veneers, or imitations of wood, saw-dust or various colored chips are mixed with the cement. When artificial stones are to be produced, fragments of various colored minerals or earth are substituted. Articles, such as ornaments, &c., may be moulded of this preparation or compound, and thus produced at much less expense than carving, &c.

Claim.—The method of making artificial veneers, &c., by combining with saw-dust (of various colors), or the equivalents thereof, the curd of milk, and lime or its equivalent, after these latter have been triturated, and thoroughly mixed, and reduced to a semi-fluid state.

No. 9,694.—Robert Adams, of London, England.—*Improvement in Revolving Fire-arms.*—Patented May 3d, 1853.

d, a spring bolt, when pressed forward, comes against a suitable

shoulder, or recess, formed on the hammer head, and retains it back while the revolving chambers are being charged. c^4 is a stud on the trigger, which enters any of a series of recesses to retain the magazine in place while the discharge occurs. When the trigger is pulled back, the sear c' lifts the hammer to a sufficient height for the action of the main-spring *j* to give it sufficient force to explode the cap, and the sear c' is thrown out of the recess e' by the projecting angular part of the cock, when the cock is forced back to the fullest extent.

Claim.—Combining with the frame *a* and the hammer *e*, the spring *d* for holding the hammer back. Also, the sear c' attached to the trigger by a swivel joint and acting on the hammer *e*. Also, the stop or projection *c* on the trigger for holding the chambers in position when firing.

No. 9,695.—Richard L. Hinsdale, of New York City.—*Improvement in Elastic Exercising Machine.*—Patented May 3d, 1853.

This machine consists of elastic bows (which are applied in such a manner as to sustain the person exercising, and tend to strengthen the muscles of the body, and expand the chest of the operator), and a spring platform and elastic reciprocators.

Claim.—The bows on their hubs, and the string and handles, either alone or in combination with the spring and vibrating platform, as described. Also, the elastic reciprocators. And thirdly, the bows on the brackets, or their equivalents, either alone or in combination with the spring platform, for the purposes of vertical exercise.

No. 9,696.—George Kendall, of Providence, R. I.—*Improvement in the Manufacture of Candles.*—Patented May 3d, 1853.

The object of this improvement is to diminish the manual labor and expense of moulding candles, and to perform many of the nicer parts of the operation automatically; which is accomplished by mounting the moulds upon cars, which run on cross railways on the floor of the moulding room. By running the car into an oven, the moulds are heated to about the temperature of melted fat, then carried by the car to a cauldron of melted fat and filled, and then run to one of the empty tracks; after standing until cool, they are removed upon the car to an apparatus by the aid of which the candles are drawn at one operation, and the moulds rewicked. To facilitate the transference of the moulds, the cars are carried about on trucks fitted with rails at right angles to the track on which they run, so as to be moved in any direction desired.

Claim.—The arrangement of the travelling and fixed railways, in combination with an oven for heating the moulds, a melting pot to

prepare the fat for casting, and apparatus for drawing the candles from the moulds.

Also, in combination with a series of moving stands of moulds, the counterpoised hooks or their equivalents arranged and operating to aid in drawing the candles and centring the wick in such manner as to dispense with much of the care and skill heretofore required for the performance of this operation. Also, an elastic or yielding cap for the lower end or tip of the moulds, which performs the two functions of stopper and friction-brake to stretch the wick. Also, the wick clamp.

No. 9,697.—Daniel Reid, of Washington, N. Carolina.—*Improvement in Manure Carts.*—Patented May 3d, 1853.

The object of this invention is to spread guano or other manure equally on the surface passed over by the cart, or to deposit the same in hills at regular intervals. This is accomplished by having on the axle on one side of the cart a small wheel *a*, with projections *g* on its rim; in the rear of this wheel there is a bar *b*, with a spring. This lever-bar is on the axle *c*, on the middle of which, and in the rear of the middle of the cart, is a fixed arm *d*, which, by means of another arm *e*, works the feeding or measuring box *f*. The box K has one half of its bottom open, from which the charge is dropped into the hill.

Claim.—The measuring valve apparatus beneath the lower hopper, in combination with the said hopper, for discharging manure as set forth, &c.

No. 9,698.—George W. Reid, of Evansville, Ind.—*Improvement in Corn Shellers.*—Patented May 3d, 1853.

This improvement consists in forming the feed hopper, shelling concave, and separator, in one connected and self-adjustable piece; and in the peculiar construction of the screens for the separation of the cobs and other refuse: *c* is the cylinder, *j* the concave, *k* the vertical spring, giving the concave complete mobility. The grains fall from the concave upon the conducting shute *f*, and the cobs are rolled around between the cylinder and the concave, and thrown upon the combined screens *g* and *h*.

Claim.—The combination and arrangement of the sloping longitudinal slat-screen *g*, and the transverse slat-screen *h*, for the rapid and thorough separation of the corn from the cobs, as they are thrown from the concave by the shelling cylinder upon these screens.

No. 9,699.—Paris J. Steere, of Cheshire, Mass.—*Improvement in Machines for Sawing Barrel-Heads.*—Patented May 3d, 1853.

In this machine the barrel heads are cut by two dishing circular saws, which are brought in contact with the stuff to be cut, one forming the short or upper bevel of the head, and the other the long or lower bevel.

Claim.—The finger *t* in combination with the movable shaft D, for the purpose of converting the curvilinear motion of the saw into a rectilinear motion.

No. 9,700.—James S. Taylor, of Danbury, Conn.—*Improvement in Machine for Shrinking Hat-Bodies.*—Patented May 3d, 1853.

This machine consists of any suitable number of rollers placed nearly horizontally upon a frame or vat, and so arranged as to form a cavity between them, of sufficient size to receive the hat when rolled up, after having been partially felted. *a a a* are the rollers, *b* the vat, and *c* the cavity. The rollers are provided with pulleys, and are driven by means of a cross-band.

Claim.—The process of shrinking or sizing the hat bodies, by passing them longitudinally into or through a chamber, formed by placing several cylinders or rollers (having concave or other denomination of surfaces) in such a proximity as to form the said chamber.

No. 9,701.—Charles N. Tyler, of Worcester, Mass.—*Improvements in Repeating Fire-arms.*—Patented May 3d, 1853.

The principal object of these improvements is to include or bring the whole lock (except the trigger) in so small a compass as to be contained within the stock.

Claim.—Arranging the cock in such a manner that it may be raised, and will stand up without being held by a sear or catch, and may then be gradually lowered again, without tripping, to fire the charge, or may be tripped to fire the charge, at the option of the operator.

Also, the movable stop, operated upon by a stud or button protruding through to the outside of the stock, in combination with the fixed rest and the jack, for the purpose of preventing the jack being thrown far enough back to clear the tongue through which the trigger acts upon it, whereby the escape of the driver or hammer is rendered impossible while the stop is in operation.

Also, the magazine constructed with a self-acting driver which places the cartridges in succession in front of the discharger; and with a discharger that will draw itself back, and place the pulling-rod in the proper position for transferring the cartridges into the breech, so that they may be transferred as required, by simply pressing with the finger upon the pulling-rod.

No. 9,702.—Samuel R. Wilmot, of New Haven, Conn.—*Improvement in Apparatus for Drawing Water and Conveying it from Wells, &c.*—Patented May 3d, 1853.

This apparatus consists of a bucket, suspended from a car running upon a curved wire track A (see fig.), the car B and bucket C being operated by means of a cord D, fastened at one end to the car, and held by the operator at the other. The figure represents the mode of fastening the wire to the post.

Claim.—The projecting stud *p*, in combination with the spring *e*, and grooved pulleys *f f*, for the purpose of contracting the spring *e* by the weight of the bucket, and causing the pulleys to grasp firmly the way.

No. 9,703.—Patrick O'Reilly, of Reading, Pa.—*Improvement in Rails for Railroads.*—Patented May 3d, 1853. Antedated November 3d, 1852.

The improvement consists in dividing the ordinary bridge, or any other rail having a flanged base, by a longitudinal division parallel, or nearly so, to the top of the flanges and arch, and the sides which join the arch and flanges, into two layers, plates, or half rails, of nearly equal thickness and weight. One is applied to the other by sliding the upper one over the under one, until the end of one is opposite the middle of the other, and then riveting or otherwise fastening them together in this position, so that they will reciprocally break joint with and support each other, thus giving greatly increased stiffness and strength to the track.

Claim.—The inventor's claim substantially embraces the above description.

No. 9,704.—J. Dutton Steele, of Pottstown, Pa.—*Improvement in Rails for Railroads.*—Patented May 3d, 1853.

The nature of this invention consists in making a rail of two parts, and which is composed of a flanged bridge or U-shaped rail of usual form, resting on an interior rail or splice plate of similar external form; the under side of the arch of the exterior rail forming a groove to fit over the arch or tongue of the splice plate, and the flanges of the one resting on the flanges of the other, said flanges being fastened together by rivets. This rail has a double bridge and double base so far as the interior rail or splice extends.

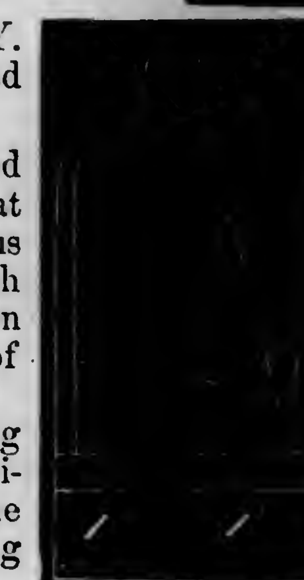
Claim.—The invention above described, whether the splice be longer or shorter, or the tongue or rib be hollow or solid.

No. 9,705.—Asahel G. Bachelder, of Lowell, Mass.—*Improvement in Countersinks.*—Patented May 10th, 1853.

The nature of this invention consists in a collar with a cutting lip on one end; the collar is provided with a set screw, so as to fasten it in the position desired upon bits or other instruments for boring, so as to countersink or ream the hole when it is bored to the desired depth, at one operation. *a* is the collar with the cutting lip.

Claim.—An independent countersink so constructed that it may be used on different sized bits or other instruments for boring, for the purpose of countersinking, as well as gauging the depth of the hole, at the same time it is bored.

No. 9,706.—Nehemiah Dodge, of New York, N. Y.—*Improvement in Pump Valves.*—Patented May 10th, 1853.



This improvement consists in forming an arched valve, the curvature of which is the same as that of the barrel of the pump. Its form may be thus described: Suppose two planes inclined to each other, passed through the barrel of the pump, then the lines x x will represent in projection the seats of this curvilinear valve.

Claim.—An arched valve, formed by passing two planes, inclined to each other, through a semi-cylinder of the same diameter with the bore of the pump—the sectional valve thus formed being hinged by one vertex to the interior of the bore.

No. 9,707.—Evan L. Evans, of Hartford, Conn.—*Improvement in Washing Machines.*—Patented May 10th, 1853.

This machine is constructed of two rubbers, which are suspended on brackets, the brackets being suspended from a cross-bar sustained by frames. One of the rubbers is secured to the lower end of the bracket, while the other is suspended on a similar bar, which is secured to the main bar by a hinge which allows the rubbers to be drawn together or forced apart by the operation at pleasure. The operation is performed by means of an apparatus adapted to that purpose. These rubbers act in combination with other rubbers corresponding to them, which are placed directly under them, one of which is secured firmly to a bar, while the other is allowed to slide freely on the same surface, which admits of its being drawn away from the one which remains stationary (which is done by means of a spring), or forced against it by means of a treadle and pulley. The bars on which the rubbers are secured are supported by means of spiral springs under them, which

allow the bars and lower rubbers to be depressed at pleasure, by means of a handle provided for that purpose.

Claim.—The combination of the rubbers and rod or handle for opening and closing the rubbers, it being the same handle with which the rubbing is performed.

Also, the combination of the two pairs of rubbers, with the rubbers and the bars, so that the two pairs of rubbers shall each of them grasp the cloth and rub it between them.

No. 9,708.—THOMAS S. MINNISS, of Meadville, Pa.—*Improvement in Invalid Locomotive Chairs.*—Patented May 10th, 1853.

(This improvement is sufficiently explained by the claim, which conveys a general idea of it.)

Claim.—The combination of the wheel, axle, and shank on the end of the projecting arm, by which a central support is given to the frame within the dish of the wheel—the bearing in the hub being central with the bearing of the rim, permitting a free lateral movement to the wheel, without changing its point of support to the frame, and enabling the wheel to receive any shock on its rim with firmness, while its plain surface is left unobstructed from the free movements of the crank and handle.

Also, the arrangement of the adjustable handle, which can be used to pull the chair, or as a guide in the hands of the invalid, when he wishes to propel himself with his own hands. (This machine may be constructed of wood, iron, or other material.)

No. 9,709.—JONATHAN W. MORRILL, of Hampton Falls, N. H.—*Improvement in Ditching Machines.*—Patented May 10th, 1853.

This invention consists of a hollow cutter with three sides or vertical cutting edges, open at the top and bottom and one of the sides. In connexion with this cutter is a spade, turning on a fulcrum pin passing through the handle of the cutter, which is also connected to the lower or walking-beam by means of a connecting link, and operated likewise through the weight of the operator applied to the lever or beam. The spade is intended for cutting underneath the sod, and is made to enter the open end of the box-shaped cutter. (See fig.) *a a* are the wheels for propelling the machine; D D D, square box of cutter; F, vertical handle passing up through the slot G of the beam; J, the spade; O P are thin strips for guiding the first sod as it is raised by the second sod, and also for throwing it on the side of the ditch.

Claim.—The employment of the swinging cutters D D D, in combination with the swinging spade J.

Also, the combination of the swinging cutters, swinging spade, and lever.

No. 9,710.—ENOCH OSGOOD, of Bangor, Me.—*Improved Mode of Fastening Leather Belts.*—Patented May 10th, 1853.

The object of this improvement is accomplished by the employment of metallic hooks and eyes, on tapering screws, inserted into the edges or ends of leather belting, and by this means uniting the ends of the belting closely, and making it run smoothly.

Claim.—The application of the tapering screws with hooks and eyes, screwed into the edges or ends of leather belting, for the purpose of uniting the edges together as above described.

No. 9,711.—JOHN W. RICHARDS, of Hoboken, N. J.—*Improvement in Registering Apparatus for Printing Presses.*—Patented May 10th, 1853.

The nature of this invention consists in permitting the registering points to be passed through the feed-board at any point within a given area; which is accomplished by means of a circular plate of a size to include within its circumference all the area necessary for registering with a given sized press. One of these plates is introduced on each side of the feed-board, near its lower edge, and set into a circular rebate, flush with the surface of the feeding-board; and each plate has a radial slot passing through it and running across the plate a little further than the centre thereof. By rotating this plate, an opening at any position can be obtained within the circle, for the passage of the registering points. The figure represents a vertical section of the apparatus: *a*, the impression cylinder; *b*, the feed-board; *c*, a cam connected with a rod 1, actuates the rock-shaft 2, and by the arm *d* raises the point 3; *e* is the circular plate in which the improvement consists, let in flush with the face of the feed-board.

Claim.—The circular slotted plate *e*, let in flush with the face of the feed-board, and fitted so that it can be rotated to bring its radial slot into any desired position to pass the registering point. Also, the spindle and arm connected to and combined with the circular slotted plate *e*, so as to slide vertically when actuated by competent mechanical means, and project the point 3 through the slot in the plate.

No. 9,712.—JOHN P. SHERWOOD, of Fort Edward, N. Y.—*Improvement in Machines for making Wrought Nails.*—Patented May 10th, 1853.

The principal features of this machine are a set of bevelling rollers,

two sets of cutting and pointing apparatus, with their appropriate heaters; and a reciprocating, griping and heading carriage, which, travelling to and fro between the two sets of pointing apparatus, alternately gripes and heads a pointed nail-blank at each of its extremities, and withdraws it from the pointing apparatus. By this machine wrought nails may be formed, either from nail plate presented sideways to the dies, or from nail rods presented endways thereto.

Claim.—The combination of a revolving cam-drum with converging die stocks, moving in directions oblique to the axis in which the cam-drum revolves, the cam-drums being constructed with two curved faces meeting at an angle; the whole arrangement being such that dies moving at right angles to each other are operated by a single drum, without the intervention of rods or levers.

Also, the compound gauge and nipper, which acts as a gauge to regulate the breadth of the nail blank, and also as a nipper to hold it firmly, during the action of the pointing die.

No. 9,713.—FREDERICK E. SICKELS, of New York City.—*Improvement in the Mode of Operating and Controlling the Rudders of Steam Vessels.*—Patented May 10th, 1853.

The nature of this invention consists in combining with the steersman's handle and the rudder a steam-engine, so arranged as to move or hold the rudder, with and against the force of the propelling engine. The steersman's handle at A (see fig.) is connected to the valve motion, so that in moving round the pin *e*, it moves the valve I and O, and alternately applies and releases the power from each of the pistons Q and R; thus causing the engines to move only with a motion corresponding to the motion of the steersman's handle, as each piston Q and R acts as a check to the other, until the power is applied and released by the steersman. In holding the rudder at midships, for instance, the engines will act in conjunction with each other.

Claim.—Combining the steersman's handle and the rudder with an engine so arranged as to move or hold the rudder with and against the force of the propelling engine.

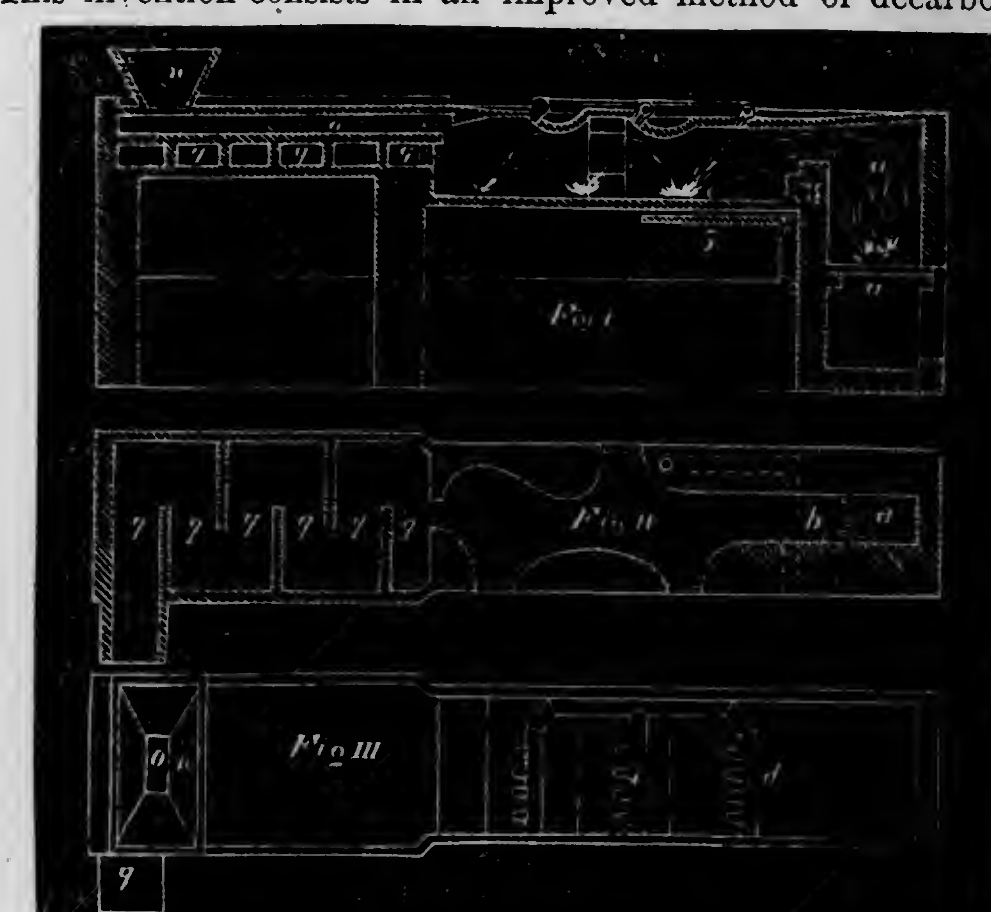
No. 9,714.—JOHN H. SNYDER, of Troy, N. Y.—*Improvement in Machines for Making Hook-headed Spikes.*—Patented May 10th, 1853.

The figure is an elevation of the dies, with the fixed heading lips. This machine is composed or consists of four rotating forming dies, and four working dies, making four pairs, two on the main shaft *b* and the other two on the other shaft *c*. Each pair consists of what the inventor calls a "former," on the wheel *q* of the shaft *b*, and a "worker" *p* on a wheel on the shaft *c*. The worker has a flange *s'*; *t*, the face of the worker *p*.

Claim.—Rolling wedge-pointed spikes between rotating dies, so formed that the face of one shall be the reverse of one face of the spike when formed, and the face of the other die to correspond, in the rotation, with the other face of the spike. Also, forming hook-heads on spikes by rolling from the point towards the head, to force the surplus metal towards the head; and then bending and giving the form required, by a lip on one of the dies projecting beyond its face, so that it shall have an increased motion, by reason of its greater radius, to give the required form. Also, in combination with the dies for rolling the shank of the spike, making the heading lip for forming the head movable, by forming the lip upon the end of a bar adapted to slide in the stock of the die. Also, in combination with the rotating dies, the employment of the sliding cutter and carrier, for cutting from a rod the required lengths, and carrying them to the rotating dies. Also, in combination with the rotating dies, the slides for presenting and forcing the ends of the rods into the rotating dies, to insure the proper position of the rod in the dies.

No. 9,715.—GEORGE A. WHIPPLE, of Newark, N. J.—*Improvement in Manufacturing Malleable Iron.*—Patented May 10th, 1853.

This invention consists in an improved method of decarbonizing



iron ore, in manufacturing malleable iron directly therefrom, in a reverberating furnace; first subjecting it to the process of deoxidation, by which the ore is brought directly to a pure iron, or comparatively so, rendering it malleable, and preventing either the red or cold share, so troublesome to iron masters. "To effect this I bring a blast of atmospheric air (says the inventor), heated or otherwise, upon the ore, according to the state the ore is in, and the heat required in each process as it progresses to the perfect loop, which drives out the carbon and unites therewith, and also during the process removes the other impurities, destroying or removing the causes that produce red or cold share in the iron." In the accompanying figures, *a* is a fire chamber; *a'*, a grate; *b*, a fire bridge built of fire brick; *d*, an air-pipe; *q q q*, flues; *n*, hopper on the table *o*.

Claim.—Forcing down upon the iron ore, from the roof of the furnace, in the different stages of the process as required, and on the different hearths, atmospheric air either heated or cold, for the purpose of decarbonizing the ore and bringing the iron to nature, or refining it, and regulating the degree of heat.

No. 9,716.—D. Winder, of Xenia, Ohio.—*Improvement in Locomotive Steam Engines.*—Patented May 10th, 1853.

The object of this invention is to adapt the power of the engine to the varying resistance presented by the train, with the view to economize fuel, and at the same time equalize the power applied to the crank, or driving shaft.

To accomplish these ends, three steam cylinders are employed with their appendages; their pistons being connected with a three-throw crank, arranged at equal distances apart, so as to divide the circle into three equal parts, and have the power applied on the three, in regular succession; when this is combined with the employment of stop-cocks, valves, or their equivalents, for the purpose of letting on or shutting off the steam from one end of each of the cylinders, so that the three can be employed as double or single acting engines, and thus increase or decrease the power, to suit the condition of the road.

Claim.—The employment of three engines connected with a three-throw crank on the driving shaft, with the cranks arranged at equal distances apart on the circle, when this is combined with the employment of valves, stop-cocks, or their equivalents, for letting the steam on both ends, or cutting it off from one end, to work the engines on the single or double acting principle.

No. 9,717.—Charles F. Sibbald, of Philadelphia, Pa.—*Improvement in Paint Compound.*—Patented May 10th, 1853.

The object or use of this compound is to prevent the formation of hard crust upon the inner surface of steam boilers, and arrest the corrosion of them. The parts are one pound of tallow, one pound of graphite or black lead (plumbago), one-eighth of a pound of pulverized charcoal, to which may be added one gill of gas-tar, to make the mixture spread more easily upon the surface of boilers, &c.

Claim.—The above compound, for the purpose set forth.

No. 9,718.—John Mee, of Lowell, Mass.—*Improvement in Knitting Looms.*—Patented May 10th, 1853.

The object of this invention is the weaving a new and improved manufacture of warp-knit cloth, produced by two sets of warp threads, and two sets of needles; and wherein the rib is shown on both sides of the cloth of equal width, or on one side of double the width of the other.

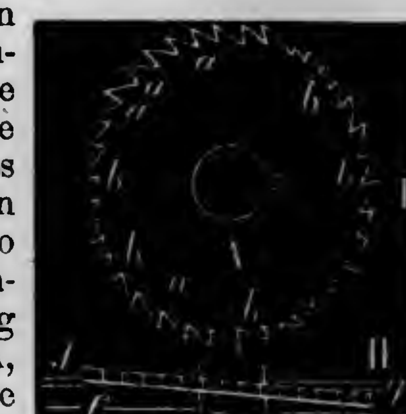
Claim.—The two sets of thread guides, in combination with two sets of needles, and machinery for casting the loops, the whole being made to operate together, to produce a ribbed knit fabric. Also, causing the two sets of needles to work or move up or down independently of each other, and thus be out of the way of the thread-guides, and be arranged close together, to make closer work than can be produced when the two sets of needles are made to move in one direction (either up or down) at the same time.

No. 9,719.—John Mee, of Lowell, Mass.—*Improvement in Warp Net Fabrics.*—Patented May 10th, 1853.

This improved fabric is made by means of two sets of warp threads, and two sets of needles or hooks; exhibiting a perfect rib on both sides of it, and which rib shall be of equal width on both sides, or double width on one side to that on the other.

Claim.—The claim embraces the above described fabric.

No. 9,720.—James M. Patton & William F. Fergus, of Philadelphia, Pa.—*Improvement in Tongueing and Grooving, and Moulding Cutters.*—Patented May 10th, 1853.



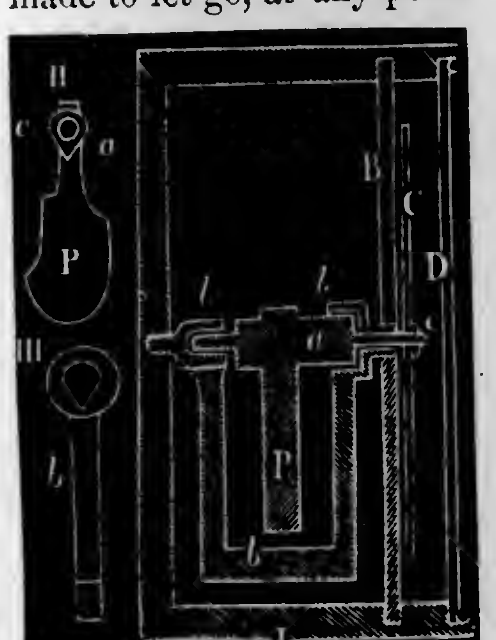
The nature of this invention consists in arranging series of cutting teeth, for forming a tongue, groove, or moulding, on the periphery of a generally elliptical plate inclined to the axis of its rotation, so that, as the plate is rotated, the cutting teeth upon its periphery shall correspond in reverse to the tongue, groove, or moulding, to be formed thereby. The double series of cutting teeth *b b*, on opposite edges of the plate A, are on the peripheries of segments of the same ellipse, and the plate is sufficiently inclined to cause all the teeth to be exactly equi-distant from the axis of rotation, thereby causing them to dress the faces of the lips *f f*, at the sides and groove *g*. The double series of cutting teeth *a a*, placed between the double series of teeth *b b*, are also on the peripheries of segments of an ellipse of a larger size, but parallel or nearly so with the ellipse before mentioned. This causes all the cutters *a a* in both series to project the same distance from the axis of rotation, and to cut at a greater distance from the axis than the double series of teeth *b b*, and thereby to form the groove *g* whilst the teeth *b b* are dressing the lips *f f* at the sides of the same.

Claim.—Arranging the cutting teeth on the periphery of a plate inclined to the axis of its rotation, so that, as they are rotated, they shall correspond in reverse to the tongue and groove or moulding to be formed thereby.

No. 9,721.—James Young, of Philadelphia, Pa.—*Improvement in Printing Presses.*—Patented May 10th, 1853.

In the figure, A represents the frame; Q, cam shaft; D, driving pinion; C, pulley on the pinion shaft; E, spur wheel; B, lever; G, roller; F, cam; B'', platen; H, fulcrum; S, stationary bed; W, false bed; V, segment bar; X, movable hook connected with the sliding pieces; P, distributing roller; O O, inking rollers; N, connecting rod; M, curved arm projecting from arm I' on cam shaft Q, connected by link J, which embraces cam I; A', nipper frame.

To operate this press, the bed is first brought into the position shown by the dotted lines, and a form laid on to it; the segment V is then unfastened, and the bed falls back into place, the clamp at X at the same time griping and holding it fast; the nippers are then properly set, and a sheet of paper or card laid on the platen, when the press is put into operation; the rollers O O descend and ink the types; after they return to their position on the roller, the platen ascends and makes the impression, the nipper being first brought into contact with the paper in the ascent of the platen, and held by springs until the paper is withdrawn from the form after the impression is made, when the nipper is made to let go, at any point to which it is adjusted, and the sheet is thrown off.



Claim.—The combination and arrangement for operating the inking rollers. Also, a false bed hinged to a stationary one, and the mode of fastening the form to the bed. Also, the eccentric in combination with the platen, by means of which the latter can be adjusted while in motion, or thrown off.

No. 9,722.—Thomas A. Chandler, of Rockford, Ill.—*Improvement in Pendulum Level.*—Patented May 17th, 1853.

This invention consists in supporting the knife edges or bearings of the axle

of pendulums of indicators in concave, angular, or knife-edge bearings formed in the turning axle of a second pendulum, whereby changes in the position of the support of the pendulum are more accurately measured by the indicator. Figure I. represents at B the disk for the graduated circle; C, indicator; D, a plate of glass; *b*, axle bent into a form resembling a bell-yoke, corresponding to the arch of the yoke, being made heavy, so as to perform the function of a pendulum ball, as well as that of an axle; P, pendulum, which has knife-edge bearings, as shown at II., that rest in cavities of a corresponding angular shape, as shown at III.

Claim.—The method of supporting the angular journals of the axle of a pendulum indicator, in turning and self-adjusting bearings of similar form to the angular journals.

No. 9,723.—Moses Coburn, of Savannah, Ga.—*Improvement in Violins.*—Patented May 17th, 1853.

This improvement consists in making the apertures, or means of communication between the exterior and interior, in the sides, instead of at the top, as shown in the figure at *a a*; this is to prevent the weakening of the centre of the top, and the consequent impediment to its perfect vibration.

Claim.—The apertures *a a*, in the sides, instead of in the top, for the purposes described, as set forth.

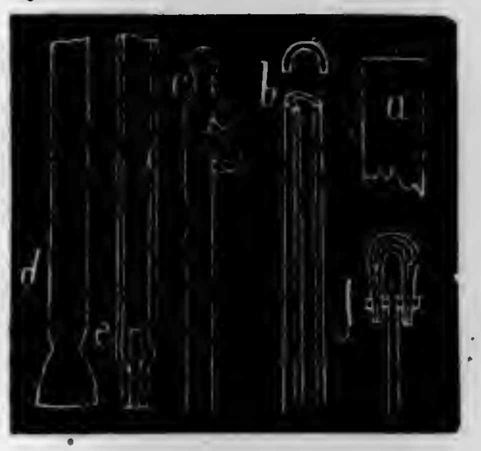
No. 9,724.—Edwin Fobes, of Boston, Mass.—*Improvement in Vertical Pianos.*—Patented May 17th, 1853.

This improvement is "practically and usefully" applied to the piccolo upright piano. A represents the metallic frame; B, sounding

board, D hitch-pins at the bar E, G bridge, *b* string, *c* roller with two grooves on its periphery, for the strings to pass over it; *f*, wooden bar for the tuning-pins.

Claim.—The arrangement of the straining pins, with their axes vertical or nearly so, and parallel or nearly so, to the general plane of the strings, and to stand above the iron frame as set forth; the strings of each hitch-pin having guide rollers applied to it—all for the purpose of advantages in tuning the instrument. Also, extending the sounding-board upwards above the bridge, and in rear of the bridge plate in the treble, and so as to be capable of vibrating, in rear of and above said bridge plate.

No. 9,725.—Samuel Fox, of Sheffield, England.—*Improvements in Umbrellas and Parasols.*—Patented May 17th, 1853.



The inventor employs steel wire (say No. 13); when annealed, it is passed between a pair of plain rollers and flattened into fillets or strips about the width of fig. at *a*. These strips are annealed again before they are passed through rolls to give them the trough-like form *b*; when they have that form, they are again annealed and straightened, and cut off into proper sizes for ribs and stretchers. A wire eye is introduced and fastened into the end of the rib by pressing it together, as seen at *c*; the other end of the rib is flattened, after a small piece of metal has been introduced (see *e* and *d*): a strip of metal is also put round the rib and forced into the trough, to make the connexion for the stretcher as shown at *f*.

Claim.—Making umbrellas, &c., with ribs and stretchers of plate steel bent in the trough-like shape, in combination with eyes and connexions, whereby they are rendered much lighter, and still possess all the requisite strength of those made with solid or round rods of metal, and at the same time the formation of the eyes and connexions is facilitated.

No. 9,726.—Lewis L. Gilliland and Joseph R. Wagoner, of Dayton, Ohio.—*Improvement in Sofa Beds.*—Patented May 17th, 1853.

The annexed figure is a vertical cross section of this sofa bedstead, showing the upper half of the sofa partly turned over in the act of forming the bedstead. A is the back of the sofa, B the lower frame, G front board, *e* and *f* two shafts, to which the canvas sacking *c* is secured. At each end of the shaft near the pinions are attached the straps *n*, which are worked by the same shaft as the sacking *c*. The turning of the roller *e* elevates the head and foot-boards *h*, which are fitted with racks *r*, into which pinions on the shaft *e* are fixed.

Claim.—The hinged front board, so arranged that by turning over the seat, to convert the apparatus from a sofa into a bed, the front-board c shall turn down to prevent it from forming a hard ridge under the sacking, which would be uncomfortable to lie on; and when the seat is turned back again to reconvert the bed into a sofa, the front-board shall be lifted up again, by the act of turning the seat back into the proper position to support the sacking of the seat. Also, the arrangement of the head and foot board, to be operated as described.

Also, the arrangement of the turning seat of the sofa and the sackings of the bed and seat in such a manner, that by the turning of the seat to form the bed the sacking of the bed shall be stretched, and by turning back to form the sofa the sacking of the sofa shall be stretched.

No. 9,727.—John H. H. Hawes, of Ithaca, N. Y.—*Improvement in Calendar Clocks.*—Patented May 17th, 1853.

The nature of this invention consists, first, in causing a clock calendar to supply its own changes for the irregularities in the length of the months, and showing the exact, and no fractional part of a day, week, or month; and, secondly, in combining, with the day of the week indicator, the two wheels working together spring tight, so as to move together, and independently of each other, for the purpose of allowing the day of the month indicator to run during the time the change is taking place from the end of a short month to the beginning of the next month, while the day of the week indicator passes from one day to another in regular succession.

Claim.—The combination of mechanism for the purpose set forth, substantially as described.

No. 9,728.—Matthäus Heim, of Cincinnati, Ohio.—*Improvement in Cooking Stoves.*—Patented May 17th, 1853.

The figure represents a section of this improved stove: *b* is an arched chamber for roasting; at each side of the stove depend hangers *c*, having each a button, over which the doors *e* are slipped, and secured thereto by a staple. A hole through both hangers and doors gives journal bearings to a spit *g*; from the hangers depends a pan *i*, to catch the dripping; *a* is the fireplace.

Claim.—The open bottomed space or chamber *b*, behind the fire, encircled at sides and top by flue, and closed at the ends by movable doors, constituting an accessible and well ventilated arrangement for roasting purposes.

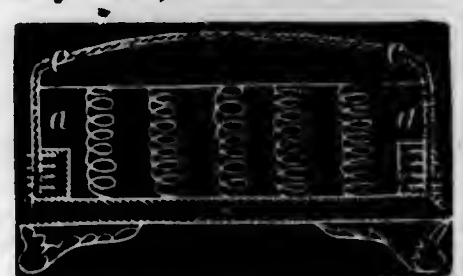
No. 9,729.—Abner H. Longley, of Lebanon, Ind.—*Improvement in Machine for Boring, and Cutting Screws for Bedsteads and other articles.*—Patented May 17th, 1853.

This machine consists of an auger, arranged to operate inside of the screw-cutting apparatus, so as to bore the hole or make the tenon and cut the screw in it, or upon it, at one and the same operation, and thereby "save twenty-five per cent. of the labor required to do the same work by the machines heretofore used for that purpose."

Claim.—Giving an equal progressive motion to the cutting tools,

in combination with a differential rotary motion, for the purpose of cutting the screws at the same time the hole is bored, or the tenon is made, in the manner and for the purpose set forth.

No. 9,730.—FREDERICK MATHESIUS, of New York City.—*Improvement in Upholstering Furniture.*—Patented May 17th, 1853.



The nature of this invention consists in attaching to the edges of the hair cloth or other material, to be used for the outside covering of chairs or sofa seats or any other article to be covered, ligaments or springs made of India-rubber or other elastic material. This elastic ligament *a a* is fastened to the sides of the covering *c c*, and also to the framework; so that when a person sits upon the chair or sofa, the elastic string will stretch to the extent of the pressure without straining the outer or fancy covering, which will resume its smooth surface, upon the rising of the person.

Claim.—The above description substantially embraces the claim of the inventor.

No. 9,731.—JULIUS A. PEASE, of New York City.—*Improvement in Seeding-Hoes.*—Patented May 17th, 1853.

This invention consists of a double-bladed hoe, with a seed-box and drop attached to it at the bottom, so constructed and arranged as to drop four kernels of corn at equal distances apart, into the opening in the ground behind each blade, made by the stroke of the hoe. The seeds are covered by the back stroke of the hoe as it is lifted from the ground. The corn is dropped by pulling the slide near the end of the handle with the fore fingers of the right hand, which brings the holes in the quarter-circle plates under the holes in the bottom of the box, allowing the kernels within the guards to pass through, and at the same time shutting off the grain from entering within said guards. O O O O are guards reaching two thirds the way round each hole; P P P P are springs which play in front of the guards; the springs are attached to quarter-circle plates D D D D (in fig. 3), which work on the under side of the box B; the springs work through slots in the bottom of the box and within guards R; near the centre of movable plate K is a pin L, against which bears a spring N, which keeps the holes shut in the bottom of the box; the movable plate K is attached to slide U (fig. 1), near the end of the handle T. Fig. 1 shows the box with the lid open.

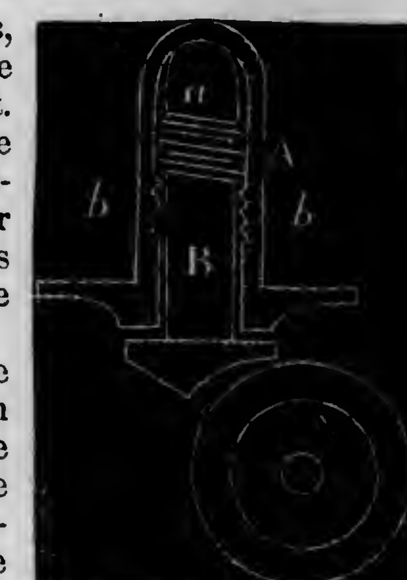
Claim.—The combination and arrangement of a double-bladed hoe with seed-box and drop, for the purpose of planting separate kernels of corn at equal distances apart.

No. 9,732.—WILLIAM J. THORN, of Westbrook, Maine.—*Improvement in Pocket Combs.*—Patented May 17th, 1853.

This improvement consists in coupling two combs, cut from one piece of ivory, horn, or wood, together by a round joint. The object is to save stock or material, and also produce a handsomer and better article.

Claim.—The manufacture of pocket combs with semicircular joints, in combination with strips overlapping them.

No. 9,733.—WILLIAM W. WADE, of Springfield, Mass.—*Improvement in Castors for Furniture.*—Patented May 17th, 1853.

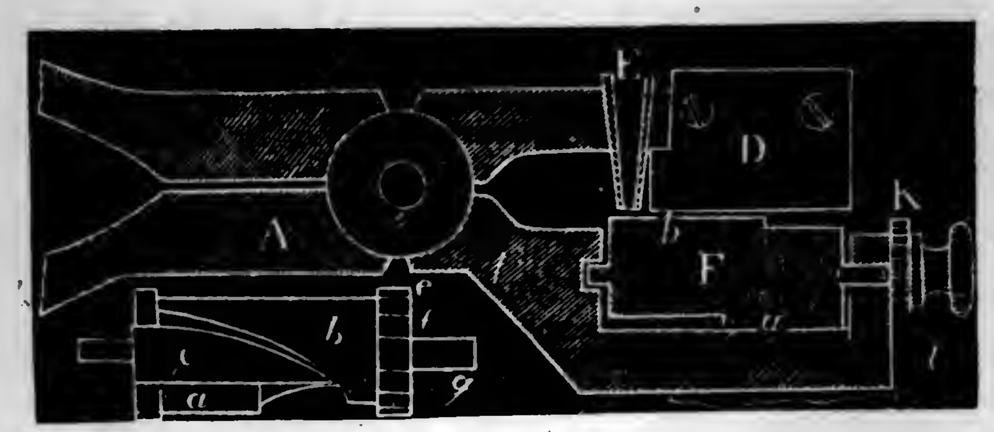


This improvement is confined to shank B, and socket A: on shank B there is a male screw *a*, to fit the screw *b* in the socket. When the male screw of shank B passes the female screw in the socket A, it not only allows the shank to turn freely, but the latter will also be held in place by the two screws and be prevented from falling out of the socket.

Claim.—The arrangement of the male screw *a* on the spindle B, in combination with or respect to the arrangement of the female screw *b* in the socket, and to the bearing surfaces of the parts A and B; whereby the spindle is not only preserved in the socket piece by the two screws, but allowed freely to rotate when its bearing surface is in contact with the bearing surface of the socket.

No. 9,734.—HALSEY D. WALCOTT, of Boston, Mass.—*Improvement in graduated Cutters, for Cloth and other Substances.*—Patented May 17th, 1853.

The figure shows a section of the cutter. E is a small tubular punch fixed to the lever A, and against the rear of the cutting knife D, and



in conjunction with the knife cuts a button-hole formed of a straight slit and a circular hole at one end of it. F is the adjustable and movable bed against which the knife acts, and on which the cloth rests. The bed is a separate figure represented as formed of two triangular or trapezoidal pieces of metal *a b*, wrapped around a cylinder *c*; one of them at one end has a series of plane beds or surfaces *e f g*, &c., which rotate underneath the tubular punch E; a small notched wheel K and a spring *l* retain the bed in any position in which it may be set. The length of the button-hole may be changed at pleasure, by rotating the bed on its axis.

Claim.—In its connexion with the cutting knife, making the bed to move or rotate transversely, in combination with making the surface of it which acts in conjunction with the knife of variable lengths, that different lengths of cut may be made. Also, combining with the knife and tubular cutter, and a rotary shaft or cylinder placed under them, the two triangular or trapezoidal beds *a b*, arranged on the shaft, whereby a button-hole may be made of any desirable length, either with or without a hole at one end.

No. 9,735.—David L. Weatherhead, of Philadelphia, Pa.—*Improvement in Cleansing and Cooling Block Dies in Rivet Machines.*—Patented May 17th, 1853.

This improvement relates to the cooling of closed or block dies in which rivets are headed and shaped, and consists in expelling therefrom the particles of oxide, cinders, &c., that fall from the article being formed, by means of a current of water, steam, air, or other fluid. While the operations of heading, &c., are going on, water is passed into the die, and runs out at the mouth of the same, during the interval between the discharge of one block and the admission of another.

Claim.—Clearing cinders, scales, and other obstructions from a socket die, made in a solid block, for the purpose of heading rivets, by forcing in at the closed end of the die a stream of water that washes out the cinders, &c., every time a rivet is discharged; the inner end of the socket of the die being closed, so that the pressure of the head of water is rendered available for forcing obstructions out of the die.

No. 9,736.—Samuel J. Seely, of New York, N. Y.—*Improvement in Lime Kilns.*—Patented May 17th, 1853.

This improvement consists in a method of calcining limestone by the aid of an artificial draught of air maintained in the kiln by means of mechanical blowers. A suction blower is arranged at the top and a forcing blower at the bottom of the kiln. A is the blower at the top; B at the bottom. The kiln furnace is also constructed for a boiler furnace, the boilers *s s* being placed over the fire. D D, furnace. The car E for supplying the kiln is worked by the same steam engine which operates the blowers.

Claim.—The claim includes substantially the above description. Also, the method of regulating the production of steam, to generate the power for the engine in proportion to the duty required of it, by setting the steam boiler in the same furnace that supplies the heat for calcining the limestone.

No. 9,737.—William F. Ketchum, of Buffalo, N. Y.—*Improvement in Mowing Machines.*—Patented May 17th, 1853.

The object of this improvement is to clear the track for the heel of the rack-piece, when the machine is on the return swath, by removing the cut grass from the standing stubble, turning it in out of the way, and thus prevent it from clogging or choking the cutters. *a*, rack-piece; *b*, raking-board; *c*, the hinge.

Claim.—The scraper or raking-board, combined with the rack-piece, at an angle less than a right angle, for the purposes above set forth.

No. 9,738.—Richard Montgomery, of New York City.—*Improvement in Corrugated Plates for Steam Boilers.*—Patented May 17th, 1853.

This invention consists in making a plate of metal, with a margin

on its edges wide enough for the rivet holes, thick, and flat (see fig. at *c*); and its middle, or that portion included within the margin,

thinner, but corrugated to render it stiff, the depths of the folds of the corrugation being inversely proportioned to the thickness of the middle, so that, to whatever degree it may be reduced, it will still have the requisite degree of lateral strength imparted to it by the corrugation.

Claim.—The corrugated metal plate as herein described, with flat margins of greater thickness than its middle.

No. 9,739.—JAMES A. WOODBURY, of Winchester, Mass., JOSHUA MERRILL, of Boston, Mass., and GEORGE PATTEN, of Charlestown, Mass.—*Improvement in Air-Engines.*—Patented May 17th, 1853.

This invention consists in the application of caloric to air while in a highly compressed state, by which its expansive force will be greatly increased by the same amount of heat (four hundred and eighty degrees) as is required to double the volume of the ordinary atmosphere. The most essential parts of this engine consist of a cylinder of the same construction as an ordinary steam engine, an air-pump, and a receiver for containing the compressed air, and to which the heat is applied.

Claim.—The mode of using air as a motive power, substantially as described. Also, in combination with such an engine, a device for regulating the pressure of the air in the receiver, and economizing the power of the engine; the device consisting of a weighted bar, entering the receiver through a stuffing box, and connected at its opposite end with the stop-cocks attached to the chambers of the air-pumps; intending to use any known means, for accomplishing the two-fold purpose of regulating the pressure of the air in the receiver, and opening the pump chambers to the atmosphere, so that the pump shall be relieved from unnecessary labor.

No. 9,740.—WILLIAM CRESSLER, of Shippensburg, Pa.—*Improvement in Seed Planters.*—Patented May 17th, 1853.

The nature of this invention consists in the manner of constructing the seeding-wheel, with a circular flange for dividing the grain from the lime, ashes, guano, or other material which may be sown with it, and the partitions in said seeding-wheel for regulating the quantity and distributing the same regularly to the opening through which it passes out of the machine. The figure illustrates the invention. On the hub of one of the wheels B is a spur-wheel I which gears into another H, attached to a shaft; on this shaft are two short screws M, which work into and rotate the seeding-

wheel N, shown separately on a larger scale. The seeding-wheel works under the hopper; through the cross-piece O is an opening P, to allow the grain and other materials sown to escape into the tube S, and shoe R.

From the hub T of the seeding-wheel N extend oblique spokes U, which form chambers for receiving lime or guano, &c., and carry it around to the opening P, and allow it to escape into the tubes S and shoe R. The space between the flange and the periphery of the seeding-wheel N is divided into smaller apartments for the grain, by means of the curved partitions V, each apartment receiving a certain quantity of grain, and moving it around to the opening P, from whence it is conveyed by the tubes to the ground. The hopper is divided into two compartments, the one for grain, the other for lime, guano, &c.

Claim.—In combination with the adjustable tubes, the seeding-wheel N with its flange and partition, for adjusting, receiving, and conveying the grain and other material to be sown with it, around to the opening whence it is conveyed to the ground.

No. 9,741.—HIRAM BERDAN, of New York City.—*Improvement in Machine for Pulverizing Auriferous Quartz and Amalgamating the Gold.*—Patented May 24th, 1853.

The nature of this invention consists in attaching, by a pin or axle and a box and sleeve (as seen in the figure at S), a ball or sphere X, of three thousand or more pounds weight, to the inclined shaft B of an inclined vase or bowl A, whose axis inclines a few degrees from a perpendicular; which ball or sphere is so fastened to the axis of the bowl as to have a combined rotary and spiral motion by the turning of said bowl upon its inclined axis, which may be effected by horse or any convenient power applied to gearing which mashes into cogs on the periphery of the bowl at Y. The basin A is furnished with quicksilver, serving also as an amalgamator; the finely pulverized gold is retained, while the earthy matters pass off with the stream of water flowing into and out of the bowl through openings T at its sides. The ball may be made solid, or hollow to be filled with lead or sand when at the proper locality to be used; the basin, which acts as an endless inclined plane, being turned upon its axis with a comparatively small amount of power, the ball in the mean time revolving continually, and by its own gravity keeping in the lower portion of the bowl, and thus grinding the quartz successively presented to it by the continued rotation of the basin. Also, in connecting with the bowl or basin a fire chamber, divided into four divisions P, with grate F, which chamber revolves with the bowl or basin.

Claim.—Attaching the ball or sphere obliquely to the inclined shaft (and in the inclined bowl) by the pin-box and sleeve, in combination with the inclined shaft, and inclined bowl. Also, in connexion with the bowl, the heating chamber or furnace as arranged and described.

No. 9,742.—SAMUEL R. BRICK, of Philadelphia, Pa.—*Improvement in Gas-Burners.*—Patented May 24th, 1853.

The nature of this invention consists in providing the interior of the ordinary gas-burner with a long centre conducting-pipe surrounded by a long concentric capping-pipe, causing the gas to be suddenly deflected from the top of the conducting-pipe, and to descend, and afterwards pass through horizontal perforations in the base of the capping-pipe into the area of the burner, and ascend to the burning point; by which means the supply for burning is made uniform, though the pressure in the main gas pipes may vary. Blowing and waste of the gas are thereby prevented; and good combustion and steady light are obtained. *a* is a common gas-burner screwed on to the conducting apparatus *b*, with its female screw at base *e*, which screws on to the supply gas pipe; C is the capping-pipe with perforations horizontally *d d*.

Claim.—The arrangement and combination of the centre conducting pipe and its capping pipe inside of the common gas-burner, for the purpose described above.

No. 9,743.—JOHN B. BLAIR, of Alton, Ill.—*Improved Machine for Engraving.*—Patented May 24th, 1853.

The object of this invention is to produce either mezzotint or other engraving with a greater uniformity and regularity than is done by hand, by the arrangement of a machine so as to be capable of performing the work of an engraver or other tool for the purpose.

Claim.—Combining the needle, whether sharp or blunt, with a pentagraph or other copying or tracing instrument, through the medium of double carriages moving at right angles to each other, so that the dots or punctures of the needle may be dispersed or aggregated at pleasure, for the purpose of forming the lights or shadows; the character of the lights and shadows being indicated by the sliding scale moving before the eye, or under the hand of the operator.

Also, the combination of the sliding bar, the sliding box, the cords, the spring lever, wheels, and other mechanism.

Also, in combination with the carriage and needle, the wheel with its lifting piece, and the cam wheel for changing the character of the marks, lines, or dots, at pleasure, upon the plate to be engraved—whether the same be operated in connexion with the pentagraph or not.

No. 9,744.—THOMAS H. DODGE, of Nashua, New Hampshire.—*Improvement in Kettle Bails.*—Patented May 24th, 1853.

This improvement consists in placing on the bail of the kettle or other vessel a sliding dovetail-shaped eye-piece C, which is made to slide on and around the bail B of the kettle or pan A, and when it is desired to have the bail in an upright and permanent position, to slide down to one of the sides of the kettle, and its dovetail or other shaped end to fit snugly in a female dovetail or other shaped groove cut in one of the ears or flanges of the kettle in the manner shown in the figure; the flanges having the dovetail cast either on the outside or inside of the kettle. The figure represents a frying-pan A, and B the bail in a vertical position, and secured by the dovetail-shaped sliding-piece C. This fastener C is secured on the bail, and the eyes of the ears D F on the pan. G is a side view of the sliding-piece, and H is a view of the same seen from below.

Claim.—The sliding dovetail, or other shaped piece C, in combination with the female dovetail or other shaped groove cast in the flange, for keeping the bail perfectly fixed in any position desired, and for any length of time, and also, admitting its being left loose in the ordinary manner.

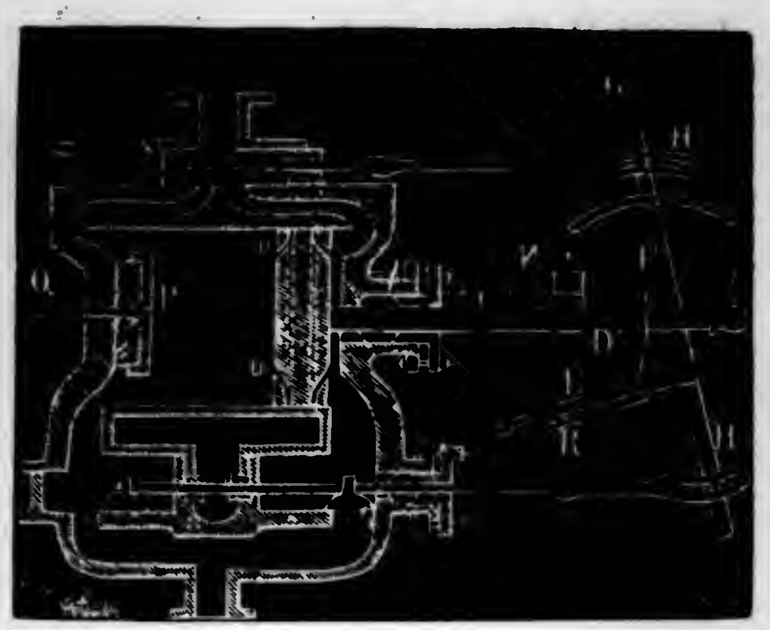
No. 9,745.—JOHN C. FLETCHER, of Burlington, Iowa.—*Improvement in Radiators for Stoves.*—Patented May 24th, 1853.

This invention consists in combining with the fire-chamber A and escape-pipe C, a series of concentric flues as represented in the figure.

Claim.—The interposition, between the fire-chamber and exit-pipe of a stove, of a series of concentric flues, so arranged as that the heat of one flue shall pass through the partitions, and in whole or in part be transmitted to the next flue or portion of the flue in advance, and prepare it for transmitting the draught through the series.

No. 9,746.—JOHN HARTIN, of New York City.—*Improvement in Water Meters.*—Patented May 24th, 1853.

The nature of this invention consists in providing the cylinders inside with a sliding box or stop P which is adjusted in its position by a screw Q, by which means the stroke of the piston is limited, by causing it to strike against the box or stop, for the purpose of preventing the pin in the arm D from straining upon the stop R in the slotted arm E, after tilting the lever F. The sliding box P in the cylinder, and the sliding piece R in the slotted connecting piece E,

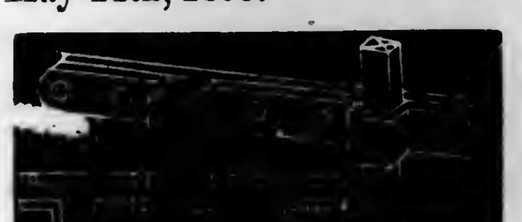


have to be regulated proportionally, so as to have the oscillating ball G, with its lever F, operate the valves properly. Slits are made in the two connecting rods H H, which operate the valves; a slit is likewise made in the connecting piece E. By the combination of the two slitted connecting rods H H and the piece E with the oscillating ball G and the lever F, a sudden change of the valves is caused, whenever the piston has moved to a certain place in the cylinder. The fluid is made to cause the piston to move tight in the cylinder, by means of the openings *u u* on the faces of the piston; these openings run obliquely towards the inside of metallic rings placed in grooves around the piston through the openings. The fluid presses against the inside of the metallic rings (which are cut through in one place), and causes them to expand and press tight against the cylinder. An index N is placed near the piston rod, and a finger on the piston rod, by which means the amount of fluid drawn from the cylinder is ascertained.

Claim.—The adjustable box or stop P in one end of the cylinder for the piston to strike against, for the purpose of preventing the pin in the arm D from straining upon the stop R in the slotted arm E after the tilting of the lever F.

No. 9,747.—Lewis Lupton, of Winchester, Va.—*Improvement in the construction of Harrows.*—Patented May 24th, 1853.

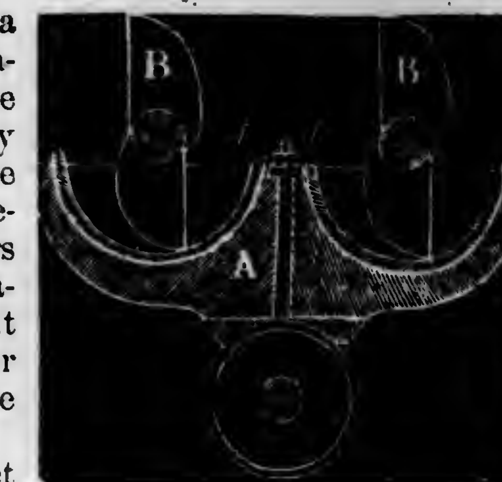
This harrow may be made in any desirable form; it is constructed of bar or stout strap-iron, which is bent into angular recesses or sockets, for the teeth to be secured therein, as shown in the figure.



Claim.—Constructing the frame of a harrow of double metallic bars, or flat strips of metal, and forming teeth-sockets thereon by bending the metal or otherwise, and uniting the bars; and combining therewith the manner of bracing or staying the same by rods and couplings.

No. 9,748.—Stanislas Millet, of New York, N. Y.—*Improvement in Meat Cutters.*—Patented May 24th, 1853.

This improved cutter consists of a revolving dish A, having a stationary cover fitting tightly on the edges. A pair of cutters B B play through slits in the cover, upon the meat within. The dish is made to present itself to the action of these cutters in all directions by its constant rotation, which brings the meat to be cut constantly under the cutters, by a pair of scrapers fitting the bottom of the dish.



Claim.—The combination of a set of revolving knives or cutters with the top plate and revolving dish, operating for the purpose and in the manner described.

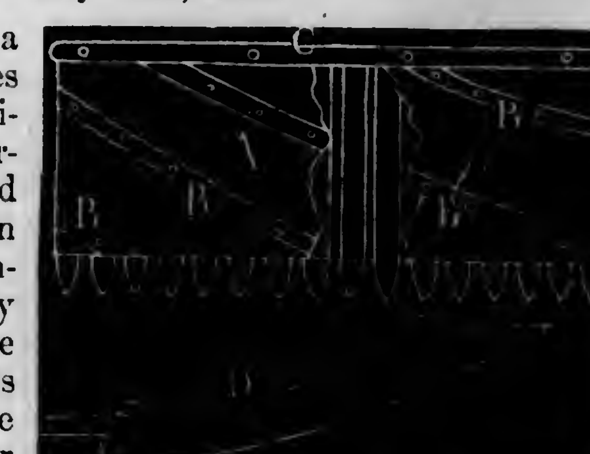
No. 9,749.—Thomas Nelson, of Troy, N. Y.—*Improvement in Watches and Chronometers.*—Patented May 24th, 1853.

(The nature of this improvement is set forth fully and clearly in the claim.)

Claim.—The method of constructing watches or chronometers of any kind, so as to permit of the employment of a spring barrel of a size that shall occupy nearly the entire interior diameter of the watch-case or frame; which is effected by placing the movements upon the top of the barrel, and communicating the motion of the barrel to them by means of a ring fixed on the interior of the case, with teeth on its inner edge, concentric with the barrel, into which teeth the teeth of one or more wheels of the movements may cog, or take.

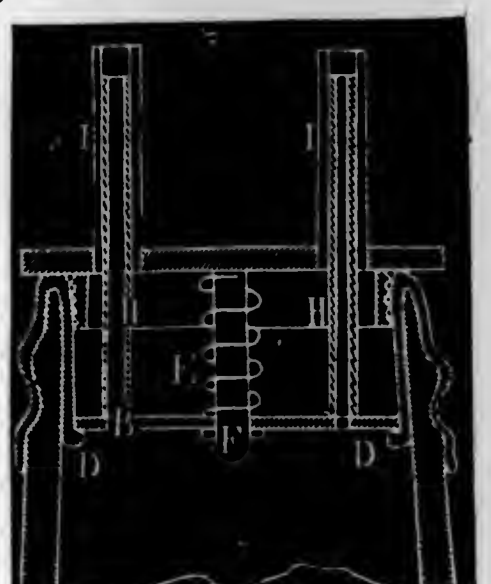
No. 9,750.—Jeptha A. Wagener, of Pultney, N.Y.—*Improvement in Clover Harvesters.*—Patented May 24th, 1853.

The improvement consists in a cylinder A, set with spiral knives B B B, arranged to act in combination with teeth curved to correspond with the circle traversed by the edges of the knives upon the cylinder, which act in concert with a straight stationary knife placed at the base of the teeth, so as to shear the heads of clover from the stalks, there being only sufficient space for the heads between the cylinder and the teeth, so that the heads only are gathered; also in making flanged teeth D, and cutting the top away, so as to form a seat for the stationary knife, and allow the teeth to spring and vibrate towards and from each other.



Claim.—The arrangement of the hollow or solid cylinder, set with knives on its periphery, and just near enough to the fixed knife, or to the concave of the fingers, to allow space enough to admit the clover heads to pass through without being crushed; and so that, by the combined action of the forward movement of the machine and the adjustable guard plate and the knives, the stems may be drawn in and severed close to the heads. Also, making the teeth so as to vibrate as described.

No. 9,751.—ALEXANDER J. WALKER, of New York City.—*Improvement in Spirit Lamps.*—Patented May 24th, 1853.



This improvement relates to the "safety spirit lamp." The inner tubes H, which carry the wick, are secured to circular movable plate B, said plate being connected to the cap or cover by means of a vertical rod F having a spiral spring E situated between the cap and the lower plate, which forces the plate down over the vertical rod when the cap is unscrewed, and thereby draws the inner tube H downward and consequently causes the other tubes I I to extinguish the light instantaneously; this spring also serves to keep the circular protection plate firmly down against a circular flange D formed round the inside of the neck of the lamp, and thereby prevents the fluid possibly getting above said plate, except through the inner tubes, and becoming heated and exploding.

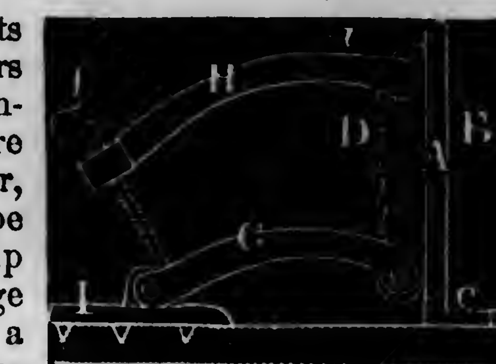
Claim.—The employment of the plate B, which serves as a protection against the fluid rising too high and becoming heated and exploding, and also as a support for the inner tubes, in combination with the spiral spring E and rod F, the rod serving to connect the plate with the top of the lamp, and the spring to hold the plate B firmly down on the flange D, and also to throw up the cap and extinguishing tubes instantaneously after the top has been unscrewed.

No. 9,752.—MADISON PAGE, of Williamsburgh, N. Y.—*Improvement in the Process of Distilling Rosin Oil.*—Patented May 24th, 1853.

For this process a common still A, with a condensing worm B, is used in connexion with the steam pipe E, whereby steam is introduced in such a manner that the steam does not come in contact with the rosin, but only with the vapors arising from the rosin. The first process is to extract the acid from the rosin, next the naphtha, and lastly the oil.

Claim.—The employment (in the manner and for the purposes described) and the introduction of steam into the commencement of the goose-neck, above the rosin in the still, so that the vaporized oils from the rosin will pass through and be commingled with the steam in the passage to the worm, for condensation for the purpose of purification, &c., as set forth.

No. 9,753.—DUNCAN E. MCDOUGALL, of Troy, N. Y.—*Improved Door Fastener.*—Patented May 31st, 1853.



The nature of this invention consists in a portable contrivance for travellers and others, to fasten doors on the inside. The plate A shown in the figure bears against the inner face of the door, having its lower end bent in the shape of an elbow, so as to form a hook or lip *e* to be inserted under the bottom edge of the door; on the back of plate A is a bar with ratchet teeth D, and a series of holes; to this bar two curved or other suitably shaped levers G H are secured by movable pins. The lever G is attached at its other end to the claw or floor-plate I, which is provided with sharp spikes which are driven into the floor. The lever H is connected to the ratchet bar of plate A by a pin, the bar H having a recess at I into which either of the ratchet teeth fit, when the screw J, which is at the other end of the lever H, is set in one of the recesses of lever G, and turned until the recess I catches in a tooth of bar D, and screwed tight to form a pressure between the two levers, giving a horizontal direction of plate A against the door B, whereby the door is firmly secured.

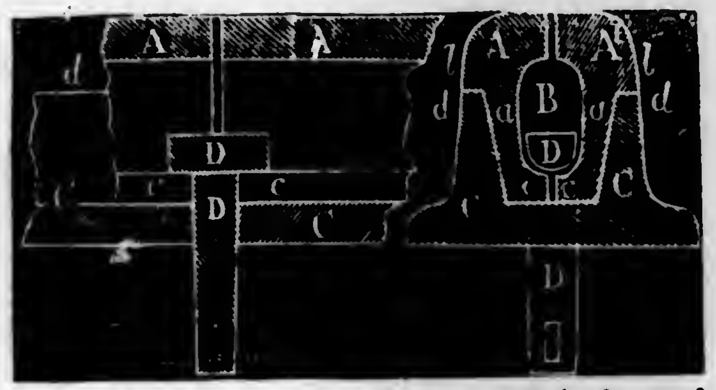
Claim.—The arrangement of the above parts, as constructed and operating for the purposes therein set forth.

No. 9,754.—PHILIP H. KECK, of Morgantown, Va.—*Improvement in Cultivators.*—Patented May 31st, 1853.

This cultivator consists in the combination of a harrow, a roller, and a plough, constructed and arranged (as one utensil) to mutually assist each other. The balance-pivot P is for facilitating the turning around at the end of the field or at any other place. The lever F is allowed to fall and comes in the position of the dotted line, and the bill-hook C enters the ground; and by the forward motion of the cultivator it is raised from the ground, when it can be easily turned around.

Claim.—The combination of the balancing pivot P with a cultivator constructed as above described, for aiding in turning the same.

No. 9,755.—RICHARD H. MIDDLETON, of Alexandria, Va.—*Improvement in Compound Rails for Railroads.*—Patented May 31st, 1853.



This invention consists in the construction and arrangement of a tripart rail, the two upper portions of which resemble the ordinary split rails, and the lower part is a continuous box, to contain and bind together the two upper parts as shown in the figure. Either half of the split-rail (A or A′) is formed of a bar or side *a*, projecting over either side and forming a shoulder *l*. The bar *a* has a flanch *c*, the top surface of which forms a hollow curve for the heads of the holding-down bolt D: when the half rails A and A′ are placed in their position, they form a tubular channel B between them.

Claim.—The combination of the continuous case-rail with the split rail, the halves or parts of the latter being constructed with shoulders that rest on the sides of the case-rail, while their lower edges fit into and rest upon the bottom of the same.

No. 9,756.—CHARLES NEER, of Troy, N. Y.—*Improvement in Fire-places and Stoves.*—Patented May 31st, 1853.

The figure represents a vertical section of this improved fire-place. B is the fire chamber; C the grate; G hot-air chamber; F flues, and K draught damper.

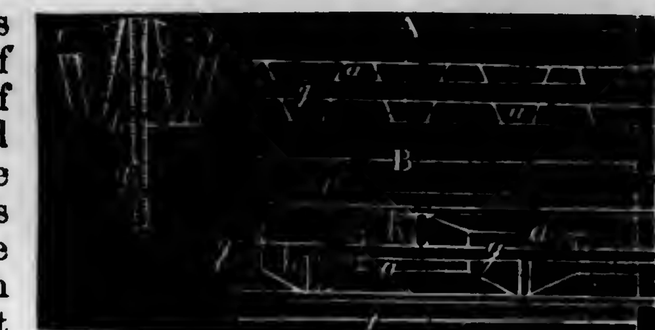
Claim.—Combining with the fire-box of a fire-place, heating stove, or furnace, an inverted pyramidal shaped air-chamber, open at top and suspended over the fire, so that the inclined sides thereof shall radiate the heat and throw it against the fire-box plates on all sides: with the fire-box surrounded by a series of one, two, or more air-heating and smoke and gas flues G F, for the purpose of exposing all the heated plates to the current of air.

No. 9,757.—THOMAS P. MURPHY, of New York, N. Y.—*Improvement in Bank Locks.*—Patented May 31st, 1853.

This improvement is too complicated to permit of a brief description.

Claim.—The slides and pins, and their operations. Also, the pressure plate, pressure bolt, and spring attached to the plate, arranged and operating as described, or in any other way substantially the same, and for the purpose set forth.

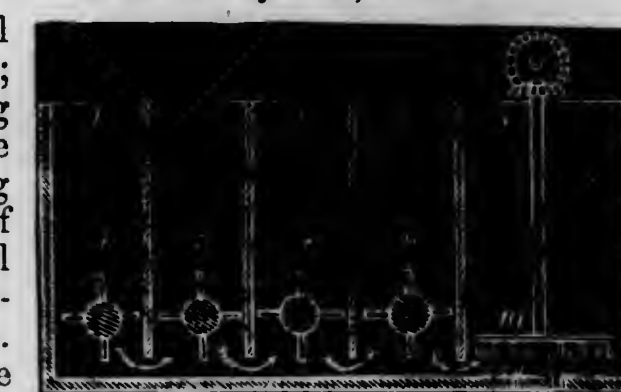
No. 9,758.—MARIE LOUISE ROUCOUT, of Paris, France.—*Improvement in Grate Bars.*—Patented May 31st, 1853.



This improvement consists in constructing the bars of furnaces and other grates of an arched or partly arched form, and with a double row of parallel air-holes made in the length of the bars, which, combined with the arrangements, prevent clogging of combustible to the bars, and improves the combustion, and economizes fuel.

Claim.—The construction of bars of furnaces and other grates of an arched or partly arched form, provided with two parallel rows of air-holes.

No. 9,759.—ARNOLD BUFFUM, of New York, N. Y.—*Improved Gold Washer and Amalgamator.*—Patented May 31st, 1853.



1, 2, 3, 4, are centrifugal amalgamating compartments; 5 is a centripetal discharging compartment; 6, 7, 8, 9, are agitators. The discharging aperture is in the centre of the bottom of the centripetal compartment at 12, surrounded by a conical inclined plane. Surrounding this inclined plane is a series of circular channels within one another, and connecting with each other by openings: they are about two inches high. Above is a revolving guiding table 10, which brings the ore in close contact with the quicksilver. The bottom of the amalgamator is covered with quicksilver; the water and ore are introduced at 1. The inclined plane of conical shape prevents the quicksilver from being discharged with the impurities, at 12.

Claim.—Furnishing the centripetal discharging compartment with a horizontal, revolving, water-moving and ore-guiding table, in combination with a discharging aperture surrounded with a conical inclined plane at the centre.

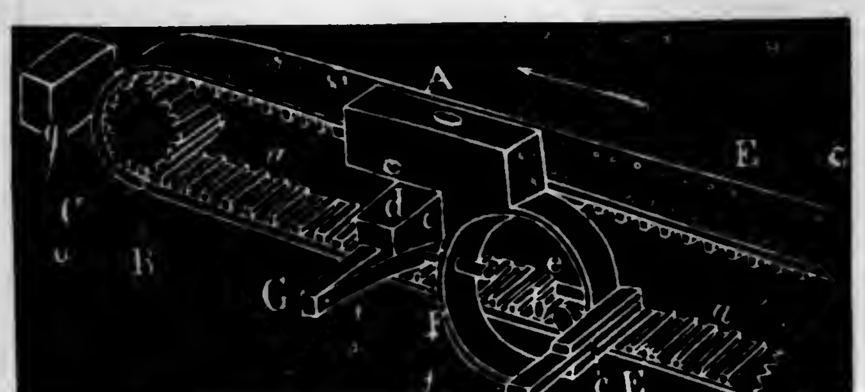
Also, the arrangement of the circular guiding channels, with connecting openings, so adjusted as to secure an irregular spiral passage from the periphery to the aperture at the centre, for gold-separators—whether used separately or in combination with the compartments.

No. 9,760.—William H. Jennison, of New York, N. Y.—*Improvement in Compositions for a Filter.*—Patented May 31st, 1853.

This composition consists of animal charcoal (say bone black) thirty pounds, mixed with sixty pounds of finely ground glass, to which is added boiled starch sufficient to cause the particles to adhere together, when it is moulded into the desired shape, and dried. The figure *a* represents the filtering medium and *b* the case, which is made of gutta percha.

Claim.—The combination of animal charcoal, glass, and starch or its equivalent, treated in the manner set forth, for a filtering composition.

No. 9,761.—Henry Baker, of Catskill, N. Y.—*Improvement in Converting Rotary into Reciprocating Motion.*—Patented June 7th, 1853.



This invention is more particularly designed for driving the bed of a printing-press, or the bed of any other machine to which it is desired to give reciprocating rectilinear motion.

The motion is communicated in the first place from the revolving shaft B to one of two wheels or pulleys C, around which an endless belt or chain E is placed; these wheels and belt or chain being so arranged, that the belt will move in a direction parallel or nearly so with the desired reciprocating motion. To the object which is to receive the reciprocating movement, is attached a ring F, which lies nearly close to the belt or chain; the minor diameter of the ring being about equal to that of the pulleys on which the belt or chain runs. Two pins *e e'* are fitted to slide freely through the periphery of the ring on opposite sides; both pins being parallel with the band, and being caused by springs applied to them to project a short distance into the ring. To the endless band E is attached a stud *b*, which projects into the ring close within the periphery, at right angles to the two pins; and as the band moves, this stud catches one or the other of said pins, and propels the ring and whatever is connected with it. As that part of the endless belt or chain which is on one side of the wheels or pulleys moves in the opposite direction to that on the other side, the stud will move in opposite directions

alternately. The sliding pins are so placed that when the stud moves in one direction, it catches with one, and when in the other direction, with the other; and each of the pins being drawn back from the ring by a lever G attached to it catching against a stop *g*, at the time the stud reaches either pulley or wheel, it is passed by the stud, which runs round the wheel or pulley with the belt or chain, and catches the other pin, and by its reversed movement drives back the ring in the opposite direction to that in which it moved before the stud arrived at the wheel or pulley. The ring F is secured to the bed A, having two knuckle-pieces *c c'*, which receive the fulcra *d d'*.

Claim.—The ring F with its sliding pins *e e*, in combination with the stud *b*, attached to the endless chain. The points or ends of the pins *e e'*, being caused to project through to the interior of the ring to catch the stud *b*, and being withdrawn alternately to allow it to pass, by springs, levers, and stops.

No. 9,762.—Thomas A. Dugdale, of Richmond, Ind.—*Improvement in Washing-Machines.*—Patented June 7th, 1853.

In this washing-machine, two wash-boards B B, with rollers D D D D, are placed in a suitable box A; the centre wash-board is attached to the lever G; the clothes are secured to this centre wash-board, which is worked up and down between the two B B. The cords E E pass over the rollers on the top of the wash-boards, and are secured to the side of the box, to prevent the two wash-boards B B from rising. F F are floats of wood secured to the inside of wash-boards B B by means of cords as shown in the drawing, which cause the wash-boards to be drawn together.

Claim.—Combining the wash-boards, cords, and floats, as above.

No. 9,763.—Henry W. Hewet, of New York, N. Y.—*Improvement in Propellers for Steamboats.*—Patented June 7th, 1853.

The nature of this invention consists in giving to the paddles, in their circuit, a greater longitudinal than vertical motion, imparted by a crank motion, modified by the vibratory motion of a beam or beams, so that the motion of the paddles shall be generated by the combined motion of the crank and the beam. Also, in making the vibrating beam (in the above combination) to slide on its fulcrum; by reason of which combination the paddles begin to move back in the direction of the propelling action, before the cranks in their descent reach the horizontal line or dead point, in carrying

the paddles down towards the water, and continue this motion in the direction of the propelling action, until after the cranks in rising have passed the horizontal line or dead point, thus avoiding what is called back water. There are three cranks on two shafts connected by three bars like *c*; *f* the paddle bar. Each carriage is provided with two studs *g*, to give longitudinal motion in addition to what is imparted to the paddles by the cranks; and the carriage is embraced by the lower end of the beam *h*, which is made double at the lower end for that purpose, and the two parts at this end are slotted longitudinally to embrace the studs *g* so as to strike thereon freely. The upper end of the beam *h* is attached to a crosshead *j*, which slides between ways K in frames *l* erected above the guards; the beam is also attached to an arch-piece *m* extending over the carriage and bar *c*, and connected with the end thereof.

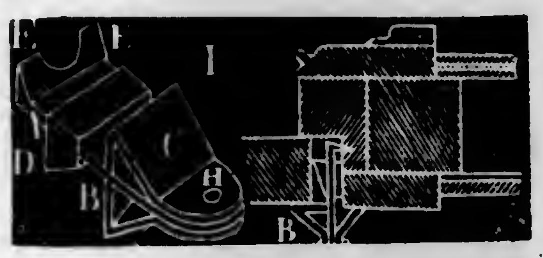
Claim.—The foregoing description embraces the claims of the inventor.

No. 9,764.—WILLIAM S. HUBBELL and AMOS BARRETT, of Kingsville, Ohio.—*Improvement in a Composition for treating Wool, to fit it for the different Manufactures.*—Patented June 7th, 1853.

This composition consists of oil and alcohol; two-thirds by measurement of oil, and one-third of alcohol. The object is to obviate the necessity of washing the wool previously to the various stages of its manufacture from the raw state to its finish in cloth.

Claim.—The above composition, for the purpose specified.

No. 9,765.—SAMUEL P. KITTLE, of Buffalo, N. Y.—*Improved Door Fastener.*—Patented June 7th, 1853.



For the application of this fastener, the door is provided with a metal bar A (see fig.) sufficiently thin to allow the door to shut; this bar has spurs E E, which are pressed into the wood forming the rabbet by closing the door (see sectional figure). The end of the bar which projects beyond the face of the door when closed, secures it so long as the edges retain their hold in the rabbet. Figure 1 represents a perspective view of the fastener with cap on. A is a bar; B, stop or rest; C, brace; D, cap; H, the rivet which holds the pieces B and C to plate A, and upon which B and C turn.

Claim.—The construction of the bar A, having the edges E E, with the stop or rest B, having the lips F and G arranged as described.

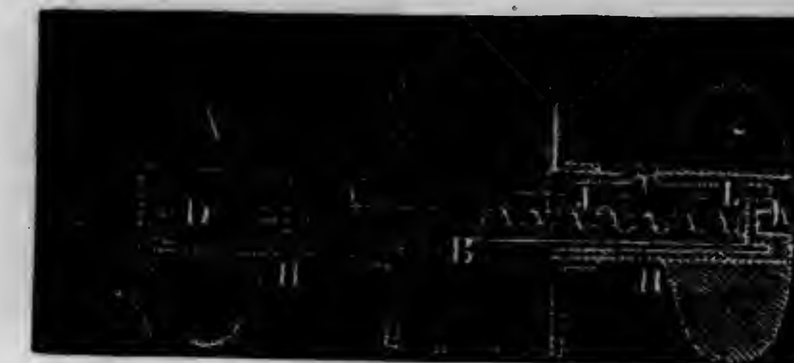
Also, the combination of the cap D with the bar A.

No. 9,766.—R. W. BELSON, of Philadelphia, Pa.—*Improvement in Culinary Boilers.*—Patented June 7th, 1853.

This invention relates to stove boilers, and consists of a flue and valve, provided for the escape of the steam and odors into the chimney. A is the tube, and C the valve, which is controlled by the movements of the cover.

Claim.—The employment of a valve in combination with the escape tube of culinary boilers, the valve being controlled by the cover or in any equivalent manner.

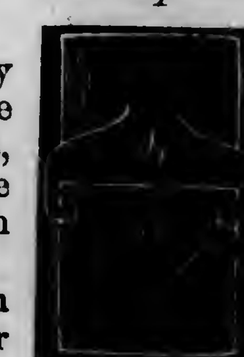
No. 9,767.—OLIVER ELLSWORTH, of Hartford, Conn.—*Improvement in Operating and Locking Knob Bolts.*—Patented June 7th, 1853.



The figure represents a section of the lock. D is the thumb-piece or disconnector; when pushed in, it forces the rod C towards the inside knob B, carrying the pin attached to the rod out of the teeth of the outside knob tube A, and into the "cavity" or "oblique sides" contained in the side of the lock case, and the latch has now become a lock. The only way of opening the lock from the outside when thus disconnected is by the introduction of a key which fits over a thumb pin and on to the end of the spindle. The inside knob B has an extender K, which serves to disconnect the outside knob A, and to lengthen or shorten the rod C.

Claim.—The inventor claims the above described combination and arrangement, for the purpose not only of an ordinary door fastening, but made so as to be converted into a lock.

No. 9,768.—RALPH J. FALCONER, of Washington, D. C.—*Improved Hose-Coupling.*—Patented June 7th, 1853.



The hose are (by this improvement) coupled by means of the taper or draw slide, to hold and bind the two parts together. (See fig.) *a* and *b* are the parts, attached to hose and locked together, which may be quickly done even while the water is flowing through the hose.

Claim.—The employment of the slide coupling in combination with the collars of hose, in the manner and for the purposes set forth.

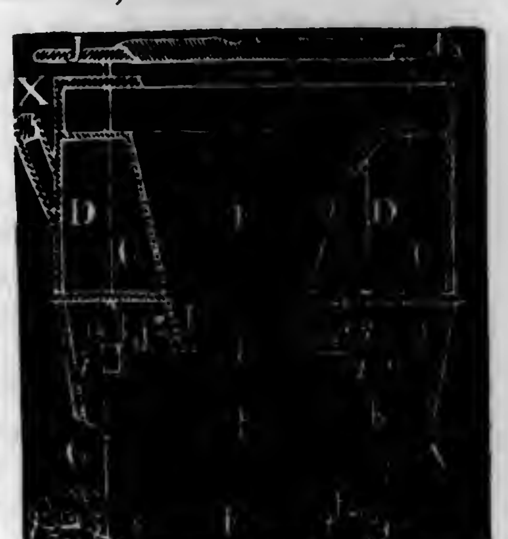
No. 9,769.—P. G. GARDINER, of New York, N. Y.—*Improved Arrangement of Quartz Pulverizer and Gold Amalgamator.*—Patented June 7th, 1853.

This improvement consists in the arrangement of a pulverizing

basin and an amalgamating basin, with a screen interposed between them; the basins operating together, upon the same shaft. In the figure, B is the driving shaft, and receives its motion through belt-pulley C; the upper shaft is forked to receive a block D. E is the lower or amalgamator basin with centre shaft F, to which is secured the inner or crushing basin G, with the balls K K. The lower end of shaft F is connected by a crank-rod I to the shaft B, which works freely in a hole made in the block D, at right angles to the pivot *f*: at one end is pivoted a metal box J, which is bored to receive the journal *i* on the lower end of shaft F. A spring *g* is applied between the block D and the shoulder on the rod I. The quartz is fed into basin G. The stream of water let into the basin G washes up all the finely pulverized particles, and carries them through the screen L into the amalgamator E.

Claim.—The arrangement of the vibrating pulverizing basin, and amalgamating basin attached thereto, with the screen interposed between the two, connected and operating as described.

No. 9,770.—HERMAN GOLDSMITH, Jun., of New York City.—*Improvement in Water Closets.*—Patented June 7th, 1853.



(See fig.) D is the water-chamber, which contains a valve *m*, which opens when the basin F closes, and allows a requisite quantity of water to pass round the pan or basin and the flange of the orifice; the effluvium is prevented from escaping by the closing of the pan or basin, thus hermetically closing the orifice. E is the opening in the centre of the water-chamber, of a conical shape. The pan F is attached to a shaft *d*, which has spiral springs wound around it, and pinions *g g*, one at each end, into which racks G G mash. When the board J J is depressed, the two racks G G work the pinions *g g* on shaft *d* to which the pan F is attached, and opens the pan F; when the basin rises, the pan closes.

The water-chamber is closed air-tight at X, to prevent an undue quantity from escaping.

Claim.—The claim of the inventor is substantially included in the above description.

No. 9,771.—LEON JAROSSON, Jersey City, N. J.—*Improvement in Painting on Cloth.*—Patented June 7th, 1853.

The woollen cloth first undergoes a series of operations of a preparatory nature in chemical preparations, &c. The mordant is composed of muriatic acid, sulphuric acid, and block tin, in about the proportions of 18 lbs. of the first, 9 lbs. of the second, and 2½ lbs. of the third; the whole being warmed in a sand-bath, whilst chlorine gas is introduced by a pipe to saturate it.

Claim.—The painting upon cloth, previously prepared with the mordant, that will combine chemically with colors laid one over the other, and blended by the means described; by which great richness is given to the figures, whilst the tint of each is carefully preserved; and developing and fixing the colors by steam; and restoring the cloth to its natural pliable state by washing out the excess of coloring matter.

No. 9,772.—GERARD SICKELS, of Brooklyn, N. Y.—*Self-adjusting Platform for Ferry Bridges.*—Patented June 7th, 1853.

This platform is constructed in such a shape that when the boat approaches, it covers the entire space between the boat and the bridge.

A represents the bridge working by pivots *a*; C the frame which supports the lever frame D, whose pivots or bearings *b* work in oblong slots. E F is the platform. To the lever frame D are attached cords or chains *g g*, with counterpoise G. H represents the ferry boat. I is a vertical pin secured by a pivot to lever J, having a fulcrum at *j*. When the boat approaches, the cut-water K strikes the cross-bar *i*, and forces the lower end of the frame inward and downward, and raises the weight G.

Claim.—Substantially the improvements above described.

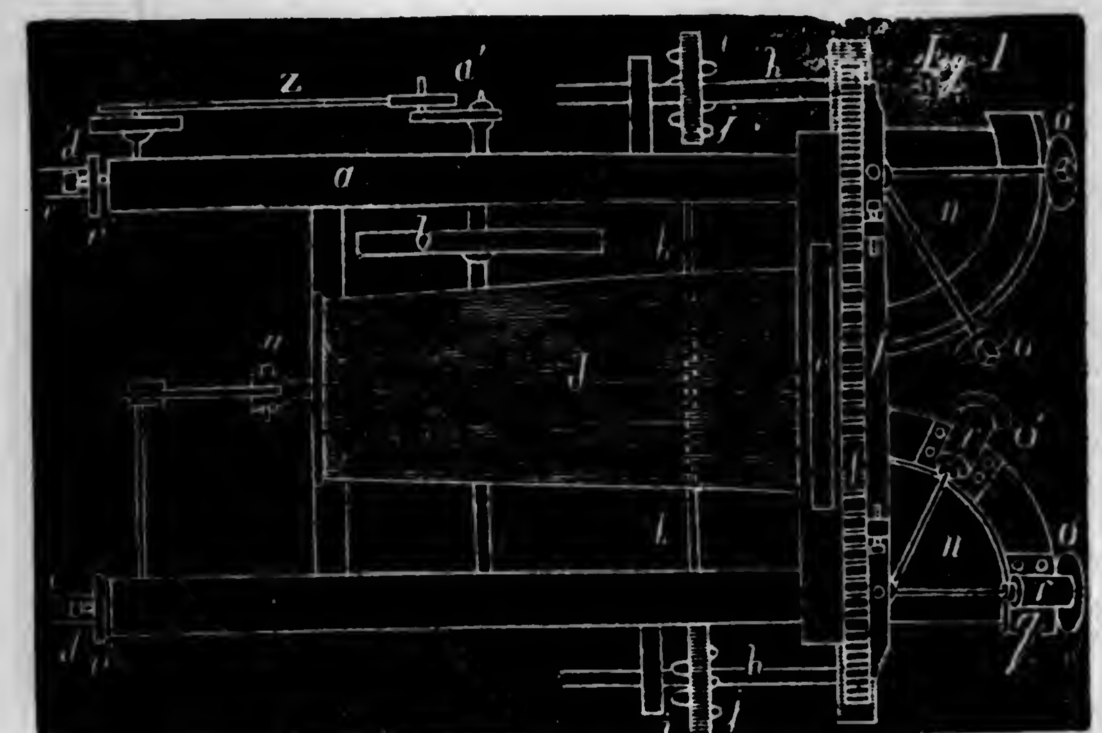
No. 9,773.—GEORGE W. WIGHT, of New York City.—*Improvement in Screw-Presses for Packing Boxes.*—Patented June 7th, 1853.

The application of this press may be seen by reference to the annexed figure. A, the male screw; B the joints in the arms, G the female screw, E E the hooks. This screw-press is designed to hold and press down the cover of the box while it is nailed or fastened.

Claim.—Bending the upper portions of the arms or levers from a vertical position, and tending towards each other till they reach the cross-piece at B, and are jointed thereto at any point between the uprights and the centre of the yoke at G, to give them an inward tendency when the yoke is raised by the screw A.

No. 9,774.—EBENEZER TALBOT, of Windsor, Conn.—*Machine for Tunnelling, or Boring Rock.*—Patented June 7th, 1853.

The nature of this invention consists in so employing one or more metal rollets, or sets of rollets, with the periphery adapted to cut



away the surface of stone by rolling against it, that they shall describe in their action the segment of a circle, from the centre to the

circumference of the tunnel, in combination with a slow motion around the said centre of the tunnel, or other aperture, whilst at the same time that part of the machine which carries the rollets is capable of being advanced for the feed motion in the direction of the axis of the tunnel.

Claim.—The method of applying a rollet-cutter or cutters, for boring or excavating tunnels and other apertures in rocks, by causing the rollet-cutters to cut segments of circles from the centre to the periphery of the tunnel, with the concavity towards the machine, in combination with a motion or motions around the centre of the tunnel, to cause the cutters to act in succession on the entire surface to be cut away.

No. 9,775.—J. HORNIG AND LUDWIG SUESS, of Union Hill, N. J.—*Improvement in Artificial Stone.*—Patented June 7th, 1853.

The composition consists in silex seventy parts, clay eighteen parts, and twelve parts of common salt, or substances containing sodium or potassium in sufficient quantity to cement the silex and clay by means of heat together; when two parts of chalk are added, the composition receives a fine white color; ten parts of dross of copper give it a greenish color; fifteen parts of dross of iron give it a gray or black color. To give it a very remarkable degree of hardness, and a granite-like appearance, mix sixty parts of sand, fifteen of clay, ten of salt, and fifteen of quartz slate. The employment of powdered quartz instead of sand gives it a still greater hardness, especially when five parts of powdered glass are mixed with the rest of the composition.

Claim.—The above described mode of forming artificial stone, by the use of silex, alumina, and salt, or chloride of sodium.

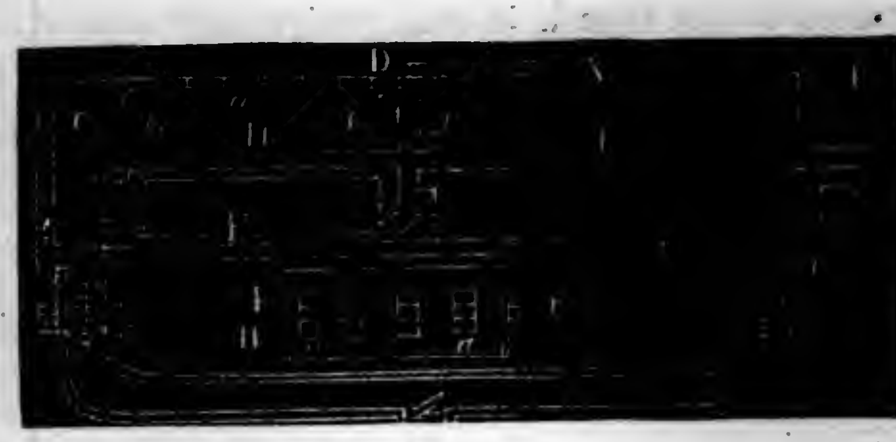
No. 9,776.—HAMILTON L. SMITH, of Cleveland, Ohio.—*Improvement in Paper Files.*—Patented June 7th, 1853.

This improvement consists in a series of narrow leaves *a a*, which are bound together in the form of a book. The outer margins of the narrow leaves are coated on one side with a glutinous substance, by moistening which it will adhere to the margin of a letter or other paper applied to it. The narrow leaves may be numbered and an index added.

Claim.—The paper file herein described, with prepared adhesive leaves, or margins.

No. 9,777.—LEVI P. and WILLIAM F. DODGE, of Newburg, N. Y.—*Improvement in Pumps.*—Patented June 7th, 1853.

This improvement consists in connecting the valves G G′ of the piston heads, by a tube H encircling the rod E, whereby their simultaneous operation is insured, one closing at the precise time the other opens, while the piston heads are connected by a thin cylinder F, open on one side to communicate with the discharge pipe D. Fig. 1 represents



a section of the pump. On the upper side of the piston cylinder F, opposite the discharge aperture D, there is a series of passages *a a a* to let the water pass out freely from the interior of the piston. (See fig. 2.)

Claim.—The combination of the cylindrical piston, with its valves and passages, so that the water, all entering the cylinder upon pressure alternately at its ends, and being discharged under pressure through the openings at its side, tends to expand the same. Also, the combination of the piston heads without the cylinder with thin valves, and the induction and eduction passages, when these valves are united. The water entering through the piston heads, into the space between the same, and being discharged therefrom through a lateral eduction orifice.

No. 9,778.— CHARLES B. FITCH, of Galena, Ill.—*Improvement in Cutting Apparatus for Tenoning Machines.*—Patented June 14th, 1853.

The object of this invention is to economize time and labor in tenoning, by making a wider cut practicable than heretofore. To the gate A are attached the improved cutting tools, in pairs, D D and B B; the foremost only partially performing the cut, while the after cutters finish the same. But the cutters differ in form according to the work to be performed; the lower or foremost cutting tools are V-shaped wing cutters, and are adjustable. In order to remove the angular strips *g*, formed by the cutters B B, the finishing tools D D shave off said strips and complete the formation of a regular tenon.

Claim.—The method herein described of cutting tenons, by means of the scoring V-shaped cutter, that cuts the square shoulder and point, and at the same time scores the side of the tenon, when this is combined with the lancet-shaped or other finishing cutter, for removing the material left by the scorers; arranged and combined as specified.

No. 9,779.—WILLIAM G. HUYETT, of Williamsburgh, Pa.—*Improvement in Harvesters of Grain and Grass.*—Patented June 14th, 1853.

This improvement relates to the cutters. There are two sets of them, one above the other; the lower ones *b b*, as shown in the figure, are of the shape of saw-teeth, and have a reciprocating motion communicated to them in a direction crosswise of the machine, by means of connecting rods and cranks G. The upper set *c c c* work over the lower ones *b b*; and their outer ends are attached by pivots *e e e* to the outer ends of the teeth *a a a*. The upper set of knives are comparatively narrow, and of taper form, and are attached at their inner ends by pivots *d d* to a bar D having a reciprocating motion, which is also communicated to the upper knives by means of the piece F having its fulcrum at *h*. By this arrangement the knives operate with a "drawing cut," and the upper knives have the greatest length of vibration at their inner ends, and consequently prevent any choking or clogging of the knives, at the angles of the lower set of teeth at *i i i*.

Claim.—The peculiar manner of arranging the two sets of knives *b b b* and *c c c*, as above described, having an opposite reciprocating motion.

No. 9,780.—SHERMAN S. JEWETT and FRANCIS H. ROOT, of Buffalo, N. Y.—*Improvement in Stoves.*—Patented June 14th, 1853.

This improvement consists in constructing stoves or grates with recesses adjacent to their doors, of sufficient size to receive the doors, and open only when the doors enter.

In the figure, *b b* represent jambs, containing the recesses *c c* to conceal the doors. *d d* are the door-leaves, which slide in grooves *i i* in the bottom plate B. *g g* are the door flanges.

Claim.—The combination in a stove or grate of the fireplace or furnace with a sliding-door or doors, to close the front of the fireplace; and a recess in one or both of the jambs, for the doors to slide into, and be concealed from view, and be insulated from the fire and smoke within. The recess of sufficient size only to receive the door or doors, and open only when the door enters.

No. 9,781.—Harvey Murch, of Lebanon, N. H.—*Improvement in Mop-Heads.*—Patented June 14th, 1853.

The claim will explain this invention, by reference to the annexed figure.

Claim.—The improved mop-head composed of the fixed cross-head B, which has grooves in its lower side and end, in combination with the sliding binder C, that terminates in a notched shank *c*, and passes through the loop *a*, on the handle A, which serves as a detent in consequence of the action of the spring *d*, on the under side of the shank.

No. 9,782.—Geo. Frederick Muntz, Jun., of Birmingham, England.—*Improvement in the Manufacture of Metal Tubes.*—Patented June 14th, 1853.

This invention consists in casting short tubes of a peculiar form or section, rolling them flat to extend them in length, and then opening them out and rendering them cylindrical. Figure 1 represents the short tube; the inside is washed with lime and water containing as much salt as will be held in solution, which prevents the tube from adhering together when rolled flat. The tube is heated to a red heat, and rolled between grooved rollers similar to those used in rolling flat bar iron, but grooved to produce round edges as shown in figure 2. The tube thus rolled into flat bars is to have one end opened for about six inches, as shown in figure 3; and when in this form, and at red heat, it is to be passed through between grooved rollers shown at figure 4. The tube is then entered on to the end of the mandrel, and on to the stem, so that the tube will be thereby opened in its whole length. At figure 5 the form of the mandrel is shown.

Muntz's metal, which is used for these tubes, consists of 60 parts of best copper, and 38 parts of good zinc.

Claim.—The above described mode or process of manufacturing a metallic tube of Muntz's metal, or other like metal, or compositions of metal.

No. 9,783.—Lea Pusey, of Patterson, Penn.—*Improvement in self-waiting Dining Tables.*—Patented June 14th, 1853.

This table is constructed with an endless band, situated beneath the table and kept in constant motion during meals, by any power applied through cranks or other means. Upon the top of the guiding carriers (which are firmly attached, and are supported by small railway trucks which move in guiding apertures in the top of the table) are placed waiters, whereon the dishes are put, and constantly conveyed around before the guests on both sides of the table. Also, placing a shelf over the central portion of the table.

Claim.—The inventor's claim is substantially embraced in the foregoing description.

No. 9,784.—Fergus Purden, of Baltimore, Md.—*Improvement in Mortising Machines.*—Patented June 14th, 1853.

The nature of this improvement consists in making the bed-piece in two parts, so that it may be adjusted to mortises in different positions and of various widths, to allow the chips to escape from the under side of the piece to be mortised.

Claim.—A divided bed, so constructed that it can be adjusted to suit the width of the mortise to be cut, so as to prevent the side of the mortise from being splintered by the cutter or chips, when they are forced through and driven out on the under side.

No. 9,785.—Alex. Hypolite Sampson, of New Orleans, La.—*Improvement in Brick Machines.*—Patented June 14th, 1853.

The nature of this improvement consists in combining the mould wheel, pressing apparatus, the carrying chains with suitable projections thereon, which furnish from a reservoir or box, and carry forward to the delivery followers, the boards or platforms upon which the pressed brick are received and carried forward to any convenient point for arranging them in the drying-house or kiln; some portions of the apparatus having a continuous, and others a reciprocating intermittent motion, but the whole being so timed as to operate with perfect uniformity with each other.

Claim.—The box or reservoir of platforms with the carrying chains, or their equivalents, provided with suitable projections for catching, drawing forward, and carrying immediately underneath the delivery follower, the boards or platforms for receiving the pressed brick, and by which they are conveyed out of the machine.

No. 9,786.—E. H. Smith, of New York, N. Y.—*Improvement in Copying Presses.*—Patented June 14th, 1853.

The platens A and B are set vertically. The hand lever has its fulcrum at F, and works between the upright supports D, to which the stationary platen is attached. To the lever is attached a pawl E, to give the progressive motion; H is the transverse bar to which the upright standard G is attached, and the movable platen A. The adjustable stop L in the separate figure is set upon one end of the transverse bar, and is to be secured in any position by the wedge I, whereby the press can be worked exactly, and at any distance required.

Claim.—The employment of the hand lever to operate the pressing

platen through the agency or by the means of the sliding transverse bar, or its equivalent, in combination with the adjustable stop or its equivalent.

Also, the arrangements of the plates or platens A and B in such relation to their support and operating medium, as to render three of the four edges of each platen unobstructed, perfectly available, and easy of access.

No. 9,787.—JOHN I. STURGIS, of New York, N. Y.—*Improvement in Type-Casting Machines.*—Patented June 14th, 1853.

The nature of this invention consists in arranging upon a horizontal rock-shaft working in adjustable boxes in standards at each side of the bed plate of the machine, the mould-block rest in a horizontal position, having one edge inclining downwards, so as to give the mould a downward slant to drop the type, and having its back end in a vertical rock shaft, having a pin in it to work in a groove of a cam on the main shaft, for the purpose of producing a reciprocating motion to carry the mould-board to and from the nipple of the metal bath. Also in the combination of the levers and cam and spring movements, for holding the matrix, and "levering" it (technically) when in operation for moulding type. Also in the mode of setting the upper half of the mould-block, by means of a V-shaped bar secured to a back piece, which is made adjustable by means of set screws, holding in the joint at the back of the mould-block. And lastly, in the arrangement of the several parts of the machine, for the purpose of type casting.

Claim.—The use of the horizontal mould-block rest, in combination with the vertical and horizontal rock-shafts and cam. Also, the use of the lever and rod in combination with the horizontal mould-block rest and matrix. Also, the use of the matrix-holder, having a slot in it, to allow of a lifting motion on its centre pin, and a notch in its back side for the end of the spring to act against, in combination with a spring and inclined plane or cam, on the horizontal rock shaft, and a pin for holding it. Also, the V-shaped bar secured to an adjustable end plate, attached to the outer end of the lower half of the mould-block.

No. 9,788.—GILES F. FILLEY, of St. Louis, Mo.—*Improvement in Cooking Stoves.*—Patented June 14th, 1853.

The claim, by reference to the figure, will fully explain this improvement.

Claim.—The flaring enlargement of the side flues D D, C C, from the space above the oven to the flue space E, which extends under the entire front end of the oven; and also the enlargement of the central flues F and G, from the flue space E to the upper end of G, for the purpose of increasing the draught of all the flues, and causing a larger portion of heat to be conducted into the flue space E. Also, in combination with the flaring shape of the flues C C F and G, the auxiliary dumb flue H, which rises from the flue space E to the hearthplate, and thence is continued immediately under the fire chamber and up the back of the same; by which another portion of heat from the fire chamber is conducted by radiation and circulation into the flue space E, for the purpose of aiding in giving an increased draught to the stove, and in raising the temperature of the front end of the oven bottom to the required degree for baking purposes.

No. 9,789.—JAMES M. BROOKFIELD and EPHRAIM V. WHITE, of Honesdale, Pa.—*Improvement in Manufacturing Glass.*—Patented June 14th, 1853.

The nature of this invention consists in combining and using a blast with the ordinary furnace, and anthracite coal as a fuel, for melting the materials in the manufacture of glass. The common furnace is used, having the ordinary arched chamber A for containing the melting pots, working holes, &c., sieges, heating chambers B, air chambers *d*, doors *e*, &c.; and to permit the use of anthracite coal, in addition to the ordinary bellows, a blast apparatus is applied, and the blast is conducted through the pipe *g*. The strength of the blast is regulated by the sliding valves *h*. The shelves *i* are for heating the coal, and the apertures *k* for introducing it into the heating chambers B.

Claim.—The application of a blast, and anthracite coal as a fuel, in the manufacture of glass.

No. 9,790.—JOHN L. KINGSLEY, of New York, N. Y.—*Improvement in Moulding Gutta-Percha Stereotype-Plates.*—Patented June 14th, 1853.

The nature of this invention consists in making moulds for stereotyping of India rubber or gutta-percha, by mixing the gums with metallic or earthy substances, and by expelling all air from the mould while it is being filled, to render the cast in all respects perfect. (The process would require too lengthy a description for this Report.)

Claim.—The process of expelling air from the surface of the type when forming the mould, and from the surface of the mould when forming the plate. Also, the method of dressing, levelling, or thicknessing the moulds and plates, when made of any compounds that run, so that all the plates made shall be invariably of the same thickness.

No. 9,791.—J. J. GREENOUGH, of Boston, Mass.—*Improvement in the Manufacture of Glass Plates.*—Patented June 14th, 1853.

This improvement consists in the apparatus and process of forming plates of glass, by causing the melted material to pass between two or more pairs of rollers, while in a plastic state, and in keeping the plates

between the rollers, and supported by them, till cool enough to support themselves straight without stretching while annealing, or by suspending them by their upper edges in an annealing chamber during the process of cooling; both of which processes may be used in conjunction. The apparatus consists of a carriage composed of two side pieces, properly connected and placed on trucks; this carriage supports two or more pairs of rollers, arranged so as gradually to reduce the thickness (if desired) of the glass, as it passes between them. The hopper or reservoir containing the melted glass is located above, and so arranged as to precipitate the melted glass directly between the rollers, by turning the frame upon which the hopper is suspended or swung.

Claim.—Manufacturing plates of glass, by causing the glass while in a plastic state to pass between two or more pairs of rollers. Also, embossing the surface of the plate-glass by passing it between embossing rollers. Also, suspending plates of glass by their upper edges after they have been formed while annealing, so as to keep them in a perfect plane, without resting on a bed.

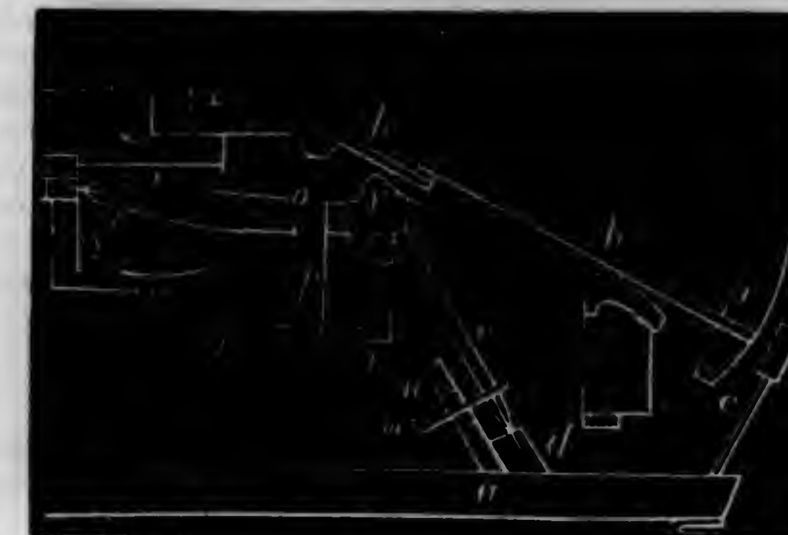
No. 9,792.—HORATIO ALLEN and D. G. WELLS, of New York, N. Y. —*Improvement in Cut-off for Steam Engines.*—Patented June 21st, 1853.

In this improvement in the cut-off, the exhaust valve toes are permanently attached to the rock-shaft; and on this shaft are placed the loose toes, or secondary toes, by means of which the steam valves are operated: motion is given to raise the loose toes by means of an arm permanently attached to the rock shaft, and to lower them by means of an arm having its centre on an arm attached to the rock shaft, and deriving its motion from any part of the engine whose motion commences with or slightly precedes the motion of the piston rod. *b* is the rock shaft; P P are loose toes; 8 8′ are two sectors, supported by the pin 7, but free to turn on it. These sectors are connected with the arm 9 by means of a right and left hand screw.

Claim.—The mode of operating the loose toes by means of sectors, combined with the rock shaft, and operated as set forth.

No. 9,793.—BENJAMIN E. COLLEY, of Cambridge, Mass.—*Improvement in Piano-Fortes.*—Patented June 21st, 1853.

This improvement consists in making the fly of the jack adjustable by a set screw, which keeps it in its proper position with regard to the shoulder of the hammer arm, and prevents its rebounding against the same; at the same time the fly of the jack is prevented from blocking by being pushed from the lever which operates the hammer-arm, at each blow; *a* represents the key-lever; *c*, back-catch; *d*, jack; *e*, fly; *f*, arm which works on a fulcrum at *g*.



In the arm *f*, and turning on a fulcrum *o* in the same, is placed the right angular lever *p*, through the bottom end of which is inserted a screw *q*, with washers at *r*. The other end or projection *t* of this lever bears against the stationary piece s. When the arm *f* is raised by the fly of the jack, the lever *p*, turning on the fulcrum, will press by means of its screw *q*, and washer *r*, against the fly of the jack, and throw it from the shoulder of the arm *f*; thus effectually preventing its sticking or blocking. The lever *p*, of right angular form, is aided by the bent spring *u*.

Claim.—Throwing the fly of the jack from the arm which operates the hammer each time the note is struck, so as to prevent its blocking in the arm, by the bent lever *p*, and set screw *q*, operating independently of the hammer and hammer arm in the manner set forth.

No. 9,794.—WILLIAM H. DANFORTH, of Salem, Mass.—*Improvement in Power Printing Presses.* Patented June 21st, 1853.

The nature of this invention consists in the employment of two parallel type forms, and two platens, in one printing machine, so arranged one above the other that both platens can be operated together, so that a sheet of paper can be printed by each form at one impression. Also, in the manner of feeding the paper into the machine between a series of griping bars and bands, that hold it in place to receive the impression, and pass it forward afterwards; while the inking roller is so arranged as to follow closely after it, across the face of the types, to ink them, and be followed in turn by the blank sheet that is to receive the next impression. Also, in the manner of providing an opening between the feed bands, at the time that the sheets are entered from the tympan. Also, in the arrangement for operating the feed bands, so that they will be stationary at the time that the impressions are given.

Claim.—The employment in one printing-press of two parallel type-forms, one above the other, and two platens so arranged in a

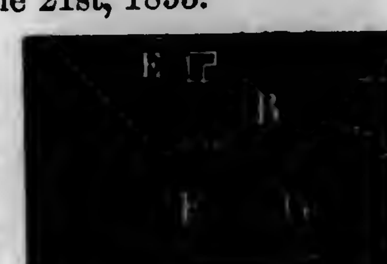
frame as that a sheet of paper can be printed by each form at one impression. Also, the mode of feeding the paper. Also, making the feed-bands unequal in thickness, for the purpose described. Also, the employment of a series of griping or discharging cross-bars, in combination with and so arranged upon two endless bands, as to be made to act upon the leading edges of the sheets as they pass along, and hold them against the feed-bands, until they have passed across over the top of the pile upon the platform, for the purpose of piling the printed sheets. Also, the device for giving and checking the motion of the feed-bands, alternately as required; consisting of the vibrating lever, bar, reciprocating-rack, connecting-wheel, feeding-wheel, fast-wheel or disc, spring-pawl, adjustable cam, pin, studs, arm, rock-shaft, brake, cylinder, &c.

No. 9,795.—John A. Elder, of Westbrook, Me.—*Improvement in Looms for weaving Checked and Figured Fabrics.*—Patented June 21st, 1853.

The main feature of this improvement consists in placing one half of the trap-boards directly above the other half, their position being such as to allow the knot-cords to pass from their point of suspension, through holes in the two trap-boards, placed at short distances apart.

Claim.—The arrangement of two trap-boards, placed one above the other, and between the suspension board and needles. Also, two trap-boards, arranged, the one above the other, with their slots in opposite directions to the knot-cord holes, when combined with the knot-cords, having a knot for each board, and a single set of needles, for the purpose of vibrating the knot-cords from the slots in one board to the slots in the other; the whole arranged and combined in the manner herein set forth.

No. 9,796.—Edmond L. Freeman, of Ann Arbor, Mich.—*Improvement in Bog-Cutting Cultivators.*—Patented June 21st, 1853.



The teeth are constructed in the form represented in the figure. B represents the beam, E the shank, F the coulter part of the tooth, and G the blade of the tooth. The teeth are set in triangular frames.

Claim.—The precise construction of the tooth, and placed in the position as set forth, the vertical part and the horizontal each having a backward slant.

No. 9,797.—Frederick W. Howe, of Windsor, Vt.—*Improvement in Machines for planing Metals.*—Patented June 21st, 1853.

A represents the bed or rail frame, which supports the tool carriage C; B B are friction boxes connected to the tool carriage; D is a lever shown in dotted lines K; the endless chain, which moves continually in one direction through the boxes B B.

Claim.—Combining with the endless chain and the primary tool carriage the two slide boxes B B (or their mechanical equivalents), the binders G G and rocker lever D, and its operative mechanism, viz., the rod F, eccentric H, shaft J, and lever I; the whole being made to operate

substantially in manner as described, and for the purpose of enabling a person to readily produce a movement of the tool carriage either to the right or left, while the endless chain has a continuous motion in one direction.

No. 9,798.—William S. Hyde, of Townsend, Ohio.—*Improvement in Cultivator Ploughs.*—Patented June 21st, 1853.

This cultivator is constructed of three shares, and secured to a triangular adjustable frame. The middle share, which is placed behind the side shares, is of the shovel variety. The side shares B B are of the plough variety, and are inclined, to throw the soil in opposite directions from the centre of the machine; each of the side shares has an adjustable wing K which is pivoted to the mould board, and can be turned up or down, as seen in dotted lines K. *i* is a bolt.

Claim.—The cultivator herein described with adjustable supplementary wings, so constructed as to cultivate the soil near the roots of the plants superficially, and deeper at a distance therefrom, the wings being adjustable to any required angle with the bottom of the furrow, so as to give any desired degree of inclination to the sides of the ridges or hills, and to change their inclination from time to time to adapt them to the varying stages of the growth of the plant.

No. 9,799.—Simon Ingersoll, of New York, N. Y.—*Improvement in Feed Motion in Plug-Cutting Machines.*—Patented June 21st, 1853.

This invention consists in the employment of a feed motion which

is constructed and operated so as to move the board or slab from which the plug or bung is cut, at intervals between the longitudinal motions of the cutter spindle, after cutting one plug to a proper distance to cut another one, and which has certain provisions made for forcing the feed dogs into the work, and withdrawing them therefrom, preparatory to the feeding and retrograde movements, for the prevention of injury to their edges and to the face of the work.

Claim.—The above description substantially sets forth the claim of the inventor.

No. 9,800.—John H. Many, of Waddam's Grove, Ill.—*Improvement in Cutters to Harvesters.*—Patented June 21st, 1853.

This improvement consists in a strong straight bar A and a series of lozenge-shaped blades B B secured thereto by screws, or otherwise. The blades should be four inches long and one-eighth of an inch thick, with their edges sharpened by bevelling them off in the manner of a joiner's chisel.

Claim.—A cutter or sickle composed of a series of lozenge-shaped blades attached to a bar; whereby the pressure of the grass at the front corners of the blades is so counteracted, that the latter are not bent down from the edges of the guard fingers against which they cut.

No. 9,801.—D. H. B. Newcomb, of Conewango, N. Y.—*Improvement in Hill-side Ploughs.*—Patented June 21st, 1853.

This invention consists in arranging, centrally between the mouldboards, a running wheel, which aises from the bottom of the furrow the share which for the time being happens to be behind, and thus prevents the dragging of the same, and obviates all friction from that cause, and also facilitates the draught, and prevents the wear from the same cause.

Claim.—Arranging the two shares of a double plough which alternately run forward on a central wheel, in such manner that the share in the rear shall be carried above the bottom of the furrow. Also, the method of relieving the swivel, and of steadying and supporting the beam when set and in turning, by means of semi-circular guide or track, in connexion with a catch at each end of the track to hold the beam in place when properly adjusted.

No. 9,802.—Augustus R. Pope, of Somerville, Mass.—*Improvement in Electro-Magnetic Alarms.*—Patented June 21st, 1853.

The nature of this invention consists in applying to either doors or windows of a house a magnetic alarm, for the purpose of giving alarm in case of burglarious or other attempts to enter the same through doors and windows. By opening the door or window the

spring of the key which is attached thereto is forced against the other wire, which forms a circuit, whereby the magnet becomes charged and draws the armature towards it, thereby throwing the hammer of the bell, and giving alarm.

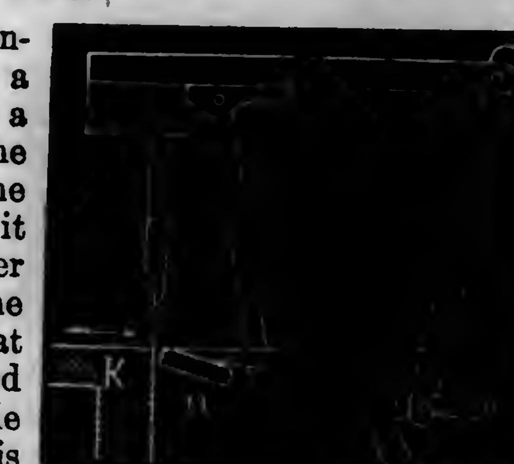
Claim.—The combination of the movable and vibrating armature and the spring circuit-breaker with the hammer of the bell, the same to be used in connexion with the electro-magnet wires, and a key applied to the door or window.

No. 9,803.—George Rohr, of Charlestown, Va.—*Improvement in Seed-planters.*—Patented June 21st, 1853.

This invention consists in a device attached to a seed-planter, for the purpose of sowing grain, or scattering it from an apron and screen.

Claim.—The use and application of a ridged, or fluted, or corrugated vibrating apron device, combined with the "grain scatterer" with crank-handle axis actuated by the pins or cogs, on the hub-flange of the propelling wheel, together with the reacting spring rest; the whole arranged and used together as a seed fountain, with apertures so constructed as to admit of connecting thereto short detachable or movable mouth-pieces or outlet spouts, for the more perfect and free escape of the seed from the grain chamber on to the apron and scatterer.

No. 9,804.—J. R. Shank, of Buffalo, Va.—*Improvement in Lath Machines.*—Patented June 21st, 1853.



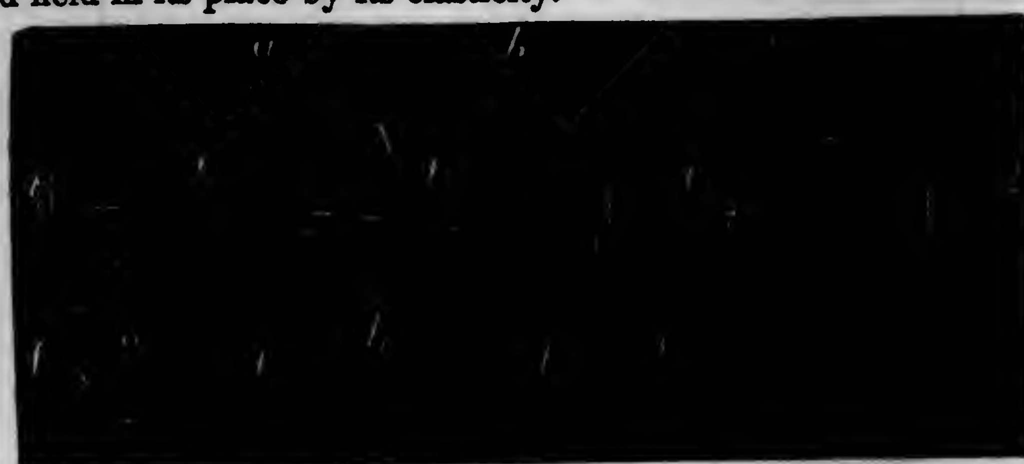
The nature of this invention consists in providing the machine with a gauge O, which is furnished with a vibratory motion, answering the double purpose of regulating the thickness of the lath, and slipping it from the knife and table K, in order to be sure of its separation from the board, so that it can be shoved up at every stroke of the machine and thereby cut a lath perfect. While the knife is descending the gauge is descending, whereby the lath is forced down from the table.

Claim.—Imparting a vibratory motion to the gauge-bar, in the manner described, so that it will not only perform the function of a gauge-bar to regulate the thickness of the lath, but also that of a slipper in order to insure the separation of the lath from the block, for the purposes described.

No. 9,805.—Walter Sherrod, of Providence, R. I.—*Improvement in Expanding Mandrels for Turning Machinery.*—Patented June 21st, 1853.

The nature of this invention consists in the use of an arbor A having a taper turned thereon, on which is fitted an expanding

cylindrical spring shell *a b c*, open at *f* longitudinally with the arbor, and held in its place by its elasticity.



Claim.—A divided spring shell constructed as described, and so that when it is combined with a tapering mandrel it shall retain its position on said mandrel; the whole arranged, constructed, and combined in the manner set forth.

No. 9,806.—William McKay Thornton, of Bloomsburgh, Pa.—*Improvement in Horse-collars.*—Patented June 21st, 1853.

Figure 1 represents this improved collar, with wide pad-flaps *d*, which are stiffened by means of a metallic bow, as shown in figure 2.

Claim.—A horse-collar formed with pad-flaps *d* by the extension of the face leather of the pads as described. Also the manner of stiffening and uniting the pads by means of a metallic bow, the ends of which are rigid to stiffen the shoulder pads and support the tugs, while its arch is flat, thin, and flexible in one direction, to allow the pads to change their relative distances apart, comparatively rigid in the other direction, to prevent the pads from turning, with respect to a plane parallel to the front of the collar.

No. 9,807.—Joseph H. Tuttle, of Seneca, N. Y.—*Improvement in Saws.*—Patented June 21st, 1853.

The nature of this invention consists in so forming and arranging the teeth on a saw blade, as that the set of teeth which scores the

sides of the kerf shall project slightly beyond the other set of teeth which planes out the wood between the scores, and so also that a portion of the planing teeth shall by their form and location act as a gauge, both to the fleam cutters or scorers and to themselves, to prevent the teeth from taking too rank a hold on the wood, which makes it run with great ease and efficiency. A A and B B represent the fleam or knife-edged teeth, and C C the curved planing teeth.

Claim.—The combination, arrangement, and location upon the same blade of the sets of fleam teeth for scoring the sides of the kerf, and the sets of planing teeth for removing the wood between the scores, when the planing teeth are placed back to back, curve in opposite directions, and are between the sets of fleam cutters, and at sufficient distances apart, so that each planing tooth shall serve alternately as a gauge to its fellow, while allowing it to cut to a proper depth, and be a permanent guide to the fleam cutters, to prevent any of the teeth from taking too rank a hold upon the wood, which makes it run with great ease and efficiency, and is applicable to slitting or cross-cutting.

No. 9,808.—Jonas B. Wilder, of Belfast, Me.—*Improvement in Ploughs.*—Patented June 21st, 1853.

The nature of this invention consists in having a revolving mould-board, so arranged and attached to the share and land-side plate, that the mould-board may be turned independently of the share, which also revolves. Both the mould-board and share may be turned to either side of the land side plate, so that the dirt or sod may be cast or turned in either direction; and the object in having the mould-board so arranged that it may have an independent movement, is, that it may be adjusted properly to either side of the plough, and the plough work equally well, no matter on which side of the plough the share and mould board are placed. The figure represents the side-hill plough, the share C and mould board A being down, or in the act of being turned over on the other side of the land side B.

Claim.—Having the mould-board so constructed, arranged, and attached to the share C and land side plate B, that the mould-board may be turned independently of the share, and a proper curved outer face be presented to the sod on either side of the plough; the mould-board being constructed with two faces precisely of the same form.

No. 9,809.—Benj. R. Norton, of Syracuse, N. Y.—*Improvement in Metallic-Pointed Pens.*—Patented June 21st, 1853.

To construct these pens metallic moulds are first prepared, either in halves, or as most convenient, the inside of which is of the shape

and size of the pen to be made, having on one end a cylinder and piston, for forcing the composition of gums when in a plastic state into the moulds. The pens are made of gutta percha or other elastic gums, and pointed with metallic points, the nibs of which are tipped with iridium, as in the ordinary manner of making gold pens.

Claim.—A metallic-pointed pen, attached to a wire of the length required to form a handle, when such pen and holder are covered from the top of the holder to near the nib of the pen by a coating of gutta percha or India rubber, of suitable thickness.

No. 9,810.—WILLIAM T. TYSON, of Orwigsburg, Pa.—*Improvement in Propellers for Canal Navigation.*—Patented June 21st, 1853. Antedated December 21st, 1852.

This propeller consists of inclined blades, which are secured to a hub; the peripheries of the blades are everywhere equidistant from the axis on which the propeller turns, and are furnished throughout their whole extent with rims, which have the form of helical strips cut from the barrel of a cylinder, and project backwards from the blade, to confine the water on which the latter is acting, and thus prevent it from being thrown outwards by the centrifugal force generated by the revolution of the blades. A A are the propeller blades in the figure, *d d* the rims, *e* the axis.

Claim.—The blades constructed with lips or rims, which are sections of a cylinder concentric with the axis on which the propeller rotates.

No. 9,811.—ENOCH HIDDEN, of New York, N. Y.—*Improvement in Side-lights for Ships.*—Patented June 21st, 1853.

This improvement in ship lights has for its object a more convenient ventilation. The figure represents a section, and A a portion of the ship's side. B B, the main frame of the light, rendered tight by a lead ring K K. O O, movable frame in which the glass D is fastened and turned on its pivots J in the projecting pieces E, cast on the frame B. L shows the frame O in an upright position when open. F F are the screws with combined inclined planes, which firmly screw the light frame or glass cell to its India rubber seat O O, making

it air and water tight. The screw F is shown separate, fig. O being the circular inclined plane; N is a projecting pin for stopping the screw in its proper position when the light is to be opened for ventilation.

Claim.—The arrangement of screws F tapped into the main frame B, in combination with inclined planes or spirals O, forming part of the screws that holds the light frame, or cell containing the glass, fast to the India rubber in its grooved seat in the main frame, with its stop pin N for stopping the screw in its proper position when the light is opened for ventilation. Also, the projecting ears E, with slots or chase-mortises, in which the pivots of the light frame or cell turn, allowing the light to be hauled from its seat, and consequently out of contact with the India rubber, so as to allow the plane of the light to be placed at any angle to the main frame, thus freely admitting of ventilation. Also, the arrangement of a lead or other ductile metallic ring soldered on to the main brass frame of the light, so that it can be turned round the other edge of the opening in the vessel securing any suitable material, completely making the main frame of the light water-tight to the vessel.

No. 9,812.—R. L. HAWES, of Worcester, Mass.—*Improvement in Envelope Folding Machines.*—Patented June 21st, 1853.

This invention consists in the self-feeding machine, which takes a sheet of paper and carries it forward to impress or form a base, and thus retains it until it is carried onward to the finisher, whence it is discharged a finished or folded and pasted envelope, the paste being applied in its progress through the machine.

Claim.—The combination of the self-adjusting feed table *d* with the paste fountains, so arranged that they will descend and press a freshly pasted surface of their rollers upon the top sheet, and raise it to permit the table *b* to pass beneath and take away a sheet at every second revolution of the main shaft. Also the combination of the platform with the hooks and the retaining fingers. Also the combination of the platform with the follower and weight. Also the finishing folder, consisting of knives with their adjustable springs and guides, in combination with the finishing plunger to press the envelope and cause the three flaps to adhere together. Also the arrangement for raising the table, in combination with the fingers for discharging the finished envelope.

No. 9,813.—BARNABAS H. BARTOL, of Philadelphia, Pa.—*Improvement in Refrigerators for Cooling Liquids.*—Patented June 28th, 1853.

This invention consists in an improved apparatus for cooling water used for the condensation of vapor from vacuum pans, especially applicable in places where water is scarce. The apparatus consists of a room twelve feet square, and nearly as high, filled with a series of vertical board partitions *a a a a*. The surface of the boards is corrugated or rough; between the boards is a space of two inches; over every

board is a pipe *b b b b*, with small holes from which the water falls upon the board. In front of the chamber is a fan blower *c*, inclosed in a shell, driving the air into the cistern, whence it passes up between the boards.

Claim.—The arrangement of a series of partitions and interstices, for cooling water.

No. 9,814.—Horatio Clarke, of Dedham, Mass.—*Improvement in Bobbins.*—Patented June 28th, 1853.

In this improvement the bobbin head is composed of a wooden disc, cemented or glued firmly to a disc of raw hide or other flexible material of durable quality. This raw hide protection may be fixed on the inner or outer side of the bobbin head. This additional disc of hide protects the bobbin head from breaking, and resists wear and tear.

Claim.—Making the bobbin head as described, of wood and raw hide, or other material having like qualities, for the purpose of durability, &c.

No. 9,815.—Christopher Duckworth, of Thompsonville, Conn.—*Improvement in Shuttle-box Motion in Looms.*—Patented June 28th, 1853.

This improvement consists in the manner of operating the shuttle boxes, by means of levers, friction rollers, notched slides, &c., so that the shuttle boxes may receive a lateral, vertical, and diagonal motion at pleasure, and may also be kept in any one position as long as is required for any figure, or character of the fabric, being governed by the card pattern.

Claim.—The method of giving a three-fold movement (lateral, vertical, and diagonal) to the shuttle boxes, by which any required shuttle may be operated at any given pick. Also the apparatus for operating the shuttle boxes, consisting of the case (with its friction rollers and slides), combined with the levers which work the slides, and the principal lever which moves the shuttle boxes; when the whole is constructed, arranged, and combined as described.

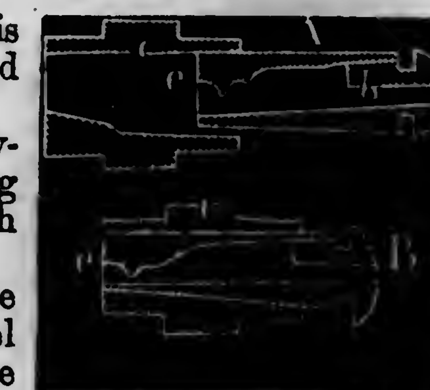
No. 9,816.—Horatio N. Goodman, of New Haven, Conn.—*Improvement in Melodeons.*—Patented June 28th, 1853.

This improvement consists in constructing the melodeon with two sets of reeds and two sets of valves, in such a manner as to be played with two sets of keys. The arrangement is such that each set of keys

may play its own set of reeds independently, or so that the lower set of keys may play both sets of reeds (in the ordinary way of two stops) while the upper set of keys may play its own set of reeds only, in any other part of the key board, at the pleasure of the performer. The lower set of keys may be connected with the back set of valves, so that both sets of reeds may be played by the lower set of keys.

Claim.—The above fully sets forth the claim of the inventor.

No. 9,817.—Daniel H. Hovey, of Kilborn, Ohio.—*Improvement in Machines for Twisting Waxed Ends.*—Patented June 28th, 1853.



By reference to the annexed figure, this improvement will be readily understood from the claim.

Claim.—The combination of the revolving rollers or tubes *c c*, conical coupling cores *b b*, the spring tighteners *e e*, with the detaching levers.

(After the threads are secured in the cores properly, the operator turns a wheel around a few times, by which the cores are turned and the threads are thereby untwisted to make a good end or extremity. The *end* is speedily twisted by turning the wheel.)

No. 9,818.—E. Morewood and G. Rogers, of London, England.—*Improvement in coating Zinc with Lead.*—Patented June 28th, 1853.

The nature of this improvement consists in a compound sheet of lead and zinc. The zinc is coated with lead in the following manner: A suitable quantity of lead is placed in a pan, having the shape and size to mould a slab suitable for forming a sheet by extension between rollers, and kept at a heat a little above the melting point of zinc. Zinc, say three times the bulk of lead, is poured on the lead, when cooled down to about 300° Fahr. that compound is rolled out.

Claim.—Such a composite sheet as a new and useful manufacture, or article of merchandise of great value and importance, and which possesses the hardness, stiffness, and strength of zinc, with the capacity of lead to resist the action of oxydizing agents.

No. 9,819.—Levi S. Reynolds, of Indianapolis, Ind.—*Improvement in Bran Dusters.*—Patented June 28th, 1853.

This invention relates to the employment of an additional scourer, through which the finer grades of offal are passed after separation from the coarser, in order that they may be subjected to the requisite degree of friction for producing the desired effect, without involving the necessity of the coarse offal undergoing the same process, and consequently becoming injured by cutting; also, to the arrangement

of the bolting cloths so as to be capable of a vertical vibratory motion for preventing the clogging of the cloth; and further, to an arrangement by which a current of air is passed through the bolting cloths for throwing the flour and bran against them and effecting the separation in a superior manner.

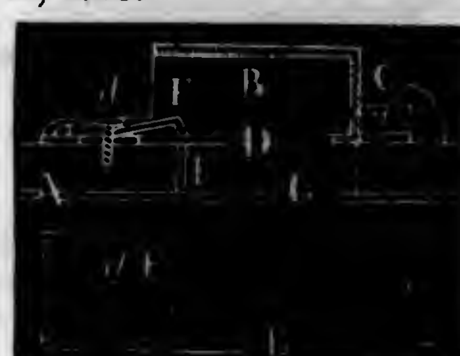
Claim.—The employment of the conical roughened metallic scourer, in combination with the double disc rubber, the discs and pins of which always preserve the same relative positions—being arranged and operated in the manner and for the purposes set forth.

No. 9,820.—CHRISTIAN SHARPS, of Hartford, Conn.—*Improvement in Percussion Pellets.*—Patented June 28th, 1853.

Instead of the ordinary open percussion cap or pellet, the inventor makes a closed cap or pellet, by inserting detonating powder into two cylindrical shallow boxes, as shown in figures *a* and *b*, that fit into each other like the lid and bottom of a pill box; when these boxes are united, as shown in *c*, they are submitted to pressure, whereby an annular crimp around their periphery is formed, permanently uniting them as at *d*. When varnished with gum shellac they will be hermetically sealed, and the powder perfectly preserved.

Claim.—The above description fully sets forth the claim of the inventor.

No. 9,821.—EDMOND E. SHEPARDSON and EDWIN LUCAS, of New Bedford, Mass.—*Improvement in Tuning Melodeons and other Reed Instruments.*—Patented June 28th, 1853.



The nature of this improvement consists in securing the reed D to movable pipes or tubes, the reeds being arranged between stationary clamps E and F, which are brought nearer to, or further from the ends of the reeds. Consequently, by operating or moving the pipes or tubes B, the clamps E and F are brought nearer to or further from the ends of the reed; thus, the vibrating parts of the reeds may be lengthened or shortened, and a greater or less vibration of the reeds obtained, as desired. By this simple arrangement the instrument may be tuned with the greatest facility and accuracy. A is a part of a bellows. The lower clamp E is secured to the lower end of the slot or recess G in the upper board of the bellows; the upper clamp F has a small jaw or hooked projection which bears upon the upper surface of the reed.

Claim.—Securing or attaching the reed to a movable pipe or tube B, the reed being placed between stationary clamps E F, by which, as the pipe or tube is moved, the vibrating portion of the reed may be lengthened or shortened, and the desired tone obtained.

No. 9,822.—LAUREN WARD, of Naugatuck, Conn., Administrator of RICHARD WARD, deceased, late of Naugatuck aforesaid.—*Improvement in Machines for Planing Irregular Shapes.*—Patented June 28th, 1853.

This improvement consists in the use of jointed levers suspended from a bar or frame above, and the crank by which the levers are operated to elevate and depress the front end of the inner part of the carriage to the desired extent for planing the article in an elliptical shape of polygon; and in the use of the notched collet on the front or toothed centre, connected with the ratchet wheel, which by means of the curved bar raises the front end of the inner part of the carriage still higher, and more suddenly than the operation of the levers would do, at the proper time to give form to a more prominent part of the article, as the square part of a spoke.

Claim.—The inventor claims the above named parts, combined, arranged, and operating as described, for the purpose aforesaid.

No. 9,823.—JAMES FOSTER, Jr., and PLATT EVENS, Jr., of Cincinnati, Ohio.—*Improvement in Bushing for Seal Presses, &c.*—Patented June 28th, 1853.

The nature of this invention consists in dividing the soft metal for bushing purposes, around a mandrel, for instance that to which the die of a seal press is attached, in such manner that the metal is prevented from shrinking as heretofore on the mandrel, and is thereby allowed to shrink on itself towards the box or cavity in the press frame, so that a sufficiently free motion after cooling, and yet a good working fit, is obtained for the purposes intended.

Fig. 1 is a longitudinal and vertical section through the stock boxes, mandrel, and die. Figs. 2 and 3 are each a transverse section through the upper and lower boxes. Fig. 4 shows a transverse section of the mandrel at the portion where it passes through the lower box. A A represents the stock of a press; E D, the guides or boxes. B is a mandrel made of hard cast iron or other metal; *g* is a spiral spring around the mandrel between the two guide boxes. The metal is prevented from forming a continuous ring around the mandrel by means of feathers *i i*.

Claim.—The mode of preventing the shrinking and binding of metal bushings, when cast upon screws, mandrels, spindles, shafts, and the like, by the insertion of feathers either movable or fixed in the boxes to be bushed, for the purpose of separating or breaking the ring of bushing metal, substantially in the manner and for the purpose set forth herein.

No. 9,824.—Amzi C. Semple, of Cincinnati, Ohio.—*Improvement in Presses.*—Patented June 28th, 1853.

A represents the platform, B cap, *b b* and *c c* arms of toggle-joint which connect the nuts with the cap and platen D, E the screw, O and F nuts.

Claim.—Sustaining the gear-frame of a double toggle-press, by the toggle arms and joints (which connect the nuts with the cap and platen) independent of and disconnected from the frame of the press, by attaching the same firmly to the nut; in combination with supporting the screw by the nuts thus sustained only.

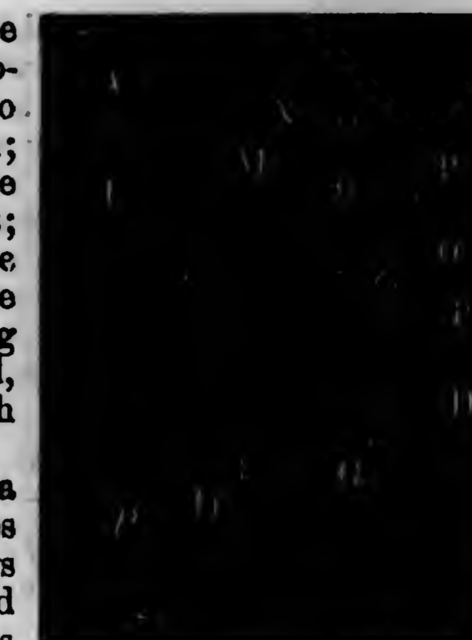
No. 9,825.—Napoleon B. Lucas, of Otter Creek, Ill.—*Improvement in Separating and Cleaning Grain.*—Patented June 28th, 1853.

This improvement is confined to the winnowing part of threshing machines. The figure represents the screen h^2 projecting from the rear end of an inclined screen h^1, which has at the front a fan-blower *f*; there is another and smaller fan-blower *g* attached to the lower screen h^3; *e* is the grain and straw carrier.

Claim.—The auxiliary screen h^2 placed in a horizontal position or nearly so, and projecting from the rear end of the inclined screen h^1, so as to be out of the axis of the blast, for the purpose of catching the blighted and lighter kernels of grain, which may be blown beyond the rear extremity of said screen h^1.

No. 9,826.—Alanson Abbe, of Boston, Mass.—*Improvement in Instruments for correcting Lateral Deviation of the Spine.*—Patented July 5th, 1853.

This instrument is secured around the hips by the belt D, and the crutch A, placed in the axilla and secured to the shoulder and the body by the shoulder-straps and the steel band L, and the pads M N and their straps. After adjusting the lever or bar H to its correct position, the thigh is moved up to it, and confined to it by the padded strap attached to its lower end. Whenever, during the correction of the deflection of the thigh from its natural or true position, it may be desirable to bring the lever H outwards, or laterally at a greater angle, a key may



be applied to the screw P, so as to move a wedge connected with that screw upwards. This instrument is intended to be worn in a sitting or standing position; the pads M N being made to rest on the prominent points of the back and chest; by means of the adjusting screws the centre of gravity of the body can be thrown directly over the foot of the leg to which the instrument is applied, whereby the correction of spinal or thigh deflection is insured.

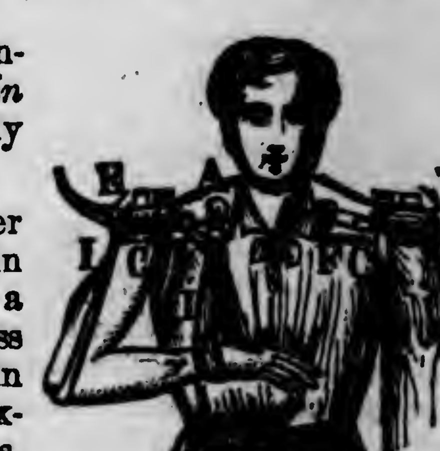
Claim.—The instrument made of a combination of the crutch A, the hip-plates O, the plates E I, the wedges and screws thereof, the breast or body-band L, and its pads and straps, or other contrivances for confining the whole instrument to the thigh and body, the whole being applied together and made to operate in the manner and for the purpose set forth.

No. 9,827.—J. Cross, of New London, Ohio.—*Improvement in Brushes.*—Patented July 5th, 1853.

The figure represents a section of this improved brush. C is the handle, which has at its lower end a female screw B; this screw works on to a metallic casing A with a male screw; into this casing the bristles are placed: a wedge E is inserted in the centre of the casing, which is forced down between the bristles by the screw on the handle C, and kept in place. The bristles can be readily attached to the handle and removed therefrom, and readily tightened when loose.

Claim.—A brush consisting of a divided case to hold the handle and bristles, in combination with a wedge forced among the ends of the bristles within the case, and tightened from time to time so as to squeeze and hold them, by screwing the two parts of the case together.

No. 9,828.—Almiron M. Day, of Bennington, Vermont.—*Improvement in Clavicle Adjusters.*—Patented July 5th, 1853.



This adjuster is designed to rest over the scapula, to retain the shoulders in their natural position, acting as a counter-brace during the healing process of the fractured clavicle; it is held in position by a strap O O at each extremity; on the top of the yoke are ears,

through either pair of which, to suit the size of the patient, are passed the straps furnished with sliding pads o′ o′; at the extremities of the arms of the yoke A are the hooks E, and in front the hooks F, from which is suspended the strap I, on the fractured side, by a buckle; this strap has a sling, into which the elbow is placed; the strap I′, held by the hook F, supports the forearm.

Claim.—The arms of the yoke A, hollowed as described, in combination with the straps O and I, attached and operating as described; by means of which the acromion process of the scapula is compressed, and the arm held in position for uniting a fracture of the clavicle.

No. 9,829.—George H. Hazlewood, of Boston, Mass.—*Improvement in Cradles for Children.*—Patented July 5th, 1853.

This improvement is fully explained by the claim alone.

Claim.—Constructing the two sides of the bed frame of a cradle, so that portions of each may be turned round and arranged parallel to one another, and across the bed frame, and thus convert the bed frame into a "*tête-à-tête*" seat or chair.

No. 9,830.—Charles W. Lancaster, of New Bond St., England.—*Improvement in the Manufacture of Cannon and other Firearms.*—Patented July 5th, 1853.

This improvement consists in giving a peculiar shaped bore to the gun, whereby the angular groove usually cut in such arms (more generally in rifles) is dispensed with, while the advantageous effects of such grooves are retained.

Claim.—The method of boring the barrel of a gun or other firearms, so that a cross section thereof would be in the form either of an ellipse, or of a series of curves. Also the construction of the boring tool for giving to the bore a form of which the cross section is not a true circle; that is to say, the combination of the cutter-bar with the boring tube, the bar passing through the tube eccentrically, the axes of both being parallel; also the bar with its inclined plane, in combination with the cutter for regulating the depth of the cut; also the expanding collar, the inclined or bevelled space on the boring tube, with the other parts in connexion therewith, for the purpose of guiding the boring tool when boring out an irregularly formed cylinder.

Also, the curved rail, or other like fixture for giving the proper motion to the barrel of the gun during the boring operation, by which the spiral or twist is given as described.

Also, the cap for supporting the boring tube just at the moment the cutter is about to clear the muzzle.

No. 9,831.—Thomas L. Mitchell, of Birkenhead, England.—*Improvement in Propelling Vessels.*—Patented July 5th, 1853.

This invention consists in applying an instrument of the nature of a "Bommareng," placed in a suitable axis, as a propeller. The Bommareng is a remarkable species of missile in use among the savages of Australia, and is a bent blade so warped as to form a portion of a screw.

The substitution of two semi-bommareng blades for one whole one admits of the use of a hub A, of one half the length required for a single blade; but even this is in many cases inconveniently long, therefore to render the instrument still shorter the inventor proposes to cut the blade at the lines 3, 4 and 5, into four parts, and translate the parts *m n* and *o*, along the hub to the positions in which they are represented, D E C. Thus divided, the blades occupy the same angular position relative to the axis of the hub A, which they would have done had they remained as one complete blade attached to the hub in one piece.

Claim.—Constructing the blade or blades of the same, upon the principle of the "Bommareng."

No. 9,832.—John North, of Middletown, Connecticut.—*Improvement in Trusses.*—Patented July 5th, 1853.

This improvement consists in employing a right and left screw and nut in a peculiar manner, by which the wearer can with great facility adjust the pressure of the pads without removing the truss. When this adjustment is combined with a swivel joint upon the pad, it secures every important adjustment, and facility for adjusting inguinal pads. Figures 1 and 3 exhibit the adjustments applied to abdominal and inguinal trusses. Figure 2 is a dissected view of the right and left screw and nut adjustments. The arm of the truss pad *a* is screwed upon the right screw *x*, and the nut *b* is screwed upon the left screw *y*; and in order to admit the arm *a* to the right *x*, the screw *y* is made smaller than the screw *x*. It will be seen that when the nut *b* is close up to the arm *a*, it holds the arm from being moved in one direction, but not in the other. The swivel joint *d* is controlled by a common set-screw, and the pad joint *e* is such as has been commonly used for truss pads.

Claim.—The mode of adjusting the pressure of the pad, by the employment of the right and left screw, and the adjusting nut, in combination with the pad lever, in the manner and for the purpose set forth.

No. 9,833.—William Porter and Edward A. Tuttle, of Williamsburgh, N. Y.—*Improvement in Lanterns.*—Patented July 5th, 1853.

This invention consists in the method of uniting or arranging the parts of a lantern, by means of one or more small rods, extending from the bottom or cup of the lantern up inside the glass globe to the top, and there secured by a catch, by means of which a more convenient and economical mode of shipping and unshipping the lantern is obtained, and by the peculiar position of the lamp glass between the bottom and top, avoiding the necessity of fastening the same either to the top or bottom, by means of plaster sets.

Claim.—The inventor's claim is fully set forth in the above description.

No. 9,834.—Amzi C. Semple, of Cincinnati, Ohio.—*Improvement in Paddles for Vessels.*—Patented July 5th, 1853.

The object of this invention is to obviate the shock occasioned by the floats of paddle wheels (when made of non-elastic or solid substances) when entering the water, by making the floats of vulcanized India rubber, so constructed that they enter the water nearly edgewise.

Claim.—The use of vulcanized India rubber or other similarly elastic substance, which will produce the intended effect, in the construction of floats of paddle wheels, for the purpose and in the manner herein described.

No. 9,835.—Noah J. Tilghman, of Salisbury, Md.—*Improvement in Crow Killers.*—Patented July 5th, 1853.

This instrument consists of a sharp pointed and bearded rod let into a sliding block, inserted into a vertical chamber formed in the head of a rough post planted where crows are in the habit of frequenting. When the spring which is contained in the post is compressed, the rod is drawn down below the head of the post and held in that position by a dog bearing against an arm or projection of the sliding block until started by the weight of a crow when he lights upon the top of the post, bearing down a trigger which acts against the dog, and liberates the dart, which is forced suddenly upwards by a spring, and pierces the crow.

Claim.—The above described instrument with all its parts as arranged, combined, and operating.

No. 9,836.—Edward H. Ashcroft, of Boston, Mass.—*Improvement in Pressure Gauges.*—Patented July 12th, 1853.

The chief feature of this improvement consists of an elastic flattened tube, bent in a horseshoe, spiral, or other curved shape, being in a certain degree elastic. One extremity of this tube is fixed in position and connected with a stop cock, by means of which a communication can be opened between it and the steam or other fluid whose pressure is to be measured; the other extremity, being hermetically sealed, is left free to be moved by any force tending either to straighten or bend the tube. The closed extremity of the tube is connected either directly or by a link and a toothed sector and pinion to an index pointer, which traverses the area of a dial plate graduated to given pressure. In the figure representing the gauge, A is the elastic bent tube.

Claim.—The method herein described of rendering the indications of "Bent Tube Pressure Gauges" permanent and reliable by constructing the tubes of precious metal.

No. 9,837.—Chauncey W. Camp, of Hartford, Conn.—*Improvement in Shot Charges.*—Patented July 12th, 1853.

See figures 1, 2, and 3. 1, a side view of the charge tube; 2, a section of the same; 3, a side view of the slide. When the slide is pushed into the charge tube, the point of the bevel strikes the lower part of the revolving cut-off at D, and the bevel part of the slide forces the revolver round till it gets to the position at E, which permits the shot in the belt to pass freely into the slide, and when withdrawn, the force of the spring F causes the revolver to act upon and cut off the shot from the bevel part of the slide, and instantly close up the opening at D.

Claim.—The manner and method of making, and the application of the *cut-off and spring* to shot charges, substantially as described.

No. 9,838.—E. J, Dickey, of Hopewell Cotton Works, Pa.—*Improvement in Butter Workers.*—Patented July 12th, 1853.

This machine is worked or operated as follows. The butter is placed in the box between the partition *d* and the reciprocating presser E, which is then put in motion; upon being pressed up, the butter is divided by the cutters or knives G G, &c., and the buttermilk therein near the cutters is forced up along their surfaces by the pressure, and, flowing into the grooves *e e*, &c., is discharged into the trough F, and caught through the orifice *m* in a suitable receptacle. *n* is a re-

cess to prevent the butter from following the presser $p\ p$ in its retreat from the knives.

Claim.—The adjustable knives G G, &c., arranged within the box of the machine, and operating in conjunction with the reciprocating presser. Also, the recess or depression n in the bottom of the box, to prevent the butter from adhering to the presser and being drawn back with it.

No. 9,839.—GEO. M. DIMMOCK, of Springfield, Mass.—*Improved apparatus for Illustrating the Motion of a Pendulnm upon the Earth's Surface.*—Patented July 12th, 1853.

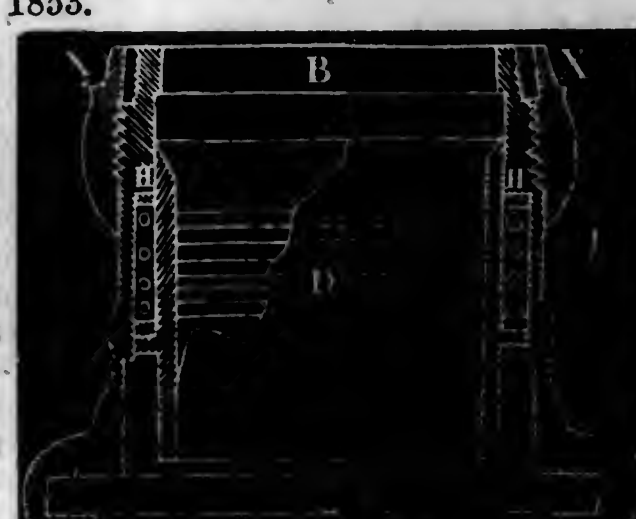
Claim.—The application to an artificial globe of one or more pendulums, the rods of which are formed of delicate springs, so as to vibrate evenly to all points of the dial, the plane of which is at right angles to the pendulum when at rest. Also, bending or springing the pendulum rods to counteract the gravity of the earth, so that when at rest they will be straight, and on the line from the point of suspension and the centre of the globe; or anything substantially the same.

No. 9,840.—JOHN J. FULTON, of Monongahela City, Pa.—*Improvement in Tanning.*—Patented July 12th, 1853.

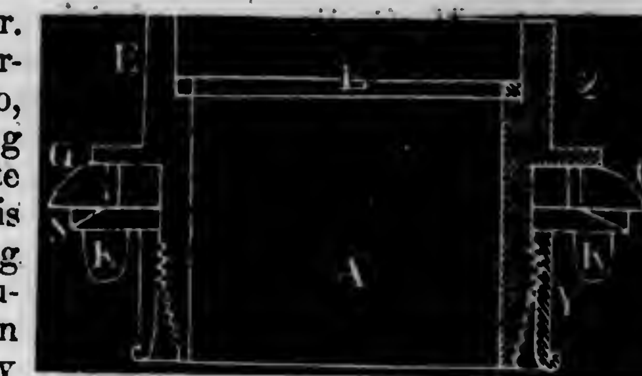
The nature of this invention consists in the employment of from two to three pounds of muriate of ammonia in combination with seven pounds of nitre for a pack of 20 slaughter hides, or one hundred calf skins (after having bated and cleansed the hides). The ingredients are dissolved in sufficient water to corn the hides, and are left in this bath until enough of the composition of these ingredients is absorbed; the hides are then placed for one day in a weak bark liquor, and then in strong bark liquor from three to five days, when they will be in good condition for laying away in strong leached liquor.

Claim.—The use of muriate of ammonia, in combination with nitre, for the purpose of suspending putrefaction, adding strength to the animal tissues, and for usual purposes in the manufacture of leather, as set forth.

No. 9,841.—SMITH GROOM, of Troy, N. Y.—*Improvement in Hose Coupling.*—Patented July 12th, 1853.

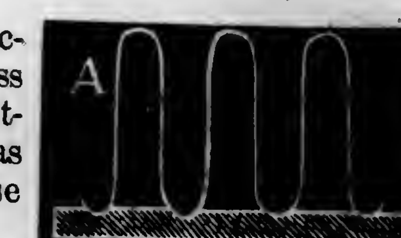


This improvement consists in the swivel E (fig. 2), which is made to slide into the outer chamber B (fig. 2), until the packing L rests against the spiral spring conduit D, which recedes by pressing the points of the bolts O which are brought to a line with it, and then is projected into the outer circular groove O, by the bolted springs Q and N; and is thus effectually coupled simply by pressing the said section together. S is the guard plate, P the partition with the key knob, which makes the coupling perfectly secure. To separate the sections, the lock bolt R is pushed back; then by pressing against the knob K, the circular guard plate S is turned in order to bring the studs V from their usual place in the detent W.



Claim.—The spring conduit D and the appendages by which it is moved longitudinally, and is held firmly against the packing L and the pads K, or rim in which the packing rests, to prevent the joint from leaking; in combination with the arrangement of spring bolts and their appendages, as shown on section A, with the circular groove O, for the purposes set forth.

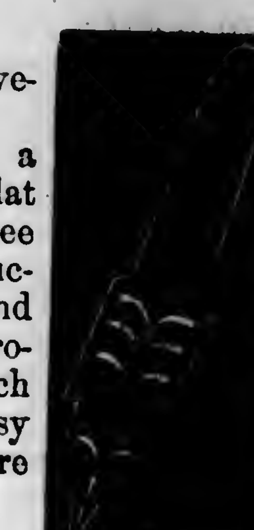
No. 9,842.—RICHARD MONTGOMERY, of New York City.—*Improvement in Sheet Metal Beams.*—Patented July 12th, 1853.



The object of this invention is the construction of metallic beams of greater lightness and strength, and at less cost; which is effected by bending sheet metal in such a form as will give it the proper rigidity and transverse strength as shown in the figure.

Claim.—A beam formed of sheet metal bent into a series of longitudinal folds, the sides of which are flat and parallel, and the tops and bottoms uninverted and inverted arches, respectively. Also, the combination with such a beam of a pair of saddles to support its ends, substantially as set forth.

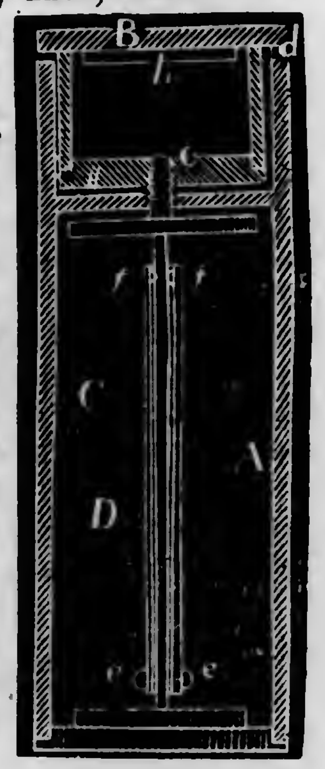
No. 9,843.—MYER PHINEAS, of New York City.—*Improvement in Metallic Pens.*—Patented July 12th, 1853.



The claim will explain the nature of this improvement by reference to the annexed figure.

Claim.—Constructing the back of the pen with a series of transverse ribs and slots, and leaving two flat springs beneath, nearly parallel to the back, and free to bend between the ribs; the effect of this construction being to give to the pen combined stiffness and flexibility within certain limits, resembling that produced by a series of vertebral articulations, and which is found to render the working of the pen more easy and pleasant than any form of metallic pens heretofore essayed.

No. 9,844.—H. G. Robinson, of Schuylkill Haven, Pa.—*Improvement in Coin Safe and Detector.*—Patented July 12th, 1853.

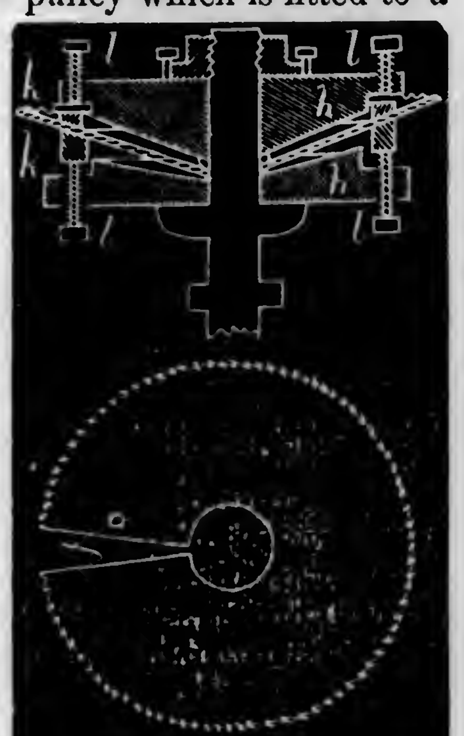


To detect counterfeit coin, the gauge box B is withdrawn from the case A. If the coin will pass snugly through the recess *d* into the box, it must be of the same dimensions as a genuine coin; and if counterfeit, it will be lighter. The clamps *c* are then withdrawn from the case A, and the small points *f f* are inserted in fulcrum holes which are placed at certain points on the outside of case A, forming a kind of balance, so that when a genuine coin is in the box B and the box adjusted in the case A, the case A will exactly balance when suspended at the fulcrum holes; the coin being represented by *h*. If the coin is to be weighed, it must be moistened with spittle, to cause it to adhere to the end of the box at *h*.

Claim.—The peculiar construction of the implement, and the arrangement of its parts, by which combination a portable receptacle for both coin and bank notes is obtained, convenient for the pocket.

No. 9,845.—Samuel T. Sanford, of Fall River, Mass.—*Improvement in Boring Machines.*—Patented July 12th, 1853.

The nature of this invention consists in fitting the auger to a stock, which is connected by a ball and socket or other universal joint with a long pole, which is attached to a suitable standard or base, in such a manner as to move in horizontal and vertical arcs; and in giving revolution to the auger by means of a pulley which is fitted to its shank, and driven by a band from another pulley which is fitted to a shaft working in the base. The attachments of the pole allow the auger to be easily brought to any required point, in the bottom or any other part of a ship or other vessel, and to be held in position to bore in any direction. The object of this machine is, boring "tree-nail" holes in vessels.



Claim.—The inventor's claim is substantially embraced in the foregoing description.

No. 9,846.—Ephraim R. Wells, of Uniontown, Pa.—*Improvement in Adjusting Dishing Saws.*—Patented July 12th, 1853.

This improvement consists in adjustable rings *k k'*, which are regulated by screws *l l l l* passing through their respective washers *h' h'*, by which any required curvature can be given to the saw. *f* represents a circular saw, in which an angular incision is made extending from the eye to the edge of the saw.

Claim.—The adjustable rings, in combination with the concave and convex washers, for the purpose described.

No. 9,847.—Ithamar P. Smith, of Rochester, N. Y., and Oran W. Seely, of Albany, N. Y.—*Improvement in Straw Cutters.*—Patented July 12th, 1853.

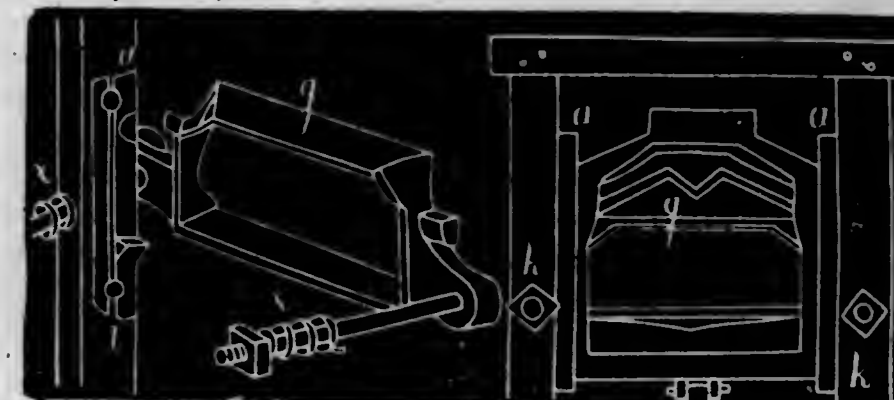


Fig. 1. Fig. 2.

The figures represent this improvement: *g* (fig. 2) being the knife, *g* (fig. 1) the frame against which the knife operates; the frame is adjusted by means of two spiral springs *x x*; the springs pass through the frame post, and are regulated by the screws *k k* (fig. 2).

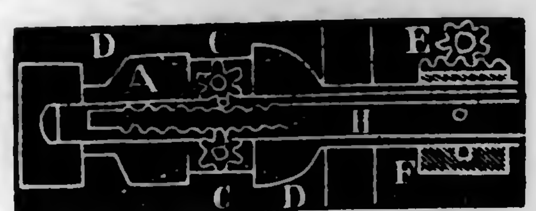
Claim.—The arrangement of the metallic guide, in combination with the knife-frame, the knife formed as specified, and the frame against whose front edge the knife is intended to play, the last mentioned frame to be adjusted by springs and screws contained in hollow boxes or cars, and by trunnions and shoulders.

No. 9,848.—Nathan T. Coffin, of Knightstown, Ind.—*Improvement in forming Teeth on Mill Saws.*—Patented July 12th, 1853.

The nature of this invention consists in forming the points of the teeth entirely by swedging: this is accomplished by means of a die in which the ordinary straight-edged tooth is secured, and the bent or chisel form is given to the point by repeated blows of the hammer. Also, in dressing and sharpening the saw by means of a file gauge, in which the files are so arranged that no one tooth can be operated upon more than another, and by means of which the cutting edges are kept in the same plane, and any inequality in the set of the teeth removed.

Claim.—The dies and gauge constructed as described, by means of which uniform chisel points are given to saw teeth by swedging. Also, the combination of the files and the block-tinned surface, and regulating screw, forming together the file gauge; by means of which, when used in combination with the bevelled file, the chisel-pointed saw teeth are dressed, jointed, and have their edges rendered uniform.

No. 9,849.—Charles F. Brown, of Warren, R. I.—*Improvement in Adjustable Screw Propellers.*—Patented July 12th, 1853.

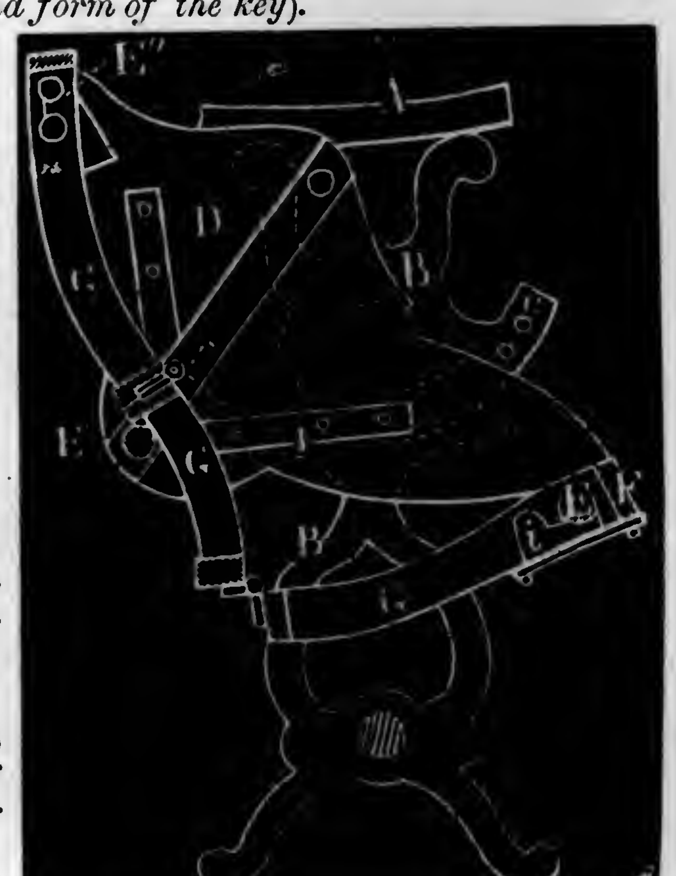


This invention consists in adjustable blades set in the hub of screw propellers, for the purpose of altering the pitch of the screw, and for bringing them to a position to offer no material resistance to the vessel's progress when under sail. A represents the hub; C C the pivots; D D (dotted lines) the adjustable paddles; E pinion; F the slide working the rack H.

Claim.—Arranging the pivots C C of the adjustable blades D D out of the centre of the hub, or at a distance from the axis, and carrying them right through the hub, substantially as described; whereby they obtain a greater depth of bearing without placing one blade behind the other, and thereby rendering it necessary to cut away and weaken the after part of the vessel unnecessarily. Also, the employment of one of the adjustable blades as a rudder in case of need, by means of mechanism.

No. 9,850.—Linus Yale, of Newport, N. Y.—*Improvement in Locks for Banks.*—Patented July 12th, 1853.

Claim.—Impressing the form of the key upon inert tumblers or their equivalents, which shall retain the impression while being separated from the key and beyond reach or influence through the key-hole before they can touch the fence (*for the purpose of preventing any indication of the size and form of the key*).



Also, in combination with inert tumblers the cross bolt D, which takes the strain of end pressure on the main bolt, and acts as a tumbler carriage to convey the tumblers beyond reach or influence through the key-hole when it moves them to the fence out of its locked position with the main bolt.

No. 9,851.—Charles P. Bailey, of Zanesville, Ohio.—*Improvement in Railroad Car Seats.*—Patented July 12th, 1853.

By reference to the figure, the claim of the inventor will explain this improvement.

Claim.—Hanging a reversable car seat, whose seat when reversed forms a portion of the back, and *vice versâ*; so that it shall occupy the same space after it is reversed that it did before, or hang between, or nearly so, the same parallel lines that it did before reversing; and so, also, that the seat and back may have an adjustment together or independent of each other, whether the seat is divided into two or more parts or not.

No. 9,852.—Samuel T. Barnes, of Columbus, Ohio.—*Improvement in Press Mould Candlesticks.*—Patented July 19th, 1853.

The nature of this invention consists in furnishing the press-mould candle-stand with a tube, shown in figure, in the centre of the mould through which the candle is forced by pressure, so as to supply it with a wick through the tube, the wick being drawn from the spool C, attached to the lower part of the press D. S is the stationary wick tube. The tallow, when forced out of the top of the candle tube *a*, will draw the wick off of the spool and up the tube, thus providing the candle with a wick as it is pressed out of the mould, by means of the press plate *h* worked by screws and gearing near D.

Claim.—The wick tube S to guide and retain the wick in the centre of the candle, in combination with a wick so arranged on a spool as to supply a continuous wick as the tallow is forced out to form the candle.

No. 9,853.—James C. Booth, of Philadelphia, Pa.—*Improvement in Process for obtaining Chromates.*—Patented July 19th, 1853.

The nature of this invention consists in reducing the oxide of iron in chrome ore, either wholly or in part, by means of carbon in any of its several forms, or by means of any of its compounds which are or may be employed as fuel, such as carbonic oxide or carburetted hydrogen, as the first stage of the manufacture. Also, in removing the iron so reduced by means of sulphuric acid.

Claim.—The reduction of chrome ore by the carbonaceous materials, as herein described, as a stage in the manufacture of chromate of potash. Also, the process of manufacturing chromate and bi-chromate of potash from chromic iron ore by means of the reduction of the oxide of iron, and the removal of the reduced iron by the several substances and modes substantially as are herein enumerated and set forth. Also, the process of removal and reduction, in connexion with the old process, or in combination with any equivalent therefor.

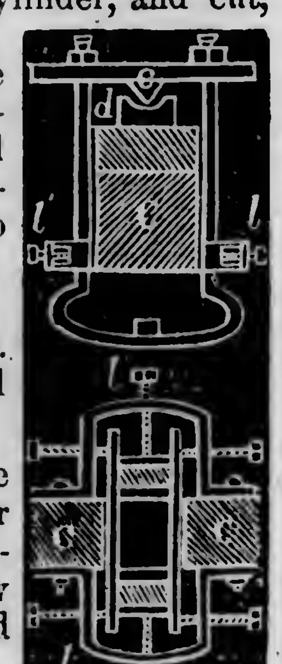
No. 9,854.—Alexander H. Brown, of Washington City, D. C.—"*Feathering Paddle Wheels.*"—Patented July 19th, 1853.

In this improvement, the rack cam E and pinion D with the eccentric F are combined, so that the paddles enter the water at an angle which may be changed with great facility and rapidity. The paddles being rendered adjustable, by thus combining the drum with the pinion and rack, a new means of saving the vessel is thereby obtained in case of accidental loss of the rudder; the arm and paddle adjusting machinery being connected with the steering wheel, they are instantly converted into a steering apparatus, by causing a variation between the two wheels, in the angles at which their paddles enter the water.

Claim.—The combination of the pinion D, rack cam E, and steering drum P with the eccentric F, for the purpose of adjusting the paddles, and converting them into a powerful steering apparatus. Also, the combination of the curved paddle with any apparatus for adjusting and feathering the same.

No. 9,855.—Isaac Brown, of Baltimore, Md.—*Improvement in the Mode of Driving Saws.*—Patented July 19th, 1853.

The nature of this invention consists in so applying the power of steam to the saw gate or frame of a saw mill, as that if the said gate or frame should vibrate laterally, or otherwise run out of line, the defect shall not be communicated to the piston or cylinder, and cut, cramp, or otherwise injure them.



Claim.—The mode of applying the power of the engine to the saw frame or gate, without being permanently connected therewith; so that the piston shall in a great measure be relieved from any lateral motion which the gate may have, which causes it to bind or cut in the cylinder.

No. 9,856.—Nathan T. Coffin, of Knightstown, Ind.—*Improvement in Hanging Mill-Saws.*—Patented July 19th, 1853.

The screws *l l'* are used to regulate the pitch of the saw, which is accomplished with great facility. For instance, small logs require the saw to be more vertical than larger logs. The knife-edge *c* and hollow or grooved plate *d* permit the stirrup to be moved backward or forward without binding or twisting.

Claim.—The combination of the stirrup hung upon a knife edge, with the adjustable screws *l l'* for the purpose of regulating the rake of the saws.

No. 9,857.—Charles J. Conway, of New York, N. Y.—*Improvement in Lamps.*—Patented July 19th, 1853.

a a are the burners; A the cylinder, divided from the lower part by partition S, and forming the chamber C in which the wicks are placed. The tubes *e d* pass up from the reservoir B into the cylinder at C. The fluid is poured into the reservoir through the tube *f*. The lamp is then held in such a position that the cylinder A gets in horizontal position, in order that the fluid may flow into the wick chamber C through tube *d*, whilst the air escapes through *e*; and thus the chamber C is replenished from time to time.

Claim.—The peculiar construction, by which two chambers are combined in the same lamp, one for the wicks and fluid, and the other the receptacle into which it is poured, and the chambers communicating by means of two pipes, substantially as described.

No. 9,858.—John Jackson, of Lawrence, Mass.—*Improvement in Spinning-Jacks.*—Patented July 19th, 1853.

The nature of this invention consists in a simple and effectual method of forming the cops and bobbins, and also in an improved method of stripping the spindles preparatory to "winding on" the thread.

Claim.—The stop R, in combination with the tappet or gear for the purpose of arresting the motion of the latter at the instant the belt is shipped upon the pulley, that the gear may be left in the precise position necessary for the performance of another duty the instant it is again set in motion, without being carried past this position by momentum or otherwise, when the brake R is so arranged in connexion with the lever or otherwise, that it shall be withdrawn by the mechanism which shifts the belt at the instant the gear is set in motion. Also operating the winding on mechanism, raising the stripping wire and depressing the building wire in the proper order, and then shifting the belt on to the fast pulley at the close of these operations, by means of a single cogged gear in combination with the tappet placed upon its side.

No. 9,859.—Edmund Munson, of Utica, N. Y.—*Improvement in Eyes for Mill Stones.*—Patented July 19th, 1853.

This invention consists in so constructing the eye of the stone that the central cone supporting the runner shall be sustained by spiral wings extending from the cone to the inner surface of the eye. These

wings are so constructed as to prevent choking and clogging; and cause a current of air to pass into the eye and between the stones, thus facilitating the feeding of the grain and also supporting the stone.

In the figure, A represents the eye; D D, the spiral wings; these wings fit between the inner periphery or side of the conical portion of the eye and the cone E. F is the spindle.

Claim.—The spiral wings, arranged in such manner as to perform the double office of feeding the grain and supporting the stone.

No. 9,860.—Ralph C. Pratt, of Canandaigua, N. Y.—*Improvement in Machines for Ditching.*—Patented July 19th, 1853.

This invention consists in the construction of an implement of revolving shovels, hung upon a shaft supported by wheels and casing, and performing a cutting and scraping operation, during the progress or revolving of the wheel and beam or shaft.

Claim.—The ditching machine consisting of a beam and casing, or their equivalents, in one or more parts, with a cutting and scraping point, hung on the shaft of a revolving wheel, with shovels attached to the outer circle of the wheel, which self-act, by turning the wheel and forming a bucket in connexion with the casing, so as to carry up the earth to the inclined slides.

No. 9,861.—John Farrel, of Philadelphia, Pa.—*Improvement in Lining for Fire-Proof Safes.*—Patented July 19th, 1853.

The nature of this invention consists in the introduction of flour, grain, or other vegetable substances into the space which in such safes is usually filled with non-conducting materials: and hardening the substance thus introduced by lime or cement. The object is to resist the action of heat, or its transmission.

Claim.—The application of the above-named vegetable substances, for the purposes mentioned.

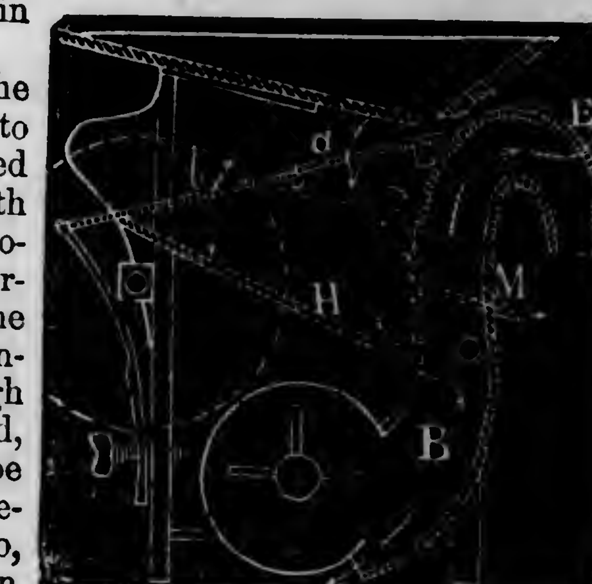
No. 9,862.—Bradford Rowe, of Albany, N. Y.—*Improvement in Gripes for holding Leather.*—Patented July 19th, 1853.

The form and construction of the gripe are shown in the figure: K represents the key, being cylindrical and fitting the bore of the cap C. When the leather L is introduced, the key K is turned from the right to the left by means of a handle T, so as to bring the edge at or near S down upon the leather, firmly; every effort to draw

the leather from the gripe, will tend to turn down the grooved edges of the key more firmly upon it.

Claim.—The construction of a gripe composed of a key turning within a socket or chamber, the key being a solid cylinder with a portion of its surface cut away in two faces parallel with its axis and at an angle with each other; one face being grooved lengthwise, and the chamber being a hollow cylinder with a portion of its space filled up parallel with its axis, and having a longitudinal slit through it for nearly its whole length, corresponding with the cut-away part of the key, so that when the key is in the chamber, a strap of leather or other material can pass through the chamber and under the key.

No. 9,863.—George B. Salmon, of Elmira, N. Y.—*Improvement in Grain Winnowers.*—Patented July 19th, 1853.

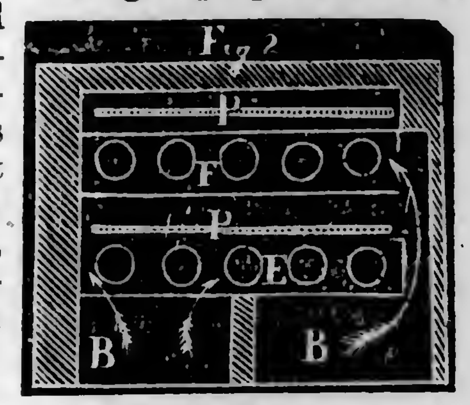


The figure and claim explain this improvement.

Claim.—The expansion of the upper part of the blast spout B into the circular, irregular, enlarged head, with an opening or mouth at the lower extremity, partly covered with the sieve E for the purpose of allowing the force of the blast to be exhausted, the screenings immediately falling through the opening or mouth of the head, while the blast and dust escape through the screen E, the blast being governed by a slide. Also, the arrangement and construction of the graduated sieve *a b* of unequal fineness; the portion *a* being protected from the action of the fan blast, so that the small substances, such as cockle, &c., passing through and falling on the bottom board of the sieve *a*, pass off at the trough and spouts M M; and when the grain arrives at the coarser part of the sieve *b*, it passes through and is acted upon by the fan blast, while larger substances than wheat pass over the end of the sieve *b* and fall on the floor.

No. 9,864.—Ephraim Treadwell, of New York, N. Y.—*Improvement in Baking Ovens.*—Patented July 19th, 1853.

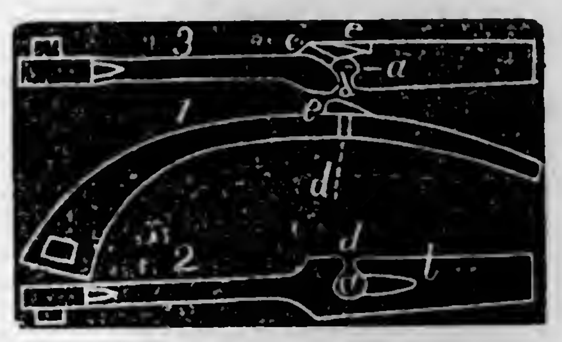
The nature of this invention consists in making a perpetual oven, having side doors in it, for charging and discharging it at intermediate points between the ends of the oven, in combination with lower independent heating flues and furnaces, for directing the entire heat from one set of furnaces through flues on the upper side of the article to be baked, and the entire heat from the other independent set of furnaces through flues on the under side of the article to be baked. The endless belt is for placing the article to be baked upon. B B are the furnaces; E and F heat chambers; P P endless wire-cloth apron; R R R doors; S is a scraper.



Claim.—The oven as above substantially described, with its appurtenances and arrangements.

No. 9,865.—Wm. H. Thompson, and Richard H. Plummer, of Biddeford, Maine.—*Improvement in Compressors for Flyers.*—Patented July 19th, 1853.

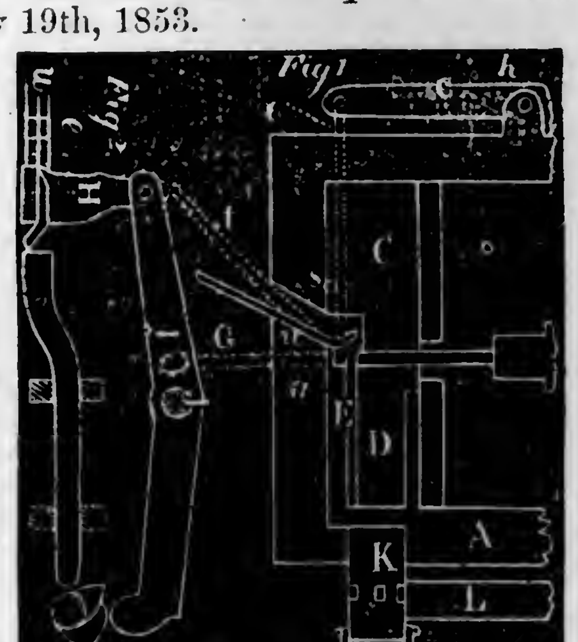
The nature of this invention consists in adapting the compressor to the speeder flyer, and to work on a bobbin having two heads, to facilitate the winding of the roving, "and thus gain" (says the inventor) "one hundred and fifty per cent. of wind on each bobbin."



Claim.—The combination of the guard rib *e* with the hole *a*, and the passage *b*, and the opening *d*, substantially in the manner and for the purpose as specified.

No. 9,866.—Philip P. Traysen, of Baltimore, Md.—*Improvement in Spike Machines.*—Patented July 19th, 1853.

C is the stationary portion of the griping and shaping die; D is the movable portion of the griping die, and carries with it the knife E, which severs the rod *u*, and a stump or projection *a* which aids the bending of the rod; G is the groove in the end of the frame through which the rod is passed to the dies; H is the pointing die, and I the lever which operates it; J, rock shaft and fulcrum of lever I; K is the toggle lever by which the die D is worked; L the lever by which K is actuated.



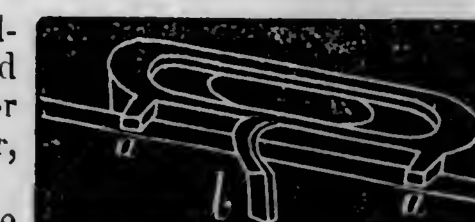
Claim.—The combination, with

the knife which severs the blank from the rod, of two stumps, either or both moving, whereby, while one blank is being headed and pointed in the dies, the end of the rod for the next blank is cut off and bent preparatory to forming a head.

Also, the method of heading spikes by bending the end of the rod preparatory to upsetting, before placing it in contact with the dies; whereby the heated rod is kept a shorter time in contact with the dies, and therefore heats them less, while at the same time it is not detained longer than usual out of the dies: so that by this method the dies are better protected from excessive heating, the rod from cooling, and the whole operation expedited and improved.

No. 9,867.—Sylvester J. Sherman, of New York, N. Y.—*Improvement in Mounting Spirit Levels.*—Patented July 19th, 1853.

This improvement consists in providing a spring catch *b*, for spirit levels, and bearers or projections *a a*, to attach or place the level upon a square, or ruler, or levelling instrument.



Claim.—The spring catch to hold the level in place upon the square or ruler, in combination with the bearers; the latter being so formed in respect to the level, that when they are placed upon a horizontal line, the bubble will be in the middle of the glass, and thus a horizontal or vertical line may be ascertained from a ruler, or from a square, when the level is attached.

No. 9,868.—Thomas C. Weldon, of Hartford, Conn.—*Improvement in the Manufacture of Wigs.*—Patented July 19th, 1853.

The nature of this invention consists in the method of fastening the hair with a gluten to the network of wigs, &c.

Claim.—The method of fastening and attaching the hair to wigs, toupees, or any other kind of hair work, by means of any kind of glutinous substance.

No. 9,869.—Charles Williams, of Philadelphia, Pa.—*Improvement in the Preparation of Bristles for Brushes.*—Patented July 19th, 1853.

The ferrule which confines the bristles is drawn over about two thirds or three fourths the length of the bristles from the flag end (that being smaller than the root), and then submitted to the action of heat, by being placed (with the root down) upon the top of a boiler heated by steam. The heat displaces the moisture from the roots, "and contracts them in a remarkable degree," so as to enable the operator to draw the bristles with ease to their proper place within the band or ferrule.

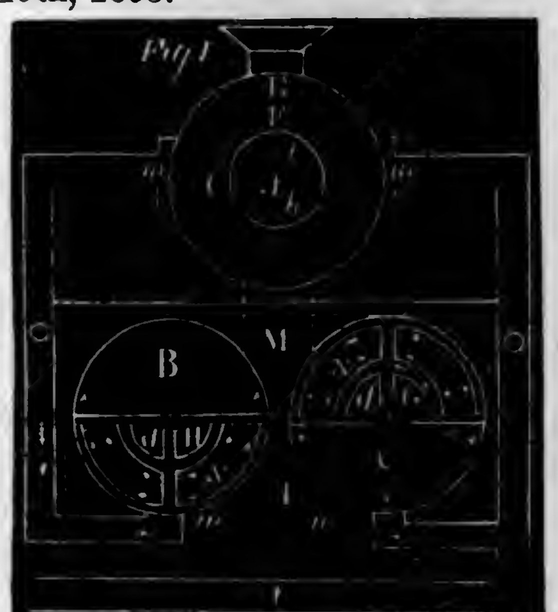
Claim.—In the manufacture of that class of brushes known as "drove work," preparing the bristles by the application of heat to the roots, substantially in the manner and for the purpose described.

No. 9,870.—Leonardo Westbrook, of New York, N. Y.—*Improvement in Gutta-Percha Stereotype Composition.*—Patented July 19th, 1853.

The nature of this improvement consists in a substitute for type metal, for the purpose of stereotyping, composed of shellac and plumbago, or graphite, of each three parts, to which is added one part of asphaltum; these are melted and mixed together, and 13 parts of crude gutta percha are cut into shreds, and ground with the other articles. A solution of one pound of the sulphate of copper in one gallon of water is then taken to cover the mass, after being heated about 212° Fahr.; the solution is applied through a tube in a regular stream while the ingredients are being ground.

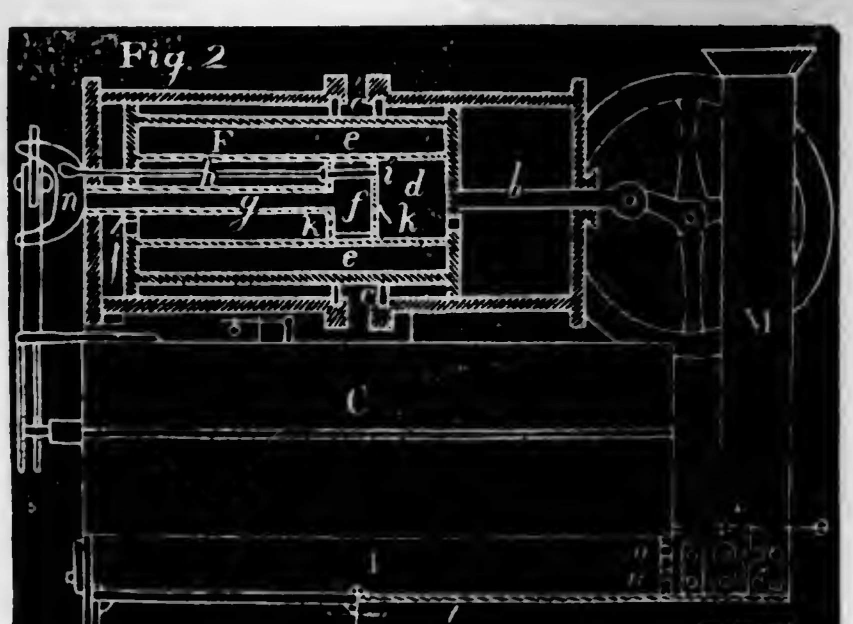
Claim.—The compound herein described, of shellac, plumbago, or graphite, asphaltum, and gutta percha, treated by sulphate of copper and water, as a substitute for type metal.

No. 9,871.—Austin O. Willcox, of Philadelphia, Pa.—*Improvement in Air Engines.*—Patented July 19th, 1853.



The nature of this invention consists in the employment of interchanging circulators G G, and H H, which are situated within, and occupy one half the capacity of each heat-reversing vessel B C.

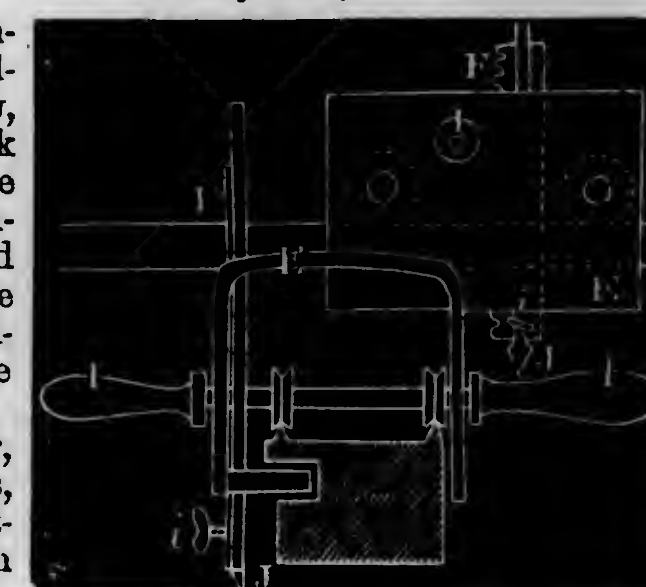
Claim.—The interchanging circulators G G and H H (fig. 1), so arranged as to alternately transfer the air or other fluid to the heating and cooling divisions of the vessels, in the same movement, to cause the air to pass through renovating plates Z Z &c., or their equivalents, whether placed within the circulators, and



transmitting the air, or placed without the circulators, and the air forced through them.

Also, placing an inwardly-pressing packing *c* (fig. 2), in the open end of each working cylinder; and in combination therewith, the construction of the working piston of a little less diameter than the interior of the cylinders, whereby the friction surface is confined to the periphery of the piston, in order to sufficiently exclude its lubricating fluid from the contact of the hot air within the cylinders. Also, the barrel *d*, and stationary hollow piston *f*, with its supply-tube *g*, aperture *i*, valves *h* and *k k*, in combination with the working piston *f*, and its valves *j j*, for the purpose of supplying air or other fluid to the cylinders when desired.

No. 9,872.—Frederick Hesse, of Bethlehem, Pa.—*Improvement in Paper-Cutting Machines.*—Patented July 19th, 1853.



The nature of this invention consists in having an adjustable knife or cutter J, placed within a sliding stock E, and so arranged that the knife or cutter may be regulated to cut the required depth, by merely turning the handles I I, by which the sliding stock is moved upon the bed.

Claim. — Cutting paper, pasteboard, or other articles, by means of the knife J, attached to the rack-bar F, which mashes into a pinion G, the pinion being hung or attached to a spindle or shaft, to the ends of which the handles I I of the sliding stock E are secured, the above parts being attached to the sliding stock E; by which device the knife may be elevated or depressed, as desired by the operator, while working the sliding stock upon the bed piece.

No. 9,873.—Cyrus C. Bisbee, of Rochester, N. Y.—*Improvement in Shower-bath Tables.*—Patented July 26th, 1853.

This improvement consists in constructing a shower-bath in such manner, that when not in actual use as a bath, it may be converted into a table. The four legs are made tubular to receive elongating standards, which can be elevated by means of racks and pinions with the shower tray, which is placed under the leaf of the table. The lower tray, which is also under the leaf of the table, can be let down when to be used.

Claim.—The combination and arrangement of the upper and lower tray, so that they shall simultaneously recede from each other to elevate the water and set up the bath, and approach each other to pack away the bath and convert the apparatus into a table.

No. 9,874.—Richard C. Bristol, of Chicago, Ill.—*Improvement in Rotary Steam Engines.*—Patented July 26th, 1853.

Claim.—The combination and arrangement of the outward radiating pistons, or their equivalents, with the sliders, steam ways or passages, and abutments, in such manner that the sliders are free from lateral friction by pressure of the propelling medium in passing the abutments, and are worked outwards and kept up to their bearings by the pistons, whereby promptness and certainty are insured in the outward action of the sliders, counteracting pressure to their inward radiation removed, and a tight but free action of the sliders throughout their entire travel produced.

No. 9,875.—William V. Burton, of Orange, Ohio.—*Improvement in Ploughs.*—Patented July 26th, 1853.

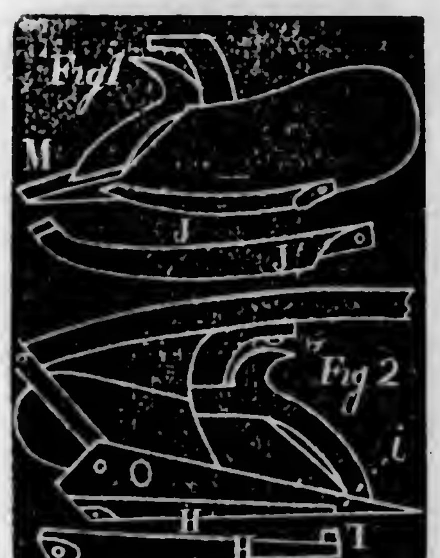


Fig. 1 represents the side of the plough where the mould board is placed. To the lower edge of the mould board is attached the piece J, called by the inventor a "land cutter," which is secured to the point M, by means of a tenon fitting into a mortise made in the point. Fig. 2 shows the land side, with a reversable land side piece O, into which a counter side piece H fits, and is secured by means of tenon I in the mortise *i*.

Claim.—The manner of securing the points of the land-side land cutter J, and counter side H, by the lock couplings, or joint formed in the mortise *i*. Also, the plough point M, and a reversable land-side piece in the manner specified, whereby the land-side piece and point M are made reversable.

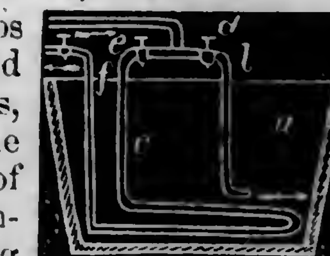
No. 9,876.—F. B. Hunt, of Westfield, Ind.—*Improvement in Mills for Grinding Apples, &c.*—Patented July 26th, 1853.

The nature of this invention consists in the employment of two endless belts—a stationary and movable one; the belts having spurs or teeth upon them, and being arranged in such manner as to feed equally well small or large substances to the cutters.

The lower belt, which is double the length of the upper one, remains in its horizontal position; the upper one is adjustable, and can be elevated or depressed, so as to allow the space between the two to be greater or less. The belts carry the article to be cut to the knives which are upon a cylinder.

Claim.—The employment of the endless belts arranged as described, for the purpose described. Also, in combination with the two belts, as arranged, one or more cutters or cutting cylinders, the cylinders being placed loosely on their axes, and secured by set screws; by which means several forms of cutters may be used according to the work to be performed.

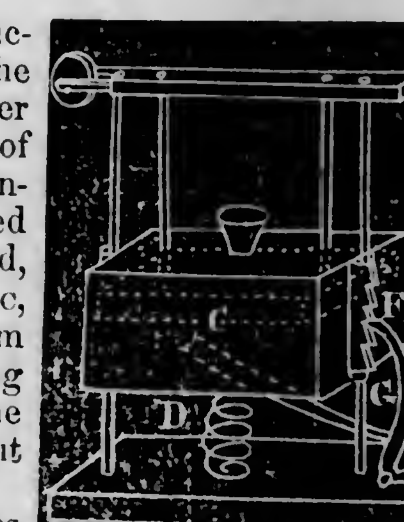
No. 9,877.—David A. James, of Cincinnati, Ohio.—*Improvement in the Process of making Glue.*—Patented July 26th, 1853.



This improvement consists in washing the scraps in small quantities in a thick cream of lime, and piling them under the protection of a roof in layers, forming an angle of about twenty degrees with the horizon; that is, commencing in one corner of the space to be occupied, which is kept the highest. When to be used, the scraps, after being washed, are placed in a bath of diluted sulphuric acid, to be freed from all calcareous matter, and then taken and again washed carefully, and are then ready for the boiling in a steam apparatus. *a* represents the tub, *b* the open steam-pipe, *c* the close steam-pipe, *d* and *e* cocks for the admission of steam, *f* cock to regulate the pressure of steam within the coil.

Claim.—The claim of the inventor is comprised in the above description.

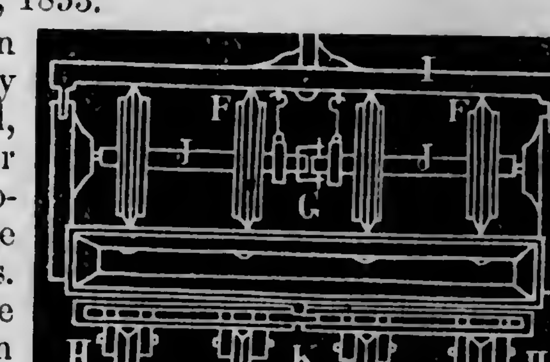
No. 9,878.—Owen Redmond, of Rochester, N. Y.—*Improvement in Lamps.*—Patented July 26th, 1853.



The object to be attained in this construction of a lamp, is to retain the surface of the oil on the same level or height as the burner at all times, without regard to the quantity of oil contained in the fountain. When the fountain is to be filled, the catch G is disengaged from the ratchet F, and as the oil is introduced, the fountain descends by itself. The float C, shown in dotted lines, prevents the oil from splashing, and serves as a check to the spring D, which retains the surface of the oil in the fountain constantly at a nearly uniform height with the burner.

Claim.—Resting the oil fountain for lamps upon a spring or springs, so constructed as to retain the surface of the oil in the fountain constantly at a nearly uniform height, whether used with or without a float.

No. 9,879.—Milton Satterlee, of Louisa, Ill.—*Improvement in Seed Planters.*—Patented July 26th, 1853.

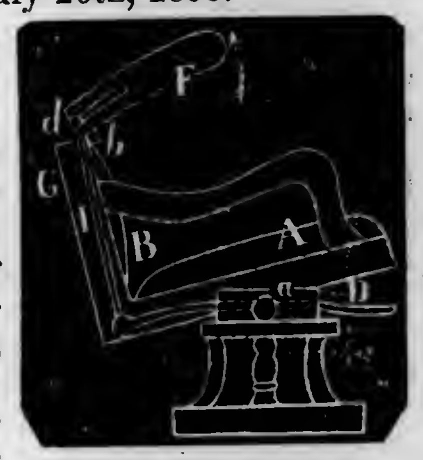


The main object of this invention is to adapt the drill more perfectly to the undulations of the ground, and to simplify the arrangement for drilling and covering; also to economize labor, and avoid breakage when meeting with obstructions. The shafts J J of the drill wheels F are united by the hinge or joint G, in the centre, that allows the wheels on either shaft to rise or fall with the undulations of the ground,

without affecting the wheels or the other shaft. In the same line with wheels F are placed, back of the hopper, the covering wheels H, that work in brackets projecting from a swinging frame K, which is jointed in the middle, so as to admit of vertical play. The wheels have a deep angular groove on their peripheries.

Claim.—The arrangement of the drill and covering wheels, or their equivalents, on flexible axles, so that they will rise and fall to accommodate themselves to undulating ground, whereby the grain in all the furrows is planted at an equal depth and equally covered.

No. 9,880.—WILLIAM M. WARREN, of Watertown, Conn.—*Improvement in Railroad Car Seats.*—Patented July 26th, 1853.



In this improved car seat, the hinged back is raised and presses against the stationary back in such a manner that the seat will be inclined. The hinge or joint *d* in the metal strip I is rather above the hinges *b b*, and therefore by raising the adjustable back, the line of the hinge *d* being the line of fulcrum, the hinges bear downwards upon the top of the stationary back B; and as the seat A is hung on pivots, *a a*, the seat will of course be inclined. By depressing the adjustable back F, the hinges elevate the seat, and bring it to a horizontal position. The cross piece D turns, and the seat may be turned in any direction in which the cars go.

Claim.—Attaching the hinged or adjustable back F to the stationary back B, by means of the hinges *b b*, and having a jointed or hinged metal strip I, secured to the adjustable back and to the cross-piece D, the hinge or joint D of the metal strip being above the line of the hinges; by which arrangement the seat A is inclined, or brought to a horizontal position, as the adjustable back is raised or depressed.

No. 9,881.—EZRA R. BENTON, of Cleveland, Ohio.—*Improvement in Bran Dusters.*—Patented July 26th, 1853.

The nature of this improvement consists in the arrangement of the feeding apparatus, in such a manner that the bran is fed into the machine by an inward current of air, which at the same time permits all heavy substances to fall into a spout and be excluded; also, in the use of inwardly acting blasts of different degrees of strength, at the top and bottom of the duster, to feed the bran in and drive the flour out through the inclosing sieve by the upper blast, while the lower blast or current only counteracts the downward pressure of the upper blast, so as to prevent discharging any flour with the bran; also, in the arrangement of teeth, in lines ascending in the direction opposite to its motion around the revolving cylinder, in such a manner that their action by the revolution of the cylinder tends to lift the bran, or to prevent its falling too rapidly to the bottom.

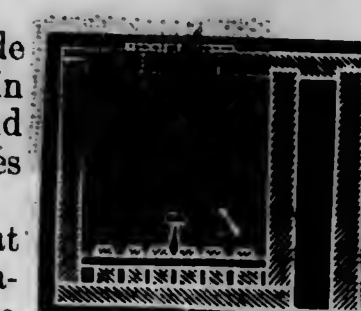
Claim.—The inventor claims the two draughts of air, produced by oblique fans, as proportioned in strength of blasts, for the purposes substantially as above described and set forth.

No. 9,882.—JACOB H. CAROTHERS, of Davidsburg, Pa.—*Improvement in Corn Planters.*—Patented July 26th, 1853.

The nature of this improvement consists in suspending the planting at any time by grappling the periphery of the wheel by two hooked levers, which are worked by means of a rod behind the hopper, and placed conveniently at the command of the operator.

Claim.—The method of stopping the seeding apparatus by grappling the periphery of the driving wheel.

No. 9,883.—SYLVESTER DAVIS, of Claremont, N. H.—*Improvement in Bee Hives.*—Patented July 26th, 1853.



The object of this improvement is to provide (by series of slats placed over the bee food in the feed drawer) means for the bees to stand on while feeding, and thus prevent the bees from being mired in the food.

Claim.—The manner of constructing the float K, or N, of two parallel series of slightly separated thin slats, placed one directly over the other, and separated by two or three cross slats, and supported by similar cross slats beneath the whole, for the purpose of allowing the bees to feed without being liable to be mired in the food beneath.

No. 9,884.—ZIBA DURKEE, of Alden, N. Y.—*Improvement in the Beaters of Smut Machines.*—Patented July 26th, 1853.

The nature of this improvement consists in covering the revolving cylinders, beaters, or wings of any ordinary construction with wire netting or cloth, by which means a uniform uneven but smooth surface is preserved, which has great durability, and can be renewed at a trifling expense when worn away, and performs the work thoroughly.

Claim.—The claim is substantially embraced in the above description.

No. 9,885.—F. O. DESCHAMPS, of Philadelphia, Pa.—*Improvement in Omnibus Lanterns.*—Patented July 26th, 1853.

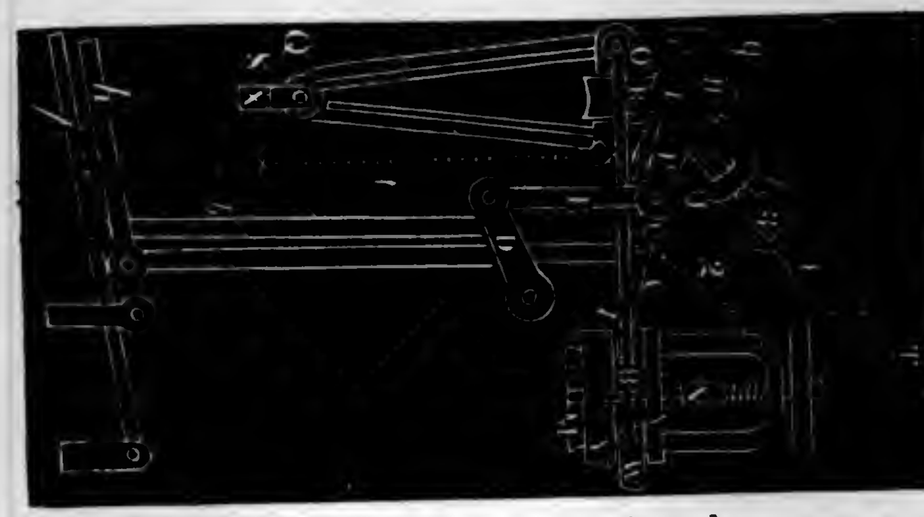
This invention consists in placing the lamp within a case, the lower part of which is formed of glass, and the upper part of a metal cap, in which cap is placed a lens. The case is intended to be inserted in the top of the omnibus or stage, immediately behind the seat of the driver; the glass portion being below the roof, and within the omnibus or stage, and the cap containing the lens above the top or roof. By this arrangement the omnibus is lighted inside, and at the same time light is afforded for the driver on the outside, or roof.

Claim.—Substantially, the above described lamp and its peculiar arrangement.

No. 9,886.—JOHN A. ELDER, of Westbrook, Me.—*Improvement in Machines for Backing Books.*—Patented July 26th, 1853.

This invention is designed to take the place of the common mode of hammering the backs of books, to prepare them after they have been

glued for the reception of the covers, and to economize time, and perform the work in a "more perfect" manner than it has heretofore been done.



Claim.—First, hanging the frame carrying the pressure rollers K upon, and eccentrically to, the centre of motion of the arms F, so that the centre of motion of the frame can be raised at pleasure. Secondly, the combination of the wedge M, and bars W and V, when connected with the jaws of the clamps, for the purpose of keeping the centre of the book, whatever its thickness, vertical with the bearings G of the swinging frame F.

No. 9,887.—DANIEL B. HINSMAN, of Philadelphia, Pa.—*Improvement in Dyeing Yarn Parti-colored.*—Patented July 26th, 1853.

The nature of this invention consists in pressing the yarn between series of separate and adjustable or changeable bars of hard wood, whose pressing faces are parallel to each other, in such parts and for such distances as are not intended to be dyed, while the parts of the yarn intended to be dyed remain, without being pressed, between and beyond the sides of the bars.

Claim.—The employment of series of separate and adjustable or changeable bars, one above the other, in an adjustable press, and pressing between their faces the parts of the yarn not intended to be dyed, while the liquor is in contact with, and dyes the parts of the yarn between the sides of the bars.

No. 9,888.—LEVI PITMAN, of Tom's Brook, Va.—*Improved Plotting Theodolite.*—Patented July 26th, 1853.

This improvement consists in arranging a traversing scale over the dial, adjusted and connected to a sliding frame under the dial, upon which a piece of paper is fastened to mark the plot upon and rule a line by the traversing scale and note the course; so that when the instrument is taken to the position sighted to, and the distance measured, it can be marked upon the line and the point measured upon the paper by the traversing scale, which is then moved back and the needle box replaced, and the next point sighted to, and the needle box removed, and the line and course marked. Also,

in applying an adjustable index to the traversing scale, so as to measure minute divisions accurately.

Claim.—The adjusting index or its equivalent, in combination with the graduated scale upon the traversing ruler and the horizontal dial. Also, the dial described, fixed upon a staff or socket, in combination with the revolving frame, and turning under the dial on the socket carrying the traversing ruler K, and a suitable sight vane.

No. 9,889.—J. A. RAPP and E. S. WRIGHT, of Buffalo, N. Y.—*Improvement in Straining Saws without a Gate.*—Patented July 26th, 1853.

The nature of this invention consists in the application of compressed air, so applied to piston heads working in cylinders at each end of saws, and to which heads the saw is connected by its ends by rods, as that the tendency of the compressed air to push or pull apart the piston heads shall be exerted to the straining of the saw, and thus keep it perfectly strained without the use of a gate.

Claim.—The application of compressed air to the straining cylinders of saws, when the cylinders are so connected with each other, that the compressed air shall alternately pass from one cylinder to the other during the reciprocating action of the saw, and combined with the air pump and pressure valve, for the purpose of regulating and maintaining the intensity of the strain on the saw.

No. 9,890.—FREDERICK G. VETTERCKE, of New York, N. Y.—*Improved Compound for Dyeing.*—Patented July 26th, 1853.

To form this compound, 10 pounds of sulphuric acid are mixed with 4 pounds of cold water, and let stand six hours:—Four pounds of prussiate of potash are placed in the receiver B, with three gallons of boiling water; and in retort A five pounds of manganese, and four pounds of common salt, to which is added the mixture first mentioned: the pipe F is adjusted and luted, and the whole is left quiet for six hours. After that time a slow fire is applied and kept up for six hours longer, during which time the chloride formed in the retort A will pass over into the receiver B, which is then taken off and hermetically sealed, and the compound is ready for use. To use this compound, a mixture of sulphuric acid and water is prepared in a retort similar to A; in another receiver are put eight pounds of salts of tin, and two pounds of tartaric acid, and three gallons of boiling water: this mixture undergoes the same management as the 'kali compound' above mentioned, and produces 'chloride of tin.' To six pounds of the first or kali compound are added two pounds of sulphuric acid, the whole mixed with about 100 gallons of water in a dye kettle, and heated to 212° Fahr.; the wool is let remain therein three fourths of an hour, which gives it a green or ground color. To the same kettle of dye are added three pounds of kali compound and two pounds of vitriol, and the whole heated to 200° Fahr.; the wool is then put in and let remain three fourths of an hour. In this manner are

produced an endless variety of shades by slight changes of the proportions of the ingredients and the degree of heat.

Claim.—Making the kali compound, substantially as herein set forth, as a basis for a blue dye.

No. 9,891.—Henry Lee Norris, of New York City.—*Improvement in preserving India Rubber in a Liquid State.*—Patented July 26th, 1853.

The nature of this invention consists in treating the juice or milk from the caoutchouc or India rubber tree, so as to form a compound that will remain liquid, and be prevented from fermentation, acidulation, coagulation, or putridity. The inventor accomplishes this by mixing with the juice, within three hours after it is drawn from the tree and strained, concentrated liquor of ammonia—to every pound of the juice one ounce of the liquid. This compound when placed in air-tight vessels can be preserved for a long time, and when poured upon a polished surface and left to evaporate slowly, it forms a very elastic, tough, and transparent article.

Claim.—The compound above described, and for the purposes therein set forth.

No. 9,892.—James A. Bazin, of Canton, Mass.—*Improvement in Seraphines and other Reed Instruments of Music.*—Patented August 2nd, 1853.

A description of this invention would be too lengthy for this Report.

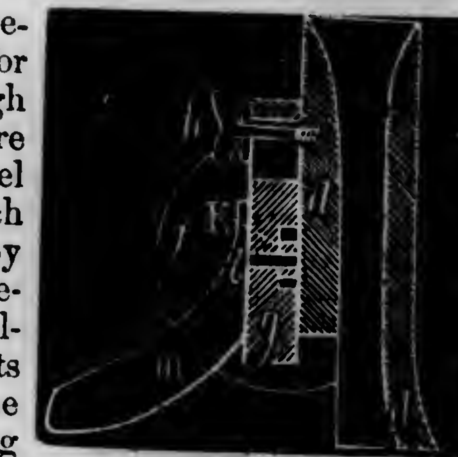
Claim.—Flatting the thirds, sixths, and sevenths, of the scale, by means of the regulating cylinder. Also, the valve of two parts, with the springs, in combination with the perforated plate for the purpose of sounding the note flat or sharp. Also, the combination and arrangement of the sliding bar, the buttons, the bent wires, and the pins, for the purpose of unlocking the key board. Also, the use of two or more wind chests in the same instrument, for the purposes separately of the bass and treble notes. Also, the peculiar arrangement of the bellows and wind chests. Also, hanging the pedal with a movable fulcrum, to prevent friction upon the foot. Also, the construction of the air passages, and their arrangement. Also, the presser bar, so constructed and arranged as to keep down the rear portion of all the valves, while their front portion is left free to be operated by the keys, thereby modifying the tone of all the notes of the instrument.

No. 9,893.—George W. Brown, of Tylersville, Ill.—*Improvement in Seed Planters.*—Patented August 2nd, 1853.

The claim embraces the object of this improvement.

Claim.—The oscillating horizontal wheels, or distributers, in the bottom of the hoppers, having slots and holes of various sizes, in combination with stationary caps and pins, for the discharge of different kinds and quantities of seeds. Also, the arrangement of the covering rollers, mounted as described, and performing the purpose of covering the seed, elevating the cutters in turning around, and in adjusting them to different depths.

No. 9,894.—Lebbeus Caswell, of Harrison, Me.—*Improvement in Seed-Planters.*—Patented August 2nd, 1853.



The principal feature of this improvement consists in an arrangement for gauging the depth to which the plough of the machine enters the ground before the seed is dropped. *f* is the gauge-wheel attached to an adjustable slide *g*, which can be raised or lowered, and fastened by a set-screw *h*. The axle K of the gauge-wheels *f* turns at its centre on the fulcrum *l*; so that in case either wheel meets with any inequality in the ground, the wheel will rise or fall without producing any corresponding rise or fall in the plough. *m*, the coverer, is attached to the slide *g*; *d* is the spout through which the seeds are dropped.

Claim.—Placing the axle of the gauge-wheels on a fulcrum in an adjustable slide, so as to plant at any desired, and, at the same time, a uniform depth.

No. 9,895.—Samuel R. Clime, of Spring Garden, Pa.—*Improvement in the Apparatus for supplying water to Steam-Boilers, and regulating the supplying thereof.*—Patented August 2d, 1853.

This invention consists of a water-chamber outside of the boiler, provided with a valve-seat and valve, by which, by means of an internal arrangement, the water is regulated in its course to the boiler in such quantities as may be required; the valve upon the valve-seat is caused to be opened and closed by the movement of the internal arrangement, thus keeping a regular supply of water in the boiler. The water enters at K and fills up the water-chamber C; but before it can get to the pump, it has to pass through the valve F F and seat G G. The seat G G being stationary, and the valve F F movable, and the openings in both corresponding precisely in size and relative position (see fig. 2), the size of the aperture between them is varied by simply turning the valve, which is done by the rod E. At E′ is a small wheel and cap,

which forms a coggle-joint or cogs; the cap fits tight against the body of the machine, and is kept in place by the spring N. The lever H produces the motion of the rod E (see fig. 3), fitting into one of the cogs in the circumference of said wheel; said lever moving upon the pivot fastened on the collar B, and being kept in its place by means of the guide D, which derives its motion from the float J inside of the boiler. The slightest motion of the float is communicated to the rod E and valve F; and the hand X attached to the rod E shows upon a dial the operation of the apparatus.

Claim.—The water-chambers above described, and the contrivance and machinery by which their action is aided and facilitated.

No. 9,896.—H. B. CONANT, of Geneva, Wisconsin.—*Improvement in Abdominal Supporters.*—Patented August 2d, 1853.

This supporter is so constructed that the pressure may be varied at pleasure, and it may be worn by persons of different sizes.

Claim.—Constructing the supporter with two encompassing springs A B, attached respectively at their centres to the front and hind pads (the hind spring being slightly curved upwards in the middle, and the front spring correspondingly curved downwards, and both springs straight on their flat sides); and uniting the springs at their adjacent ends with straps D D of adjustable lengths; whereby its pressure may be varied, and the same supporter worn by persons of different sizes.

No. 9,897.—THOMAS J. EDDY, of Waterford, N. Y.—*Improvement in Railroad Car-wheels.*—Patented August 2d, 1853.

This invention consists in connecting the solid hub and chiselled rim of a cast-iron wheel, by means of a series of spokes and a disk, all cast in one piece, and severally formed and arranged in such manner that they will not be strained by the contraction of the metal, as it cools and solidifies at the time the wheel is cast.

B is the hub; A, the rim; D, spokes; C, disk.

Claim.—A cast-iron car-wheel made in one piece, in which one end of the hub is united to the rim by means of a disk, and the other by means of a series of spokes.

No. 9,898.—C. S. BOYNTON, of New York, N. Y.—*Improvement in Paper-ruling Machines.*—Patented August 2d, 1853.

This improvement consists in employing feeding-guides attached to the endless apron, for the purpose of properly feeding the paper to the pens.

Claim.—The employment of the guides, by which the paper may be properly adjusted upon the apron, and fed underneath the pens. Also the guides or stops attached to the selvedge of the endless apron, for the purpose of elevating the pens from the paper at required distances, according as the guides are adjusted upon the apron, and thereby causing the paper to be ruled in lines of the desired length, and having the requisite spaces between them.

No. 9,899.—JOSEPH R. MILLER, of Jersey City, N. J.—*Improvement in Submarine Tunnels.*—Patented August 2d, 1853.

The claim explains the nature of this invention.

Claim.—Constructing submarine avenues, by casting them in short manageable sections, sinking each successively to its place, and uniting their ends successively by means of flanches, bolts, and packing; when these are combined with a lip or lips at the end of each section, to insure the bolt-holes, and other corresponding parts, to come and rest opposite to each other as each succeeding section is sunk to its place; and when the structure is made to rest upon a graded bottom as the work progresses, and is held thereto by superincumbent weight when completed.

No. 9,900.—JOSEPH A. SCHOLFIELD, of Westerly, R. I.—*Improvement in Temples for Looms.*—Patented August 2d, 1853.

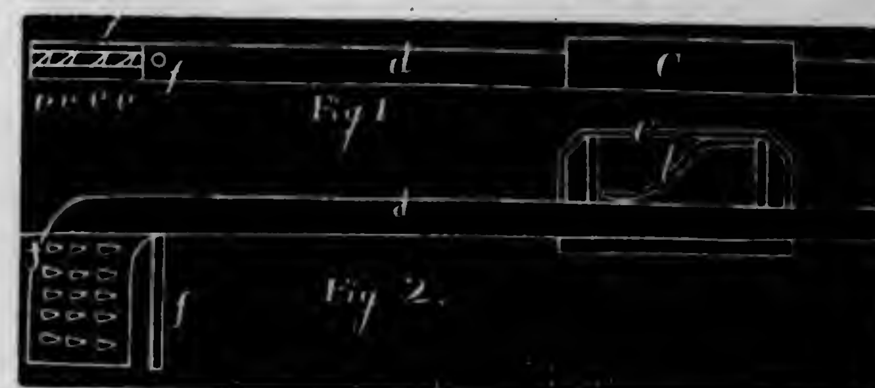


Figure 2 is a plan view of the temple with the upper plate removed. Figure 1 is a side elevation of the same; *c*, the holding-box, attached to the beam by means of screws; *d*, the shank of the temple; from the lower plate project the spurs *e e e e*, inclining towards the box *c*; *f* is a pin; *l*, a spring to hold the temple in its place.

Claim.—The application of a stationary spur-plate to the temple, with the pins in said plate inclined at an angle to the breast-beam, so as to allow the cloth to be drawn over the tops of the pins as the lay beats up, and from their inclination preventing the cloth from receding during the backward motion of the lay.

No. 9,901.—JOHN M. REEDER, of Memphis, Tenn.—*Improvement in the construction of Steam-Boilers.*—Patented August 2d, 1853.

The nature of this invention consists in providing the upper part of a steam-boiler with two openings, A and B (see fig.), in addition to that

for the safety-valve, and one, c, at the bottom of the boiler. These apertures are closed, one by cylinder D and piston, and two by valves corresponding with the openings B and C, which are so arranged as to pass the water from the boilers on to the fire under them.

Claim.—The application to steam-boilers of stem H and valves I and J, and the mode of their operation, which will, at any given pressure, allow the water in the boilers to pass freely on the fire under them, thereby reducing the steam, and preventing explosion.

No. 9,902.—JOHN R. RICHARDSON, JAMES WESTERMAN, and EBENEZER WILDER, of Newcastle, Pa.—*Improvement in Spike Machines.*—Patented August 2d, 1853.

The nature of this invention consists in the manner of forming the point of the spike by means of rollers, in combination with broad dies resting against their disks; also in other devices, which are explained by the claim of the inventor.

Claim.—The manner of forming the point as described.

2d. Slightly withdrawing the header after the head is completed, for the purpose of relieving the jaws from its pressure before they begin to open, and holding them in that position with the spike-head therein until the jaws are opened, and the movable jaw or die is nearly or quite withdrawn from the spike; then withdrawing the header to its farthest position from the dies, allowing the spike to fall: thus causing the header to perform the duty of a clearer.

3d. The combination of the cutting guide-loop, the cutter, and the holder, as constructed and operating with the movable jaw and the movable die, for the purpose of cutting off the blank at a sufficient distance from the ends of the dies to leave material for the head, and carrying it over to the stationary jaw at the same operation.

4th. Attaching the gauge firmly to the carriage of the pointing-rollers, so that it will be withdrawn as the point is drawn out by the rollers, and returned to its position when the pointers are withdrawn, without any other mechanism to actuate it.

No. 9,903.—ITHIEL S. RICHARDSON, of Boston, Mass.—*Improvement in Atmospheric Telegraph and Railway.*—Patented August 2d, 1853.

This invention consists in a method of transporting freight and passengers through air-tight cylinders, the pressure of the atmosphere behind a movable plunger being used to propel the load, the air in advance of the plunger being exhausted; by means of which the inventor intends transmitting letters, packages, and even more bulky articles of freight and passengers from one point of the country to another at a great rate of speed.

Claim.—The check-plate, consisting of three pieces, two being stationary, and the third or middle one revolving between them air-tight, constructed as described, or in any manner substantially the same, for the purposes set forth. Also, the turn-table, constructed of a ring and its station-box, in combination with other rings or their equivalents. Also, the method of announcing the arrival of the plunger, by means of the compression of the air within the cylinder at the instant of the arrival of the plunger, through the orifice in the cylinder, the valve, and the hammer; compressed air being the agent. Also, the combination of the pendant weighted lever with the valve and spring, or analogous devices; by which means the valve is drawn up to its seat when no longer kept open by the pressure of the atmosphere, and firmly locked in that position until the lever is again tripped, by the passing plunger or load.

No. 9,904.—STEPHEN P. RUGGLES, of Boston, Mass.—*Improvement in Printing-Presses.*—Patented Aug. 2d, 1853.

The nature of this invention consists in so arranging a series of diverging springs (see fig.) upon a plate K, extending across the rear or lower part of the platen D, as that they will make a guide for the paper when it is sliding on to the tympan;

the springs are forced down by the paper-holder, so as to be condensed between the type and the furniture of the press.

The paper, guided by the diverging springs C, is placed on the tympan, when the platen is drawn up by the arms eccentrically arranged on the circular plates on the shaft which drives the press, until it reaches the paper-holder J, which, by the resistance of the spiral spring N, presses down the paper-guides, and then clasps the paper between the holder and the tympan, and holds it until it reaches the impression, and falls back to nearly its lowest position, when the paper-holder is released by the relaxation of the spring, and the sheet is removed. F is one of the arms; E, the rock-shaft; P, eccentric-shaft passing through the platen D; I, set-screw; O, lever; R, set-screw resting against the platen to regulate a heavy or light impression. The figure represents an end view of the platen, detached from the press. To stop the impression the lever Q is drawn down, which lowers the platen on its axis, so as to prevent it from reaching the form.

Claim.—The combination of the adjustable-gauge with the diverging-springs, for catching and guiding the edge of the sheet when it is sliding to its position.

No. 9,905.—NATHAN THOMPSON, JR., of Williamsburgh, N. Y.—*Improvement in the Mode of Indicating the Height of Water in Steam-Boilers.*—Patented Aug. 2d, 1853.

This invention consists of an apparatus for stopping the main engine,

and bringing it to a state of rest when the water-level becomes dangerously low; which is accomplished by a float, a throttle-valve, and an appropriate connection between them; the whole so arranged, that the falling of the water gradually contracts, and finally closes entirely the area of the steam-pipe, at first gradually retarding, and finally completely stopping the main engine. Upon the float is a pin which rises perpendicularly, and prevents the float from rising higher than the ordinary working water-level.

Claim.—The method of "slowing" and stopping the main engine by means of a float or its equivalent, which is governed in its position by the height of the water in the boiler, whereby a reliable intimation of the level of the water is obtained, which cannot be disregarded. Also, a hook and pin, or their equivalents, in combination with a boiler float, whereby the float is prevented from acting during ordinary fluctuations of the water-level.

No. 9,906.—William Van Anden, of Poughkeepsie, N. Y.—*Improvement in Machinery for making Railroad Chairs.*—Patented Aug. 2d, 1853.

The nature of this invention consists in arrranging, and combining with a suitable frame, a shaft propelled by any convenient power, on which is secured a cam for operating a lever for depressing the die for holding the metal, while being cut by a pair of roller-shears, which are forced upwards by a second lever, operated by a second cam, also on the driving-shaft, the operation of the rollers being to cut the grain of the metal more perfectly than by a fixed or punching cutting arrangement. Also, in combination with the roller-shears, two adjustable benders, secured at each side of the machine on the ends of levers, operated by cams on the ends of the driving shafts, for the purpose of bending over the lips of the chair as they are cut and raised by the action of the roller-shears, so as to give them the form of the die, from which the chair is discharged by a forked rod on the end of a connecting-rod, working on the main or driving shaft, and projected out by a cam on the driving shaft, as the shears, benders, and die are restored to their original position, to push the chair off the head of the die, and projected back again by a second cam on the opposite side of the driving shaft for that purpose.

Claim.—The combination of rollers with adjustable shear-stocks, for cutting and shaping the lips of wrought-iron railroad-chairs, and their combination with the dies. Also, the use of a movable drop upper-half, or female die, in combination with a stock, and their combination with the discharging apparatus. Also, the use of adjustable and removable benders, in bender-stocks, in combination with the levers and cams on the main shaft for operating the same in an oblique and downward direction, and their combination with the dies and cutters for making wrought-iron railroad-chairs.

No. 9,907.—Stephen Waterman, of Williamsburgh, N. Y.—*Improvement in the means of Obviating the Danger from Steam-Boiler Explosions.*—Patented August 2d, 1853.

The nature of this improvement may be understood from the claim of the inventor.

Claim.—The combination, with a safety-chamber and safety-plate, of a cold-water reservoir, which has means of communication at the lower part, with the safety-chamber or steam-space in the boiler, and at the upper part with the steam-space in the boiler; which means of communication are closed, when the boiler is in proper operation, by cocks or their equivalents, which are caused to open by the tearing apart of the safety-plate.

No. 9,908.—Jesse Young, of Franklin Furnace, Ohio. — *Improved Arrangement of Pipes for Hot-blast Furnaces.* — Patented August 2d, 1853.

This invention consists in a series of annular horizontal pipes D (see fig.), connected by short vertical pipes C and E, which also serve as supports or pedestals, and a hollow base upon which the pipes rest, and through which hollow base A the cold air is admitted into the pipes.

Claim.—The arrangement of a series of annular horizontal pipes D; short vertical connecting pipes C, E, which also serve as supports or pedestals; and a hollow base A, through which the cold air passes into the pipes, and upon which the pipes rest; by which arrangement the air is made to pass slowly through the pipes and base, and is exposed a sufficient length of time to the heat, with a small expenditure of fuel, to become heated.

No. 9,909. Austin O. Wilcox, of Philadelphia, Pa.—*Improvement in Hot-air Engines.*—Patented August 2d, 1853.

The effective power of this engine is as the capacity of the transferring cylinder is to the capacity of each working cylinder; and when the diameters of the transferring and working cylinders are equal, this ratio will be as the comparative lengths of their respective strokes. Any desirable amount of pressure on the piston is produced by condensing the medium; thus forming a powerful engine, which occupies comparatively little space. The engine is rendered more compact by having the renovator in the piston itself, and by applying the fire immediately under the cylinder.

Claim.—Placing the economizing disks within, or attaching them to the driving-piston itself, to effect the complete rarefaction of the heated air while the piston is descending, and before the cold air is again let into the cylinder.

Also, inclosing the exhaust end of each single-acting working cylinder with an air-tight head, when combined with a self-acting valve, which opens from the exhaust-end of the cylinder into the eduction-pipe, in order to exclude the external atmosphere, and also for the double purpose of enabling any degree of rarefaction to take place within the exhaust-end of the cylinder, without the return of air from the reservoir, and to allow the spent air finally to escape to said reservoir.

Also, inclosing each working cylinder with a jacket, regularly increasing in thickness from the bottom to the top, so that when surrounded by water or other fluid, the temperature of the working cylinder will be kept reduced to a proper and nearly uniform degree; thus preventing injury to the lubricating fluid inside, and allowing the heat to be applied immediately under the cylinder.

No. 9,910.—Jean T. Coupier and Marie A. C. Mellier, of Paris, France.—*Improvement in the manufacture of Paper-Stuff.*—Patented August 2d, 1853.

The claim explains this improvement.

Claim.—The process of reducing straw and other similar vegetable matter into pulp, for making paper: the process consisting in applying and circulating the solution of the hydrate of soda or potash. Also, the employment of hypochlorites in the process of bleaching straw or similar vegetable matter, when prepared as above for the purpose of making paper, as set forth, that is to say, using them at or about the strength set forth in the specification, viz. 3° Beaumé; and this degree of strength only when employed upon such materials.

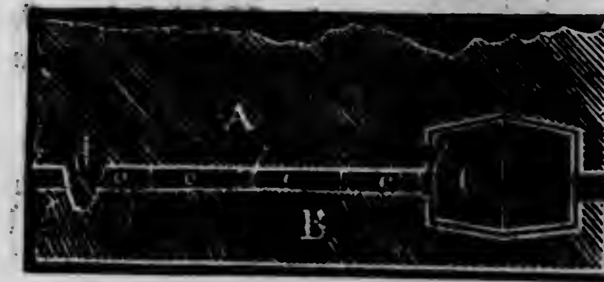
No. 9,911.—Julius Herriet, of New York, N. Y.—*Improvement in Elastic Type for Printing on Irregular Surfaces.*—Patented Aug. 2d, 1853.

The inventor prepares a mould of plaster, containing the requisite impressions or figures; into which he casts a substance or compound, of three parts of coopers' glue, and two parts of molasses. This substance when well mixed is poured into the mould, and when cold taken out, and is ready for use.

Claim.—Making, by casting in moulds or by pressure, plates with raised characters or figures, the entire substance of such plates being sufficiently elastic to adapt them to printing on irregular surfaces.

No. 9,912.—George T. Parry, of Spring Garden, Pa.—*Improvement in Anti-Friction Boxes.*—Patented Aug. 2d, 1853.

The nature of this invention consists in the employment of a series of rollers made in the form of double frustums of cones, united at their bases c (see fig.), and adapted to run in grooves of nearly corresponding

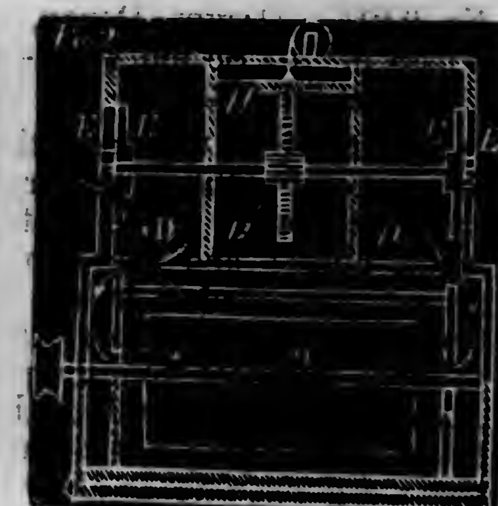


form, made in the surfaces between which they are interposed. The inner frustums of the rollers, and the corresponding parts of the surfaces of the grooves, are made on bevels proportioned to the diameter of the rollers and the grooves in which they run, whereby the rolling of the rollers about a common centre is accomplished without slip.

Claim.—Making the rollers in the form of double frustums reversed and united at their bases, and travelling in circular grooves of nearly corresponding form of the surfaces between which the rollers are interposed.

No. 9,913.—Samuel Canby, of Ellicott's Mills, Md.—*Improvement in Winnowers of Grain.*—Patented Aug. 9th, 1853.

This invention relates to the manner of graduating the blast of a winnower, so that it shall not be influenced by the irregularities of velocity to which the fan or blower may be subjected. (See figures.)



Above the fan-chamber A, and opening into it, is a regulator consisting of three apartments D′ D″ D‴, the exterior D′ D″ containing openings E in their sides for the admission of air to the fan, the central department D‴ being furnished with a piston H suspended by a cord passed over an exterior pulley L, and balanced by a weight N, at the extremity of a lever M, attached to the shaft L; extending across the three apartments is the shaft I: the under side of the piston H being attached to a rack-rod F, mashing into a pinion G upon the shaft I. The piston H opens the air-passages as the blast is weakened, or diminishes their extent when the blast is too strong. O is the hopper; P, a swinging door, which distributes the grain evenly over the bottom of the hopper. The blast is passed through the channels S and T.

Claim.—The construction of the receiving and discharging passages for the grain; that is, the passage at door P, passage C, and passage C″, in the manner and for the purpose as set forth.

No. 9,914.—Frank Dibben & Lewis Bollman, of New York, N. Y.—*Improvement in Multiplying Gearing for transmitting Rotary Motion, at increased or decreased Velocities.*—Patented August 9th, 1853.

(See figure.) The circles *a* and *b* in the diagram represent the pitch-lines of two annular toothed wheels, hung loosely upon a common axis *e*; and the dotted circles *c* and *d* represent the pitch-lines of two toothed wheels both fast together upon the common axis *f*; *c* rolling on *a*, and *d* on *b*; and both axes *e* and *f* stationary in relation to each other. Suppose the circumference or number of teeth in the wheels to be in the following proportions: $a=11$, $b=10$, $c=10$, and $d=9$; then if all the circles are made to revolve, *a* will make 100 revolutions for every 99 of *b*, &c.

Claim.—The employment (for the purpose set forth) of two pairs of toothed or friction wheels, *a c* and *b d*, combined and arranged as described.

No. 9,915.—Daniel Dodge, of New York, N. Y., and Phineas Burgess, of East Boston, Mass.—*Improvement in Life-Boats.*—Patented August 9th, 1853.

The nature of this invention consists in constructing a platform c (see figure) stationary in the central horizontal plane; and the two sets of thwarts are secured in the boat at fixed points on opposite sides of, and at equal distances from the platform. A A represents the hull of the boat, being water-tight; B, the interior of boat; *d d*, openings to allow the escape of water; D D, thwarts; F F, guard-rails or life-rods, secured in fastenings.

Claim.—The central fixed platform c, which is secured in the opening B of the boat, in a plane passing centrally and horizontally, or nearly so, through the same, which may be said to form a partition between two opposite recesses, the platform serving as a floor to the boat, whichever side is upward, and being, from its fixed position, incapable of becoming disarranged by any accident.

No. 9,916.—George W. Eichell, of New York, N. Y.—*Improvement in Setting up Ten-Pins and Returning Balls.*—Patented August 9th, 1853.

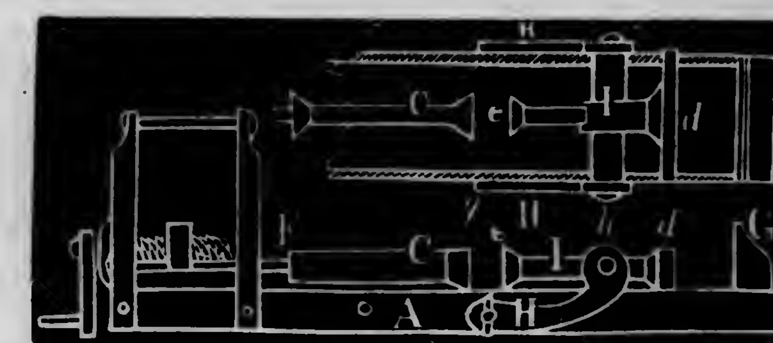
The claim will sufficiently explain this invention.

Claim.—Setting up the pins by an apparatus, operated from the head of the table, by means of weights attached to them by cords, when combined with the elevation board, which raises and sustains

the weight or weights, to admit of the pins being knocked down. Also, the use, at the back end of the table, of a delivery board, constructed and applied as described, in combination with an elevator, for the elevation and return of the balls.

No. 9,917.—Benj. H. Green, of Princeton, N. J.—*Improvement in Carpenters' Clamps.*—Patented August 9th, 1853.

The nature of this invention consists in the construction of the clamp, in such a manner as to be applicable to many different sizes of articles. A pair of arms H H (see figure) are attached, one on each side, to the beam A, by means of bolt *g*; the arms vibrate upon the bolt, which may be transferred to other holes in the beam A. Through the curved end of the arms passes another bolt *h*, and through bar I, which has a large jaw *d* on its shorter, and a smaller jaw *e* on its longer arm.



The bar I is made to turn freely upon the bolt *h*. The bar c having a small jaw on one end, may be attached to the larger jaw F, but removable at pleasure. When the bar is attached to the jaw F, the smaller jaw *e* of the bar I is brought opposite its jaw, as shown in the figure. When large articles are to be clamped, the small bar c is removed, and the bar I reversed.

Claim.—The combination of the adjustable vibratory arms H H, and reversible jaws *d e*, with the adjustable clamp, for the purpose of presenting jaws of different sizes, and at different distances from each other, in the manner set forth.

No. 9,918.—John Hartin, of New York, N. Y.—*Improved Method of Drying Paper.*—Patented August 9th, 1853.

The nature of this invention consists in drying paper by conducting it between opposite series of equal-sized fans revolving with equal velocities, causing the air to act simultaneously upon opposite sides of the paper. The object is to give to the paper a uniform, even surface.

Claim.—The above-described method of drying paper.

No. 9,919.—Samuel Hickok, of Buffalo, N. Y.—*Improvement in Railroad Car-Seats.*—Patented August 9th, 1853.

This invention consists in the method of readily changing the seat in either direction, and converting it from an upright to a re-

clining position; *e* is the support for the outer end of the seat (see figure), to which the seat-frame is secured. Secured on opposite sides, and to the bottom of the sliding seat, are two steel notched bars *c c;* and secured to the side-rails *f f* are metal plates *e e*, which fall into the notches, and confine the seat in position. The seat can be slid out either to the right or left, by pressing the end of either of the spring bars which project in front, regardless of which side the back of the seat is placed. The back of the seat may be raised in an inclined position, or lowered, when its position will be nearly vertical.

Claim.—Constructing a car-seat, by connecting and arranging the sliding seat with the reversible back hinged at the extremity of the reversing arms; and combining therewith the double ratchet-bars, in such a manner that it can be easily converted into a day or night seat, and at the same time not occupy more space than the ordinary seat. Also, the triangular foot-rest, in combination with the sliding seat, whereby it is made adaptable to the seat, when used either as a day or night seat.

No. 9,920.—Lewis S. Ingraham, of Cuyahoga Falls, Ohio.—*Improvement in Winnowers.*—Patented August 9th, 1853.

The nature of this invention consists in making the screens stair-shaped or fluted, and vibrating them perpendicularly or diagonally, instead of traversing or shaking them horizontally; whereby the grain is made to fall successively from one stair or flute to the next; in combination with a plain screen, which may be used either before or after the stair screen.

Claim.—The stair or fluted screen, constructed and operated substantially as described, for the purpose set forth.

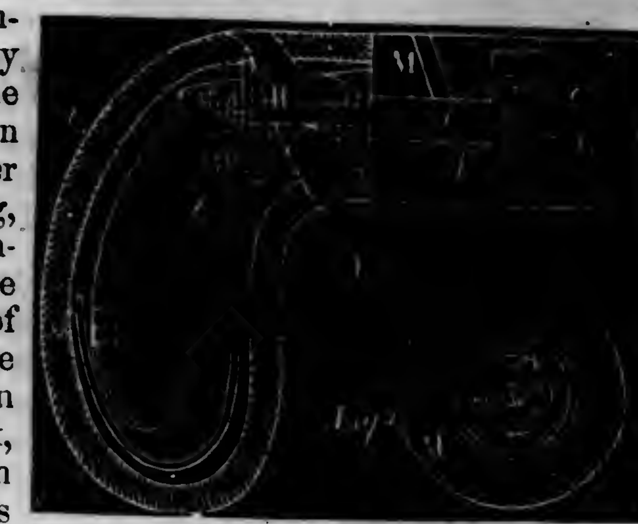
No. 9,921.—John W. Jenkins, of Greenport, N. Y.—*Improvement in Iron Posts for Fences.*—Patented August 9th, 1853.

The figure represents the post A, with the arrow-headed or barbed button pieces *e e e;* to the post is attached a twisted cross-piece B; *b*, the openings for the boards or rails; *d*, hook for wire.

Claim.—The arrow-headed or barbed button pieces *e e e* of the post, in combination with the twisted cross-piece B.

No. 9,922.—George Leonard, of Shrewsbury, Mass.—*Improvement in Fire-Arms.*—Patented August 9th, 1853.

The operation of this improved pistol is described by the inventor as follows: The trigger T (see figure) is drawn back; the notch in the lever drives back the main-spring, which carries back the hammer H; at the same time the pin *p* carries down the point of the ratchet-lever, and turns the revolving fire-guide R; when the hammer H is nearly back, one of the percussion pills in the priming magazine M drops into the hole in the hammer-guide; the motion of the trigger being continued, the lip of the main-spring lifts off the notch of the lever, when the main-spring drives forward the hammer, and the pills are exploded in the bottom of the hole in the revolving fire-guide; the fire is guided through the small hole *o* in the revolving fire-guide into one of the five small holes, into the barrel with which it is in coincidence, and the barrel is discharged.



Claim.—A revolving fire-guide, which, by the continued operation of the fire-arm, shall successively communicate fire to the different charges of several barrels.

No. 9,923.—John Lewis, of Buffalo, N. Y.—*Improvement in Printing-Presses.*—Patented August 9th, 1853.

The nature of this invention consists in constructing a swinging bail D (see figure) and a pressure bail, in combination with the lever power; in such a manner as to bring the power upon the centre of the platen T, by one motion of the lever B. F represents the bed-plate.

Claim.—The swinging bail D and the pressure bail E, constructed and operated as set forth.

No. 9,924.—Eben L. Millis, of Rochester Depot, Ohio.—*Improvement in Corn-Shellers.*—Patented August 9th, 1853.

This invention consists of a toothed cylinder and a concave, which are used for breaking up the larger ears of corn, before feeding them

to the corn-sheller, to prevent clogging or stopping the sheller, when ears of corn are fed to the sheller in bulk.

Claim.—Reducing the larger ears of corn to be shelled to a nearly uniform size with the smaller ones, by passing the whole through between a toothed cylinder and concave, where the larger ears are caught and partially reduced, preparatory to passing between the second cylinder and concave, to complete the shelling.

No. 9,925.—JOEL G. NORTHRUP, of Syracuse, N. Y.—*Improvements in Printing-Presses.*—Patented August 9th, 1853.

The nature of this invention consists in combining with a vibrating bed, a series of intermittingly rotating platens, so that the sheets may be placed on the platens in the most convenient manner, and fall from the platen after receiving the impression, without requiring a delivery apparatus.

Claim.—The combination of the series of intermittingly rotating platens with a vibrating bed, when so arranged as that the delivery of the printed sheet is from the lower of the series of platens, so that it may drop from the platen on to the paper-table, or into a drawer.

No. 9,926.—JAMES PATTERSON, of Franklinville, N. Y.—*Improvement in Friction-Rollers.*—Patented August 9th, 1853.

The nature of this invention consists in arranging within a central aperture of the car-wheel A (see fig.), and around its axle, a series of anti-friction rollers, each of which has bearing portions of different diameters; the larger, c c, of which roll upon the inner periphery *a* of the car-wheel, and the smaller, *c c*, upon an enlarged portion *b* of the axle B.

Claim.—Fitting the bearing of a rolling car-wheel on a fixed axle with a series of friction-rollers, having bearings of large diameter to run in contact with the wheel, and of smaller diameter to run in contact with the axle, the latter being enlarged at the point of contact with the rollers, as herein specified.

No. 9,927.—*Cancelled.*

No. 9,928.—ALFRED B. SEYMOUR, of Hudson, N. Y.—*Improvement in Rolling Railroad and other Iron.*—Patented August 9th, 1853.

In the figure, *a* represents the frame, and *b b* the first pair of rollers, mounted on fixed bearings, except that one of the rollers is adjustable to the other. Just back of this pair there is a second pair of rollers *c c*, mounted in the lower end of a pendulous frame *d*, suspended at its upper end to a shaft *e*, hung in the upper part of the frame *a*. The first pair of rollers are geared together by cog or spur

wheels, and on the shaft of one of these rollers there is a belt-wheel *g*, which, by a belt *h*, communicates motion to a cog-wheel in the upper part of the frame *a*, which engages a corresponding wheel on the shaft *e*, on which is suspended the pendulous frame of the second pair of rollers; and this last-mentioned wheel carries a pulley to communicate motion by a belt to a pulley on the shaft of one of the rollers of the second pair; and as the pulley is on the shaft to which the pendulous frame is suspended, it follows that the moving of the frame will not affect the communication of the driving power. A third pair of rollers *n* are mounted in a pendulous frame *o*, back of the first, and in every particular like the second pair.

The second pair of rollers must be geared to turn faster than the first, the third faster than the second, and so on throughout the series. The iron passes from one pair of rollers to another, and is caught successively by each pair of the series.

Claim.—The employment of a series of pairs of rollers, so arranged that the pairs shall be free to move from or towards each other, to adapt themselves to the condition of the metal in the process of rolling.

No. 9,929.—JOSHUA STEPHENS, of Chicopee, Mass.—*Improvement in Repeating Fire-Arms.*—Patented August 9th, 1853.

The operation of this improvement is explained, substantially, in the claim of the inventor.

Claim.—To so construct and combine together the lock, trigger, and mechanism for rotating, and locking and unlocking the chambered cylinder, as that while, by a simple pull of the trigger, the operations of unlocking and rotating the magazine or chambered cylinder, relocking it, and discharging the cock, shall be caused to take place by power applied to the trigger alone, the cocking shall be effected by means of the hand of the person.

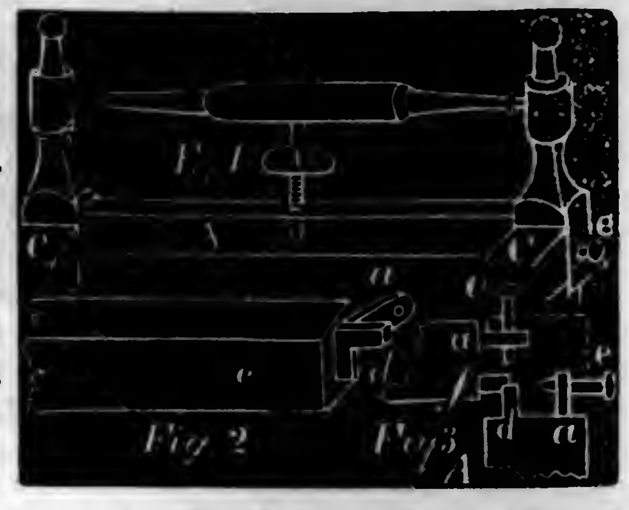
Also, the combination of the stirrup, the spring-bolt, and the lever, arranged and made to operate together.

Also, the combination of the sectoral plate (made as described) with the spring-bolt and its slot, the plate being applied and made to operate as explained in the specification.

Also, the method of constructing the lever of two parts (turning on one common pin), in combination with their confining and adjusting screws.

No. 9,930.—Suspended.—See issue of December 6th, 1853.

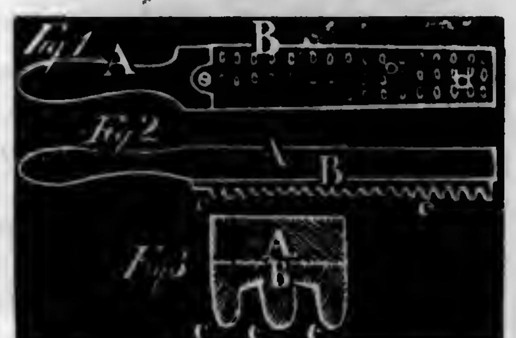
No. 9,931.—Geo. W. Baynes, Thomas Hinty, and Minter Jackson, of Glenville, Virginia.—*Improvement in Bedstead Fastenings.*—Patented August 16th, 1853.



This fastening is so constructed that the tenon marked *a* (fig. 2) being pivoted or swung in a mortise in the rail, free to rise and fall in the mortise of the post, while the other tenon *d* is rigid in its connection with the rail, may, by means of screw B (fig. 1) operating on the head and foot rails, securely fasten not only these rails, but the side ones also, by the same device. Fig. 2 shows a rail with the pivoted tenon *a* and the rigid tenon *d*. Fig. 3 shows the position of the tenons in the post, the rigid tenon *d*, in the rail A, resting upon the rigid tenon *f*, in the side rail *g*; the tenons *a a* being secured by means of pins *e e*.

Claim.—The combination and arrangement of the tenons *a a*, pins *e e*, tenons *d* and *f*, with the screw B, for the purposes set forth.

No. 9,932.—William Beach, of Philadelphia, Pa.—*Improved Instrument for making Meat Tender.*—Patented August 16th, 1853.



In fig. 1, B is the plate, with teeth thereon, fastened with screws to handle A. Fig. 2 is a side view, and fig. 3 a section.

Claim.—Forming a meat-maul for the purpose designed, by securing to one end of an oblong block of wood whose opposite end is formed into a handle, a series of rows of tapered teeth, cast on a plate, or driven singly into the wood.

No. 9,933.—John Binder, of Chelsea, Mass.—*Improvement in Hinges applicable to the Joints of Iron Bedsteads.*—Patented August 16th, 1853.

The figure represents this improved hinge, which is intended to diminish the friction upon the centre pin *h*, upon which the two halves of the hinge *g g* turn; these two halves are toothed, the bearing surfaces *i i' i''* being arcs of a circle whose centre is the centre of the pin *h*; the jaws or teeth are chamfered, for the purpose of preventing lateral motion.

Claim.—The method herein described of constructing a hinge with the circular bearing surfaces *i i' i''*, for the purpose set forth.

No. 9,934.—P. F. Charpie, of Mount Vernon, Ohio.—*Improvement in Gun-Locks.*—Patented August 16th, 1853.

(See figure.) The nature of this invention consists in connecting the dog E, of the mainspring C, to the hammer B, by means of a screw *b*, passing through a curved slot *c*, in the lock-plate A, in combination with suitable packing encompassing the slot on the outside of the plate A; and surrounding the slot *c*, there is a circular recess, in which recess is placed a suitable packing, which prevents moisture from entering the lock. The advantages of this lock are "prevention from moisture" and "cheapness." (The mainspring and dog are on the inside of the plate.)

Claim.—The lock constructed substantially in the above-described manner.

No. 9,935.—Thomas Crossley, of Roxbury, Mass.—*Improvement in the Manufacture of Carpets.*—Patented August 16th, 1853.

The filling used in the production of this carpet is slightly colored, or plain, and is beat up very hard over the stretched warp, in order to conceal the latter entirely from view, and prevent the coloring matter from passing through from one side to the other. This fabric is then printed on one or both sides.

Claim.—A single-ply printed carpet, made by combining the warps and filling in the manner described, and subsequently printing them on one or both sides, without the colors passing through and discoloring or intermingling with the colors on the opposite side of the fabric.

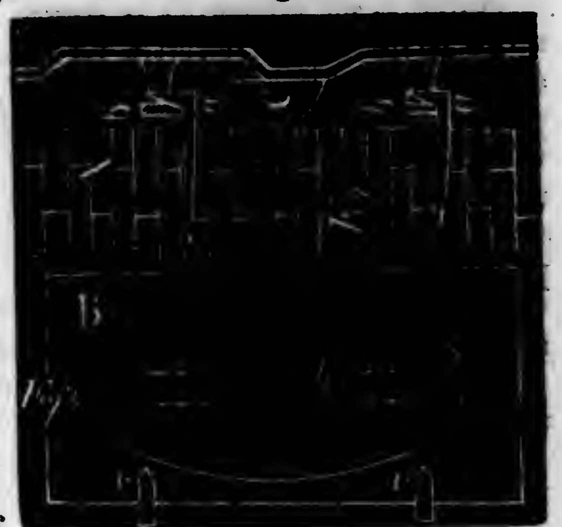
No. 9,936.—Benjamin F. Delano, Chelsea, Mass.—*Improved Rudder-Brace for Ships and other Vessels.*—Patented August 16th, 1853.

The nature of this invention consists in the application to the rudder-head of a lever or brace which is permitted to turn freely upon a pintle or centre projecting from the deck of the vessel, which lever is connected to the rudder-head by arms with hinge joints, by which means the rudder-stock is caused to turn freely in the opening in the deck, thus giving the rudder an additional support, and rendering it more secure and safe in its position.

B is the rudder-head; C, the tiller; D, a lever vibrating upon the pintle E, projecting from the deck; F, a portion of a metallic ring; G, arms.

Claim.—The brace D, connected with the rudder. Also, the combination of the brace D with the elliptical tiller H (not shown in fig.), or any other analogous device for the purpose of actuating the rudder, by the application of power to the braces, instead of to the rudder itself.

No. 9,937.—MICHAEL B. DYOTT, of Philadelphia, Pa.—*Improvement in Facing or Veneering Buildings.*—Patented August 16th, 1853.

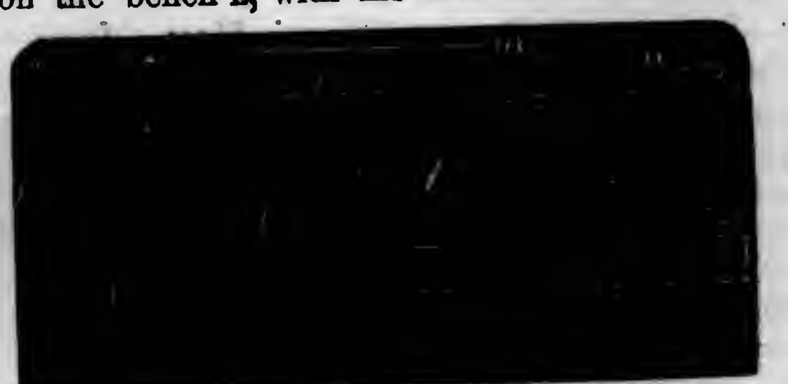


The plates B are hung to the wall by loops *b*, upon spikes and projections *c c*, which latter are cast on the iron plates.

Claim.—The method of supporting a veneering of thin cast-iron or other plates upon their inside, and uniting the same firmly with the external surface of the building, by so fixing the plates in relation to the wall as to leave a sufficient space between them to allow a cement in a liquid form to be poured in, to fill the space and all the interstices of the plate perfectly, solidify around and upon the hooks and other fastenings, and exclude the air and all dampness, whereby the veneering is strengthened, protected, and preserved.

No. 9,938.—AARON W. GEAHEART, of Beallsville, Ohio.—*Improvement in Machines for preparing Spoke Timber.*—Patented August 16th, 1853.

The timber for the spoke is laid on the bench *o*, with one end against the fixed rest, and the bridle in contact with the other end; the operator, seated on the bench E, with his foot on the lever *a*, causes the

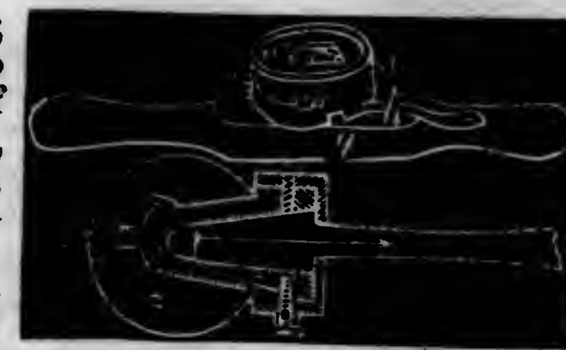


sliding ways *y y*, carrying the bridle *m* to move towards the rest, and securely clamp the piece of timber; the ordinary drawing-knife is then applied. The adjustable bench *o*, the height of which is regulated by the screws *f f*, gauges the amount to be taken off of the timber. After dressing any desired number, the bench *o* is raised and adjusted for thickness of the spoke. To give the necessary taper, one end of the bench is raised higher than the other.

By an additional device (fig. 2), which is to be placed on H, the bevel may be given the tenon end of the spoke, by which the dish of the wheel is obtained.

Claim.—The arrangement of the adjustable bed *o*, the bridle or clamp *m*, the sliding guide or gauge *y*, and foot-lever *a*, for the purpose, and operating in the manner set forth.

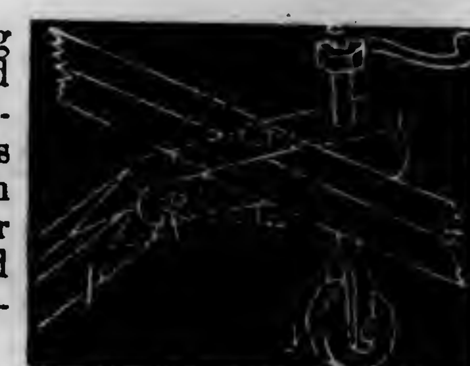
No. 9,939.—ARSHAL H. MCKINLEY, of Higginsport, Ohio.—*Improved Socket for Auger-Handles and Braces.*—Patented August 16th, 1853.



a is the handle; *b*, the socket; *d*, the circular head, with the cap *e* secured to the head by means of screws *i*, passing through slots; *h*, a spring attached to the handle, passing through notches *f g*, holding the cap in its place.

Claim.—The peculiar arrangement of mechanism by which I enable the shipping and unshipping of the bit and handle of an auger or other boring tool; that is to say, the socket having a circular head and vibrating cap, whose aperture can be made at one position to coincide with the mouth of the socket, and in the other position to oppose its straight edges to the projecting corners of the shank, the cap being retained in the desired position by spring and notch, or their equivalents.

No. 9,940.—JACOB MUMMA, of Mount Joy, Pa.—*Improvement in Draught Apparatus of Seed-Planters.*—Patented August 16th, 1853.



This improvement consists in combining a tongue (see fig.) having a vertical and lateral motion, with a supporting and directing wheel, so as to relieve the horses from the strain they are subjected to in other drills, and to enable the operator to run the drill straight forward, and keep it in its course when the horses deviate considerably.

Claim.—The combination of a tongue, having motion vertically and laterally, with the directing and supporting wheel, substantially as set forth.

No. 9,941.—E. K. ROOT, of Hartford, Conn.—*Improvement in Compound Screw-Drop or Hammer.*—Patented Aug. 16th, 1853.

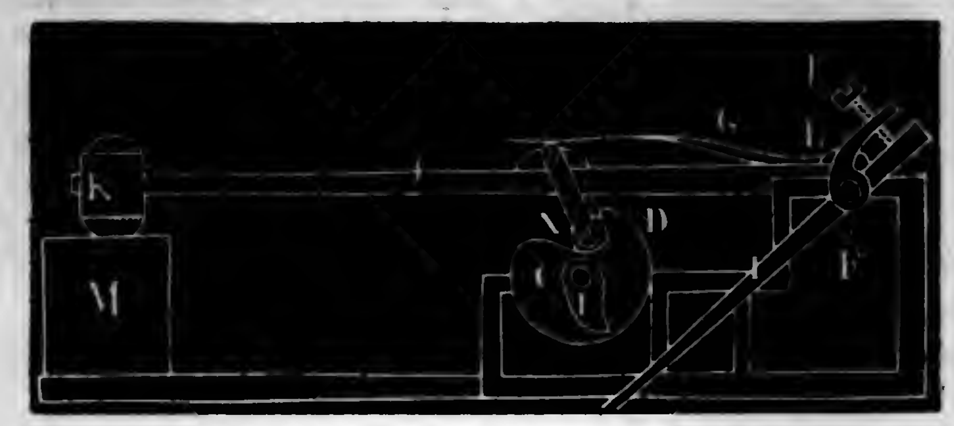
The claim explains this improvement.

Claim.—The method of elevating the drops or hammers, by means

of a screw having a continuous rotary motion, in combination with the mechanism for disconnecting the drops or hammers from the screw to permit them to drop. Also, the method of disconnecting the drops or hammers by the rotation of the elevating screw, which is notched to catch and act upon the finger or its equivalent, connected with the slide or its equivalent, to force it back and clear the thread of the screw. Also, in combination with the slide which connects the drop or hammer with the elevating screw, and with the finger on the slide or their equivalents, the employment of a catch-lever for holding up the drop or hammer when it is liberated from the elevating screw, and there holding it until it is required to be dropped. Also, in combination with the slide which forms the connection with the elevating screw, and with the catch which holds the slide when liberated from the elevating screw, the employment of the rebound latch, or its equivalent, which liberates the parts by the rebound when the drop or hammer strikes.

No. 9,942.—WILLIAM VAN ANDEN, of Poughkeepsie, N. Y.—*Improved Trip-Hammer.*—Patented August 16th, 1853.

This improvement consists in having the hammer-shaft J (see fig.) attached to a collar which works loosely around the shaft F, to which



a spring G, which forces down the hammer-shaft J, is attached. The spring is made to act more or less upon the hammer-shaft, by means of a set-screw *b*, and lever I, against which the cam D operates, which rotating with the shaft C, and bearing against the friction-rollers N N, elevates the hammer-shaft J; the cam E, as it rotates, bears upon and depresses the lower end of the lever I. The upper end of lever I consequently bears against the set-screw *b*; and the shaft F, to which the spring is attached, is turned. The spring G bears upon the hammer-shaft J; and when the highest points of the cam D have passed the friction-rollers N, the spring G, of course, forces the hammer-shaft downward, and the hammer K strikes the anvil M. The pressure upon the hammer-shaft is varied by raising or depressing the set-screw *b*.

Claim.—The claim of the inventor is substantially embraced in the foregoing description.

No. 9,943.—JOHN P. SCHENKL, of Boston, Mass.—*Improvement in Breech-loading Fire-Arms.*—Patented August 16th, 1853.

This invention consists in a method of unscrewing the breech from the barrel and withdrawing the same; of turning up the breech, so as

to bring its chamber into a vertical position for loading, and then returning the breech into the barrel and locking the two together; which motions are performed through the intervention of appropriate cams, catches, and springs, by the motion of a single lever by the hand of the gunner.

The figure represents the barrel B and breech D, with the male and female screws, with sections *y* of the threads cut away. The apparatus for accomplishing the above operations is attached to the ring D and in *e* and *b*.

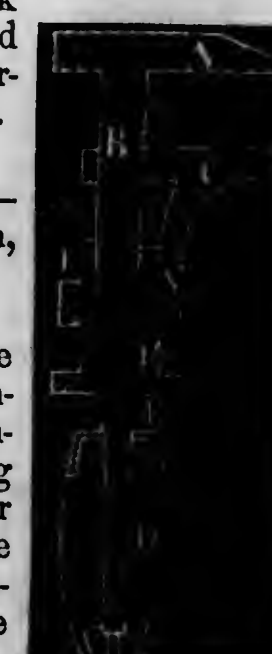
Claim.—The above-described combination of parts, for the purpose of operating the movable breech.

No. 9,944.—WILLIAM H. BABBIT, of Waynesburg, Pa.—*Improvement in Hill-side Ploughs.*—Patented August 16th, 1853.

Fig. 1 represents a perspective view of the plough body and a portion of the beam; C, the head; A, the upright; M, the bolt; O, the lever; and F, the mould-board: M and O forming the lock by which the plough body is kept in proper position. Fig. 2 shows the construction of the head C and the hole for the bolt. Fig. 3 shows the head, with the groove G in which the mould-board works. The mould-board is shown in fig. 4.

Claim.—Constructing and arranging head C in the hinge which connects the beam with the upright A, so as to lock the hinge by means of bolt M before the pivot of said hinge, and by lever O behind the pivot, for the purpose of making the bearings in the hinge adjustable.

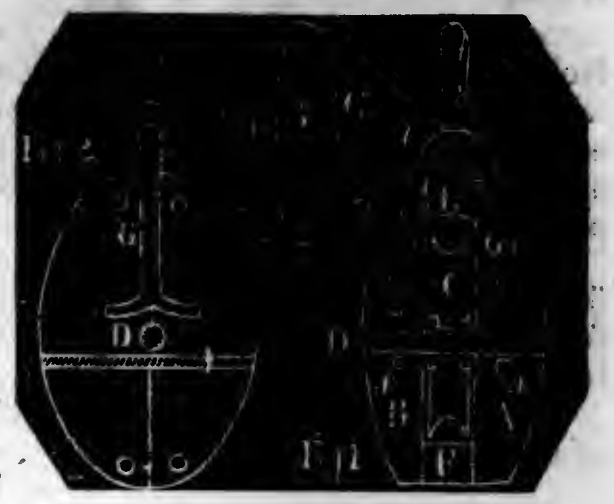
No. 9,945.—AURY G. COES, of Worcester, Mass.—*Improved Screw-Wrench.*—Patented August 16th, 1853.



The figure represents a section of this wrench.

Claim.—The combination and arrangement of the screw-tube G, its male and female or external and internal screws I F, the screw E on the shank B, the annulus and its female screw, as applied to the sliding jaw; the whole being made to operate together, for the purpose of enabling a person to readily move the sliding jaw C on the shank, with the velocity compounded of the velocities of motion of two female screws on two male screws.

No. 9,946.—William Coleman and Stephen G. Coleman, of Providence, R. I.—*Improvement in the construction of Ships' Blocks.*—Patented August 16th, 1853.



A and B represent the two cheeks; O, the sheave; D, the sheave-pin; and E F, wooden connecting pieces: and instead of straps, the staple or eye G is employed.

Claim.—The mode of constructing the hook-and-eye staple of the block, and supporting it within and by means of the cheeks, without any extension of it around and in contact with the sheave-pin, and whether each of the cheeks is made whole or in two parts; and in combination therewith, the mode of sustaining the sheave-pin, and connecting the two parts of each cheek, by a metallic rod extending through them and directly under and against the sheave-pin.

No. 9,947.—Alpheus C. Gallahue, of Alleghany City, Pa.—*Improvement in Machines for Pegging Boots and Shoes.*—Patented August 16th, 1853.

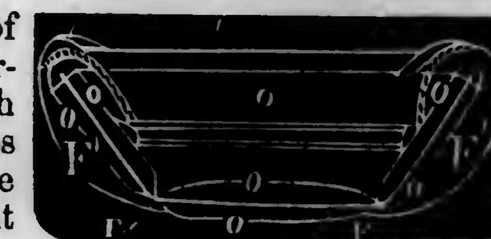
Claim.—The sliding-lever having a hook for entering the staple of the last, which, passing through slots in the uprights of the turn-table, secures the last to the table by the introduction of the wedge. Also, the turn-table mounted on the slide-table, which works on ways upon the moving-table, and is actuated by springs, for the purpose of keeping the edge of the sole at all times in contact with the gauge, when this is combined with mechanism for giving the turn-table a semi-revolution at the point where its centre is brought opposite to the awl by the motion of the table, that regularity in inserting the pegs may be secured. Also, the combination of the spring, lever, catch, or their equivalent sliding-wheels, and racks and mitre wheels, by which a semi-revolution is given the turning-table while the pegs are being inserted around the heel by the shifting mechanism. Also, the mechanism by which a driving stroke is given the peg-driver and the awl. Also, giving the peg-tube and driver a side motion, independent of the awl and awl-rod, by means of the cam and lever. Also, the combination of a cam and stirrup with the swing peg-cutter, by which the peg-wood is split from below by the knife, and at the same time forced into the tube.

No. 9,948.—Gibson North, of Philadelphia, Pa.—*Improvement in the Oven-doors of Cooking Stoves and Ranges.*—Patented August 16th, 1853.

The nature of this invention consists in enamelling the oven-doors, for the purpose of retaining the heat.

Claim.—The application of an adhesive coat of enamel, or other substance answering the same purpose, to the inside of the oven-doors of ranges or cooking stoves.

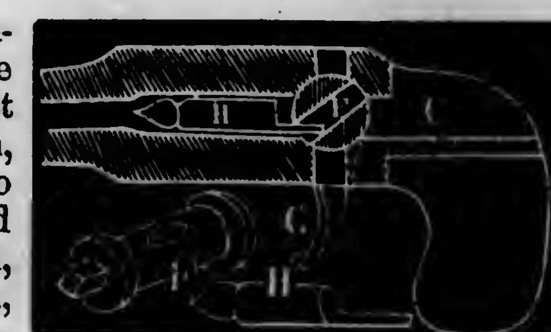
No. 9,949.—Abijah R. Tewksbury, of Boston, Mass.—*Improved Boat or Scow.*—Patented August 16th, 1853.



This boat is made of a sheet of india-rubber F, or other flexible water-tight material, lined, and covered with boards, so hinged together that the sides and ends will fold together upon the bottom of the boat, so as to require but little room for storing.

Claim.—The above-described method of constructing a boat, viz: by attaching its sides and ends to its bottom by water-tight hinges, in combination with connecting the edges of the sides and ends by water-tight flexible gores, so that the boat may be unfolded, or the sides and ends turned down into the plane of the bottom thereof.

No. 9,950.—Henry Stanton, of U. S. Army, N. Y.—*Improvement in discharging Breech-loading Fire-Arms.*—Patented August 16th, 1853.



The nature of this invention consists in constructing a movable breech in such a manner that it will, when placed in one position, form a prolongation of the bore, to allow the load to be introduced through it into the chamber; and, when placed in another position, will close the but-end of the bore, igniting at the same time the charge, by shearing or cutting off the fulminating fuse attached to the cartridge, as shown in the figure. C represents the chamber; E, the cylindrical plug, with the aperture F; G, the trigger; H, the cartridge, with the fulminating charge or fuse attached.

Claim.—The method herein described, of firing the charge of breech-loading fire-arms by the breech itself, in the act of closing; thereby dispensing with the ordinary lock. Also, the method of igniting the charge, by shearing through the fulminating compound attached to the cartridge.

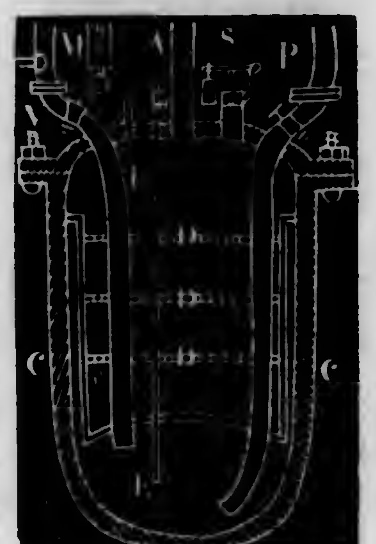
No. 9,951.—Luther Atwood, of Boston, Mass.—*Improvement in processes for purifying Alcohol.*—Patented August 23d, 1853.

This invention consists in the employment of finely-ground manganese oxide, 3 lbs.; nitrate of potash or nitrate of soda, 5 lbs., in a moistened state; to be slowly melted in a crucible; continuing the heat until the melted mass passes from a fluid to a stiff pasty condition. When cold, it is powdered and kept for use.

For every gallon of alcohol, of 85 or 90 per cent., two ounces of the manganese compound, dissolved in eight ounces of water, are used. This proportion is the average quantity for common alcohol; but so much should be used as is sufficient to destroy the odor of the fusel or odorous oils. The alcohol is then distilled.

Claim.—The use of manganates and permanganates existing in soluble compounds, however obtained, for purifying alcohol, so as to adapt it to nice purposes.

No. 9,952.—J. B. Moinier and P. H. Boutigny, of Paris, France.—*Improved Method of generating Steam.*—Patented August 23d, 1853.



The nature of this invention consists in so forming the generator as to cause a direct production of steam at high temperatures—500° or upwards—by means of ejecting water at the top, or near the top of the generator, when the same is in a heated state, and causing the water to come in small quantities in contact with the surfaces of perforated metallic diaphragms, placed within the generator, and also to come in contact with the sides of the generator, so as to increase the evaporating surface of the generator (see fig.) A represents the feeding-pipe; C, boiler; D, diaphragms; E, set-pipe; M, steam-gauge; P, purger; S, safety-valve: V, mouth of steam-boiler.

Claim.—(In generators for generating steam at high temperatures, from water introduced into the generator when in a highly heated state) injecting or introducing water from the top or near the top of the generator, when this mode of feeding or introducing the water is combined with the series of perforated metallic diaphragms, arranged one above another in the generator, so as to subdivide the water, and increase the evaporating surface, the water being gradually heated and subdivided in its passage through the apertures of the diaphragms, before it comes in contact with the more highly heated surface of the generator.

No. 9,953.—James B. Duff, of New York, N. Y.—*Improvement in the method of cutting Soap.*—Patented August 23d, 1853.

The nature of this invention consists in the employment of a traversing slatted bed, having a hinged head-piece, in combination with a series of vertical and horizontal yielding wire-cutters.

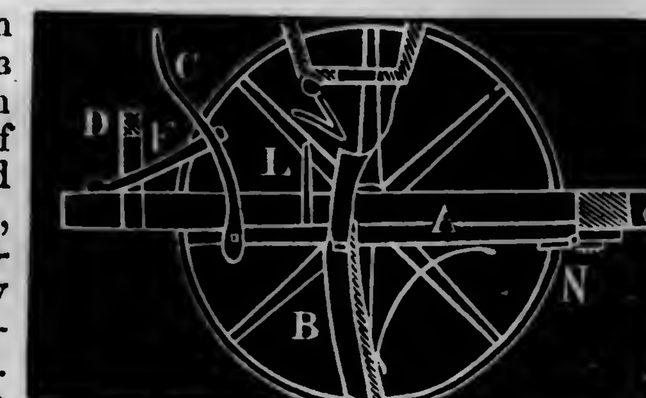
Claim.—Making the wire-knives, arranged and set with weights, capable of yielding, so that they will form a loop in passing through the soap, and consequently cut it smoothly and straight, in combination with the feeding slatted bed, or any other equivalent device for feeding or forcing the soap up to the yielding wire-knives.

No. 9,954.—Morris J. Gardner, of York, Pa.—*Improvement in Oscillating Steam-Engines.*—Patented August 23d, 1853.

The nature of this invention consists in the manner of introducing the steam through circular tubes into the steam-chest, and at the same time constituting the tubes the circle around which the cylinder oscillates. (See fig.) *a a*, the circular tubes, being made stationary on the frame of the engine; *b b*, large circular tubes attached to the steam-chest, which contain the packing, and glide over the tubes *a a*.

Claim.—The mode of introducing the steam, the circular steam-tubes, the circular steam-chest and packing-boxes, operating in the manner described, without regard to the positions or dimensions of the various parts.

No. 9,955.—Peter Horn, of Hagerstown, Md.—*Improvement in Seed-Planters.*—Patented August 23d, 1853.



The nature of this invention consists in providing the boot B (see fig.) with an arm A, which is attached to the frame of the planter by a hinge N, and is operated by a lever C, whose fulcrum F is also attached to the frame, and by which the boot B may be lowered or elevated at pleasure. When the arm is elevated in passing over uneven surfaces, the projection L strikes the bent spring above it and raises it, thus closing the aperture through which the seed passes from the hopper into the boot, and thereby saving the grain which otherwise would be lost.

Claim.—The spring *a*, in combination with the projection L and arm or lever A, for the purpose of opening and closing the recess through which the seed passes. Also, the arm or lever A, in combination with the lever C and fulcrum F, for the purpose of raising or lowering the drill tubes and operating the spring *a*.

No. 9,956.—Frederick B. Parker, of Queensville, Ind.—*Improvement in Hay-Rakes.*—Patented August 23d, 1853.

The object of this improvement is to prevent the rake from tipping by any other force than that applied by the operator for the purpose; and consists in a pair of steel springs *i i* (see fig.), which are attached to the handle-bars, projecting downwards, and terminating with lips, to rest upon two of the front tines.

Claim.—The spring-catches projecting downwards from the front ends of the hand-bars, and provided with sloping lips, which, bearing upon the front tines, assist in holding the rake to its place, until relieved by the withdrawal of the main stop by the operator.

No. 9,957.—Milton Roberts, of South Levant, Maine.—*Improvement in the arrangement of Cutters for Turning.*—Patented August 23d, 1853.

This invention relates to an improved lathe-attachment, for turning bed-posts, chair stuff, and the like; and consists in placing a series of knives or cutters and beading-tools, one or both being used in a suitable frame, the frame being moved in a direction transversely of the stick to be turned. The stick is centred in an ordinary lathe, and the frame, with its guides, are so attached to the latter as to allow the knives to come in contact with the stick as the frame is moved; the knives operating upon the stick sufficiently to give it the required form during a single stroke or vibration of the frame. In the figure, D represents two sets of knives in an inclined position; E F G are beading-tools attached to the frame at the lower part of it.

Claim.—Arranging straight-edged and grooved cutters on a frame moving parallelly to the axis of the lathe, when the cutters are placed in pairs obliquely to the piece to be turned, each set forming salient angles with each other in the frame; by which arrangement each set acts by a gradual drawing cut upon the piece, the grooved tools following, to finish the work.

No. 9,958.—Samuel Vansyokel, of Little York, N. J.—*Improvement in Grate-Bars.*—Patented August 23d, 1853.

The nature of this invention consists in casting or otherwise securing to the under sides of grate-bars, hooks or catches, through which a rod or bar is passed and held, and by which the grate-bars are prevented from warping or twisting by the heat, or from falling down, if one end should slip off. (See fig.) A is the grate-bar; B, the catch or hook; C, the bar.

Claim.—The construction of the above-described grate-bar, as set forth.

No. 9,959.—Miss Lettie A. Smith, of Pineville, Pa.—*Improved Machine for Working Butter.*—Patented August 23d, 1853.

This machine consists of the butter-tray or pan F, and the cooling-drawer G, which is placed under it, and into which ice is placed to keep the butter in a cool state while being worked. Also, of a working-apparatus, the handle of the worker H passing through a circular opening in the back of the stationary frame, and the other end extending over the front part of the tray. This adjustable apparatus or working-lever is formed with acute angles at the sides of its working face, so as to serve the double purpose of pressing the butter and turning it over.

Claim.—The combination of the cooling-drawer or ice-box G, with a butter-tray F, for the purpose described. Also, forming the working-lever with acute angles at the sides of its working face, for the purposes set forth.

No. 9,960.—William M. Warren, of Watertown, Conn.—*Improvement in Railroad Car Seats.*—Patented August 23d, 1853.

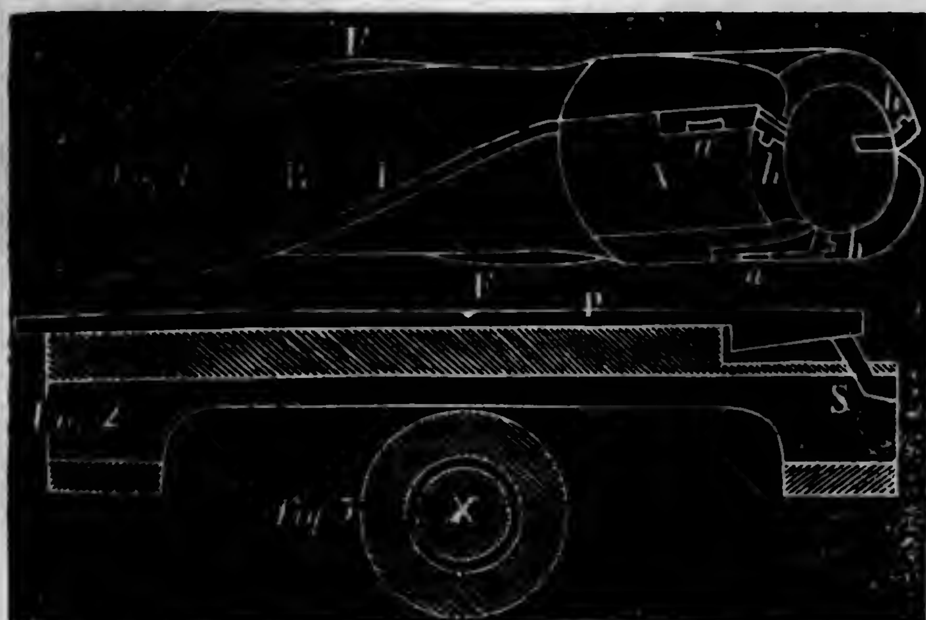
This improvement consists in the construction and use of sliding foot-boards, placed below the seat, as shown in the figure.

Claim.—The manner in which the foot-boards L L are constructed and ar-

ranged, viz., the foot-boards being attached by joints to slides K K, the slides having racks $l\,l$ on their upper surfaces, and working on beds J J connected by hinges; the under sides of the slides being provided with spurs or clicks $n\,n$ which catch into the racks and retain the foot-boards when pressed upon by the feet; the beds being retained underneath the seat when the foot-boards are not in use, by means of the catches, or any other convenient mode.

No. 9,961.—L. A. B. WALBACH, of Pikesville, Md.—*Improvement in Boring Cannon.*—Patented August 23d, 1853.

This invention consists in producing a cylindrical hole in any solid metal suitable for making cannon or small arms, by boring out an annulus of the diameter of the required hole, leaving a central core, which can be broken off when the annulus is completed to the required depth, and removed in a solid mass. (See figs.) X is the core; A, the cutter-head of the boring tool; $h\,h\,h$, the cutters; D, the shear; and F F F, the spiral flanges. To operate the tool S for cutting off the core, the wedge P must be fed forward upon the tool by a screw. The surface of the core will show any defects, should there be any in the metal of the cannon, upon its inner surface.



Claim.—The method herein described of boring cannon or the barrels of other ordnance or fire-arms, in combination with a second operation for removing the core. Also, the transverse cutter, for grooving or cutting off the base of the core. Also, the method of ascertaining the quality of the gun by testing the core.

No. 9,962.—ZACHARIAH ALLEN, of Providence, R. I.—*Improvement in Counterpanes.*—Patented August 23d, 1853.

This invention consists in weaving cloth of a width equal to the length required for a counterpane, the weft of the cloth being composed of cord and thread woven in alternate order, the thread being the usual size for the warp employed, and the cord considerably

thicker: woven so as to form a ribbed surface. The thickness and twist of the cord should be such, that when woven, its tension and rigidity will produce kinks by its tendency to untwist, which will form helicoidal curves, and give the ribs a wavy and undulating surface.

Claim.—The ribbed counterpane herein described, being so made that the thickness and twist of the cords forming the ribs, by their tendency to untwist, will give to the ribs a wavy and undulating surface.

No. 9,963.—HENRY RITCHIE, of Newark, N. J.—*Improvement in Padlocks.*—Patented August 23d, 1853.

This improvement consists in the combination of a bolt, toothed tumbler, and guard, so arranged as to prevent the bolt from being forced from the shackle in the bow by means of blows upon the case of the lock. A represents the case; C, the bolt; D, the tumbler; and E, the guard or lever, having its fulcrum on K.

Claim.—The combination of the bolt C, guard E, and the double-toothed tumbler D, one tooth n of the tumbler fitting in the shackle d, and the other tooth J fitting in the notch at the back of the bolt. The bold, guard, and tumbler operating as set forth in the body of the specification.

No. 9,964.—SNOW MAGOUN, of Newton, Mass.—*Improved Machine for Cutting and Bevelling Printers' Rules.*—Patented August 23d, 1853.

The strip of metal from which the rule is to be cut is placed

upon the bed-piece *a*, and rigidly held by the set-screws *g g*, and at the end by the slides *h h* fastened in any desired position by set-screws. The tool-carriage *c c* is moved forward and back across the bed-piece *a*, by the handle K K, turning on a fulcrum at *l*, and jointed to the arm *m*, which is attached to the tool-carriage at *n*. The tools are depressed as the cutting progresses by the screws *o o*, and raised up again, when the screws are relieved from the tools, by the springs *p p*.

Claim.—The machine above described, having, or being constructed with, a sliding tool-carriage, which carries the cutting tool forward and back across the rule.

No. 9,965.—JONATHAN FOREMAN, of Boston, Mass.—*Improvement in Diving-Bells.*—Patented August 23d, 1853.

The peculiarity in operation of this invention is, that by the combination of a reservoir of condensed air at the surface, in communication with the diving chamber and the traversing block, it is practicable at all times so to regulate the equilibrium of internal and external pressure, as to control the movements of the bell.

Claim.—The combination of the compressed-air reservoir at the surface, in connection with the diving chamber or bell, and the arrangement of the movable block or pulley, whereby the chamber or bell may be moved and directed at the will of the operator within.

No. 9,966.—M. B. DYOTT, of Philadelphia, Pa.—*Improvement in Hot-air Furnaces.*—Patented August 30th, 1853.

(See figure.) A represents the fire-chamber; B, the fire-grate; C, a cylinder or flue; D, a passage from the fire-chamber into a drum E; F, a pipe passing through the drum, serving as a partition to cut off the communication all around the interior of the drum, and communicates with drum G; H, a pipe communicating with drum G and drum E; I, pipes which pass from the upper part of the inner cylinder or flue C to the outer side of the external shell or covering J; K, the door; L, ash-pit.

Claim.—The combination of the internal cylinder C, with the drums E G, arranged in the manner described; by which combination a great amount of heating surface is exposed.

No. 9,967.—OLIVER P. DRAKE, of Boston, Mass.—*Improved Apparatus for Vaporizing Benzole.*—Patented August 30th, 1853.

The claims of the inventor, by reference to the accompanying figure, will explain the nature of this improvement.

Claim.—The combination of the heater K, and gas-burner L, with the water-vessel B, and vaporizing-chamber A; so that by means of the heater and gas-burner, and the pipes connecting them with the water-vessel B and the chamber A, the whole or a part of the mixture of

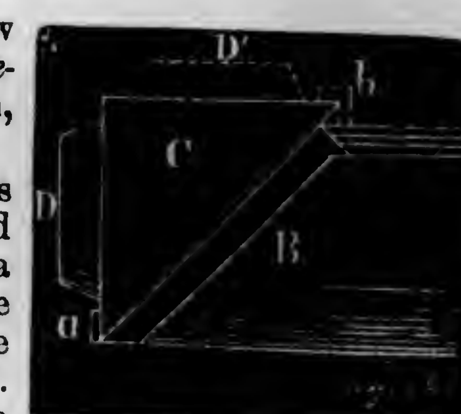
air and benzole vapor produced by the apparatus, may not only be used in any convenient place, for the purpose of illumination, but also for heating the water of the vessel B.

Also, the combination of the closed vaporizing-chamber A, the rotary vaporizer or disseminator I (placed therein), and the rotary meter-wheel Q, and its closed case S, or an air-forcing apparatus, as made to force a stream of air into the hollow shaft of the vaporizer, and through or against saturated portions of the disseminator, and into the vaporizing-chamber or regenerator, so as to vaporize the benzole or hydrocarbon, and mix it with air.

Also, in combination with the meter-wheel and its case, and the hot-water vessel B, the coiled induction pipe M, as made to pass through the water in the vessel B, and thereby receive heat therefrom; so as to warm the air as it passes through the pipe, and to supply oxygen to the volatilized vapors, and for the purpose of facilitating the evaporation of the same. Also, in combination with the induction air-pipe M, the chamber N, and its regulator slide and orifice, applied for the purpose of supplying cold air to the warmed air or to the meter-wheel, in order to regulate the temperature of the air passing into the wheel, and forced into the vaporizing-chamber. Also, the peculiar mode of making the rotary disseminator or vaporizer I, viz., of two perforated heads or disks, a hollow perforated shaft, and strands of lamp-wicking, or other absorbent material, stretched from one head to the other.

Also, for the purpose of an air-blast apparatus, the application and use of the meter-wheel, its closed case, and liquid therein; having its wheel operated by a separate power, and applied in conjunction with the water and closed case, and induction and eduction pipes, for the purpose of blowing air.

No. 9,968.—R. R. FINCH, JR., of New York, N. Y.—*Improvement in Stove-pipe Collars.*—Patented August 30th, 1853.

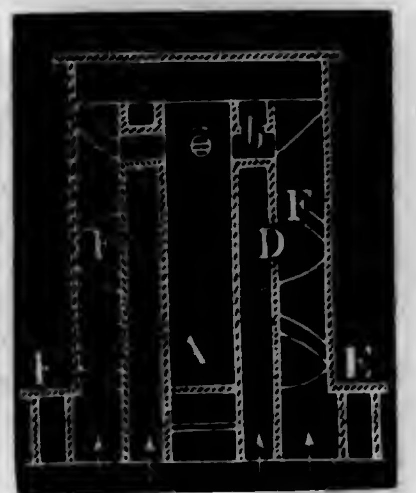


The nature of this invention consists in having a collar C (see figure) attached to the end of the flue B, which projects a short distance from the stove; one side of the collar, as well as the end of the flue, being bevelled at an angle of 45°. By this means, the collar may be so

placed or attached to the end of the flue, that the pipe may project horizontally (see D) from the stove, or perpendicularly (see D′) from it,—the collar being movable or reversible, and fitted to the flue by means of a flanch *b*, and button *a*, on the end of the flue.

Claim.—The reversible collar C, constructed, arranged, and applied to the stove in the manner and for the purpose described.

No. 9,969.—THOMAS S. GORE, of Jersey City, N. J.—*Improvement in Stoves.*—Patented August 30th, 1853.



The nature of this invention consists in surrounding an inner cylinder A of the stove, with spiral flues F F, so arranged or connected to the base E, that the heat which passes down the spiral flues will meet or unite with a main flue connected to the ordinary smoke-pipe.

Claim.—The spiral flues F F, surrounding the cylinder D, arranged and connected to the base E, for the purpose of obtaining a large extent of heating surface for flues, and also for forming a space between them, for the admission and heating of cold air.

No. 9,970.—LANSING E. HOPKINS, of New York, N. Y.—*Improvement in Conductors in Machines for Forming Hat-Bodies.*—Patented August 30th, 1853.

The nature of this invention consists in a bifurcated conductor, so constructed and arranged as to place the exhaust-cone between two jets of fur. (See fig.)

Claim.—The bifurcated conductor and blast, the conductor having its openings opposite to each other, or nearly so, and the cone between them.

No. 9,971.—BENJAMIN IRVING, Green Point, N. Y.—*Improvement in Steam-Boilers.*—Patented August 30th, 1853,

The objects of this invention are to secure a more perfect combustion of the gases generated by the consumption of fuel, and to present a large extent of heating surface, without subjecting any part of it to a very intense heat, and to guard against explosions of the boiler, to gain more compactness, and strength, and durability, and to reduce the necessary weight of metal and quantity of water. The gases rise into the cylinder G (see fig.), and between the cylinders B and E, where they are consumed and made to heat the coils and other surfaces. The products of combustion descend and pass off into the circular flue M, from whence they escape through vertical tubes into the circular flue N, which is in immediate communication with the chimney P. The steam generated by all these heating surfaces rises into the dome

K, from whence it is taken off by the pipe Q, or from any other part of the steam-chamber.

Claim.—A boiler composed of an external "water-jacket" of cylindrical or other form, with a steam-chamber at the top, and with or without one or more inner water-jackets connected with the outer water-jackets, when either water-jacket contains one or more vertical coils of steam-pipe whose lower ends connect with one of the water-jackets, and whose upper ends discharge into the steam-chamber. Also, drying the steam by passing it through a coil within or between the water-jackets.

No. 9,972.—JOHN KRAUSER, of Reading, Pa.—*Improvement in Cider-Mills.*—Patented August 30th, 1835.

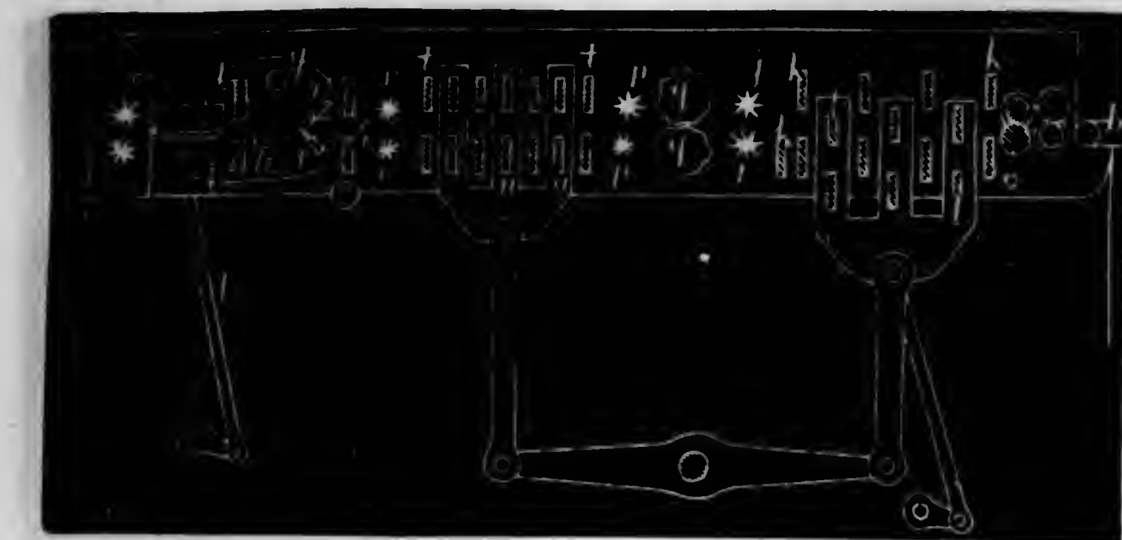
C is the cylinder; P P′, pistons. The cylinder is made to revolve rapidly, while the revolving eccentrics which are on the shaft move the pistons in opposite directions, and force the fruit against the grinding cylinder C.

Claim.—Arranging the hopper with reference to the several operating parts of the machine, so that the fruit shall not rest against the roughened exterior of the grinding cylinder, but directly upon so much of the upper surface of the anterior ends of the pistons or plungers as shall be found operating or exposed within its inclosed sides. Also, to cause the incumbent substance to press upon the cumbent or that contained within the cells, so as to oppose the upheaving or ejectment of the same, while in the act of being pressed against the passing teeth of the revolving cylinder C, by the action of the alternating pistons or plungers.

No. 9,973.—O. S. LEAVITT, of Maysville, Ky.—*Improvement in Hemp and Flax Breaking Machines.*—Patented August 30th, 1853.

b is the endless feed apron; *j j*, rollers; *k k*, stationary blades; *l l*, movable blades; *q q*, flying rollers; *p p*, second pair of feed-rollers; *r r*, third pair; *t t*, stationary, and *u u*, movable blades; *z*, slot; *c c′*, delivery-rollers; *f f′*, combs set in arms *g g′*, and worked by rock-shaft *l*.

The hemp or flax is fed to the machine upon an endless apron, which supplies two pairs of grooved rollers; and it then passes between the stationary blades, also blades working vertically; thence the flax passes to fluted and toothed rollers, and finally, when finished, to the delivery-rollers.



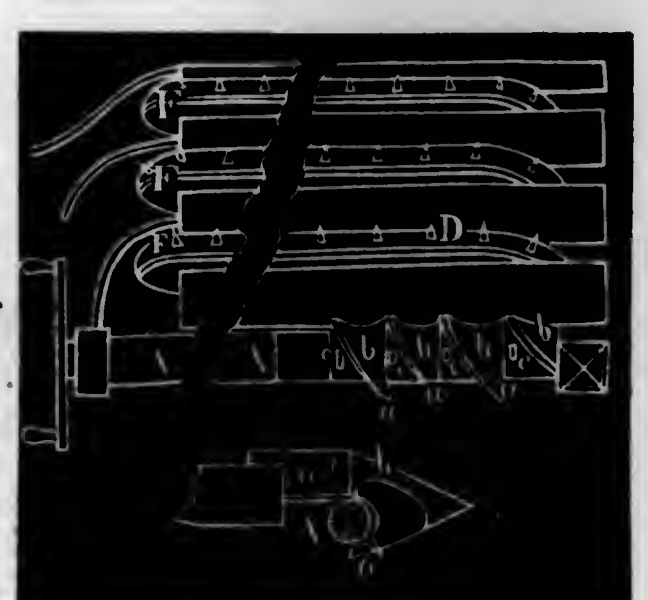
Claim.—The combing apparatus, in connection with the pieces *i i*, which move alternately up and down, to hold the hemp or flax against the combs *f f*.

No. 9,974.—WILLIAM H. MITCHEL, of Brooklyn, N. Y.—*Improvement in a Machine for Distributing and Composing Types.*—Patented August 30th, 1853.

This machine consists of means for distributing the types from the form, and setting them up in rows within grooves, a given letter in each groove or row, with the faces of the types upwards, and in a line. From these grooves the types are removed, each row of a given letter at a time, and placed within slides or conductors, which supply them to an apparatus connected with finger-keys. The striking of any given finger-key drops one of the types upon one of a series of belts, which are moved by competent pulleys; the belts conduct the types to a composing-wheel and conductor, in the order in which the keys drop them.

Claim.—The several parts of the apparatus, with their combinations, for the purpose set forth.

No. 9,975.—FREDERICK NISHWITZ, of Williamsburgh, N. Y.—*Improvement in Grain-Harvesters.*—Patented Aug. 30th, 1853.



The nature of this invention consists in a peculiar construction and arrangement of cutters and fingers. (See fig.) The cutters *a a* project at right angles, in spiral lines, from the shaft A, and pass between slots *c* in the fingers *b*. The grass or grain passes between the fingers *b*, which have an oblique position. And in the employment of flanged rollers, for the purpose of throwing the grain from the discharging ends of the belts.

Claim.—The combination of the fingers *b* and cutters *a*, constructed, arranged, and operating as set forth. Also, the employment or use of the flanged pulleys F F F, for the purpose of throwing or detaching the grass or grain from the belts D D D.

No. 9,976.—SAMUEL DARLING, of Bangor, Me.—*Improved Apparatus for Grinding and Shaping Metals.*—Patented August 30th, 1853.

This invention consists in the arrangement of an adjustable table, placed under the grinding stone, for the purpose of facilitating the operation, and making accurate work.

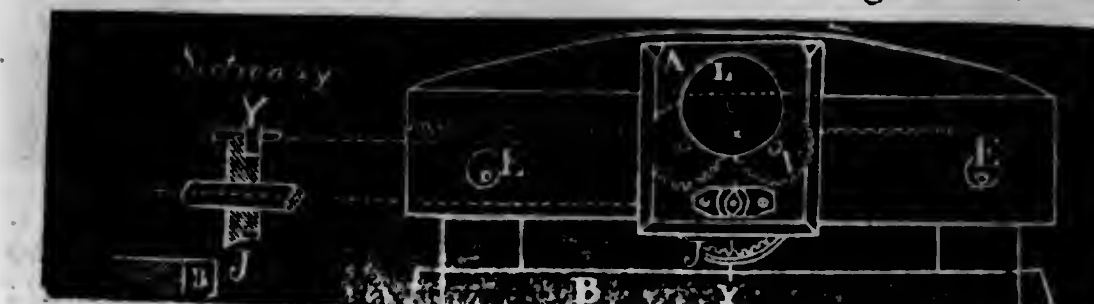
Claim.—The combination of the holder of the article to be ground, with a grindstone or grinding disk, so that the article and stone will change positions relatively to each other, during the operation, in three directions, namely: towards each other, and parallel with, and transverse to the axis of the stone.

No. 9,977.—ANDREW RALSTON, of West Middletown, Pa.—*Improvement in Saw-Mills.*—Patented August 30th, 1853.

The prominent features in this improvement consist in operating the saw horizontally, instead of vertically, and with greater velocity; and in an arrangement and combination of the saw with other parts of the saw-mill, so that the saw will run through and beyond each end of the log, and then be automatically let down a proper distance for the thickness of the stuff to be sawed, and the motion of the carriage reversed; teeth being formed on both edges of the saw.

Claim.—Sawing logs or other timber by means of a reciprocating saw operated in a horizontal position. Also, the arrangement and combination of the saw with the other parts of the saw-mill, so that the saw will run through and beyond each end of the log, and then be let down automatically as set forth, and the carriage reversed, without stopping the machine, and so on until the log is entirely sawed into the required dimensions. Also, connecting the operating pitman with the saw-gate, through the medium of a secondary pitman, connected with the saw-frame and saw-gate, so that the operating force shall be applied in a direction nearly coincident with that of the saw in its successive positions.

No. 9,978.—STEPHEN P. RUGGLES, of Boston, Mass.—*Improvement in Machines for Cutting Sheet-Metal.*—Patented August 30th, 1853.



In this machine the cutting blades B and J (J being a rotary blade),

are so hung or arranged that their cutting edges are in the same line, one placed above the other, but not in contact or overlapping; by which means perfectly straight, square, and smooth edges are cut. The cutting-blades may be accurately adjusted for cutting various thicknesses, by means of the eccentric pins or bolts E E. If the pulley L is set in motion, the box A, which carries the rotary blade J, will move along, as is apparent from the figures.

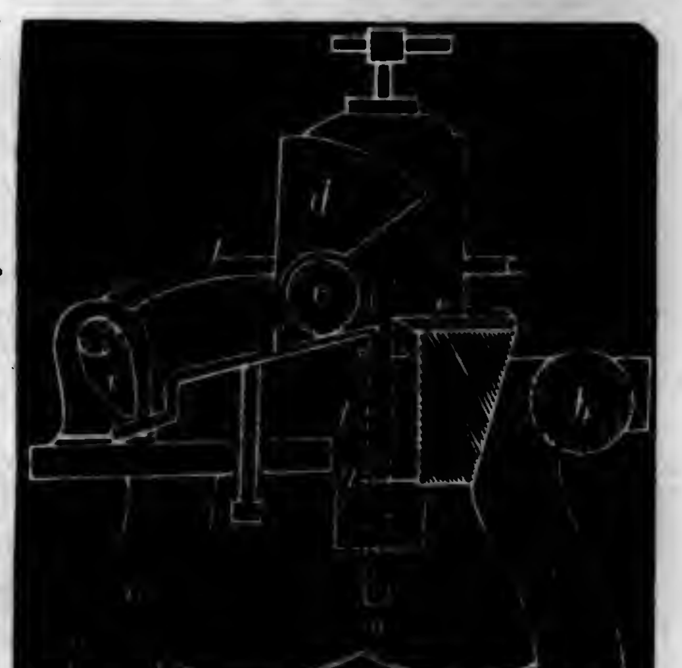
Claim.—The inventor claims substantially the above-described apparatus or machine, for the purpose set forth.

No. 9,979.—DANIEL WINSLOW, of Westbrook, and PERLEY D. CUMMINGS, of Portland, Me.—*Improvement in Paper-Files.*—Patented August 30th, 1853.

By reference to the figure, the claim will explain this improvement.

Claim.—The combination of the plates *a* and *b*, with the elastic bands *f* and *g*, so arranged as that the side edges of the top plate shall be bent down upon the bands, and hold them securely, while the side edges of the bottom plate are turned, but left far enough from the bottom plate for the bands to move freely between them and the plate; the edge lips of both plates being so bent inwards and rounded on the corners as to protect the bands from being chafed or worn.

No. 9,980.—CHARLES WESTON, of Salem, Mass.—*Improvement in Machinery for Splitting Leather.*—Patented August 30th, 1853.

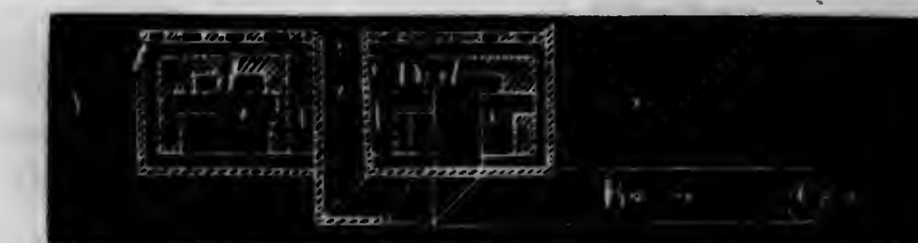


The nature of this invention consists in an arrangement for adjusting and holding the spring-plate, by attaching the arm which operates the cams to a spring-rack, so that the spring-plate will not only be susceptible of adjustment for the different thicknesses of the split, and exert a constant and uniform pressure upon the same, but will also yield to the various inequalities of the hide as it is drawn through the machine. (See fig.) *a a*, framework; *b*, roll upon which the leather is wound; *c*, pressure roll, set in the turning-bar *d*; *e*, stationary cutting-knife; *f*, spring-plate turning upon journals; *i*, cam, and *k* its shaft, which is attached to arm *l*, which is held by the rack of the movable rod *m*; *p*, spiral spring, shown in dotted lines; *q*, stationary stud, against which the spiral spring bears.

Claim.—The arrangement above described, for exerting a constant and uniform pressure upon the leather, and at the same time allowing the spring-plate to yield to the inequalities of the hide, the same consisting in a spring-rack for holding the arm which is connected to the spring-plate by the turning-shaft and cams.

No. 9,981.—WILLIAM WIGSTON, of New York, N. Y.—*Improvement in Apparatus for Purifying Gas.*—Patented August 30th, 1853.

By reference to the figure, the claim will explain the nature and operation of this invention.



A is the lower part of a dry-lime purifier; *x y*, surface of the liquor; B, inlet-pipe; C, outlet-pipe; D, "scrubber" (made of wood); *c*, circular opening in the scrubber; *d d*, annular cavity in the scrubber; *e e* and *f f*, passages.

Claim.—Constructing the scrubber or float D with a cavity *d*, to receive the gas above the surface of the fluid, and partly submerged passages *e e* and *f f*, leading from the cavity through the sides of the float, to allow the escape of the gas from the cavity, and cause its distribution over the surface of the fluid in thin streams, to produce a diffused contact with the fluid.

No. 9,982.—ELLIOT SAVAGE, of Berlin, Conn.—*Improved Machinery for Cutting and Bending Metallic-Disks.*—Patented August 30th, 1853.

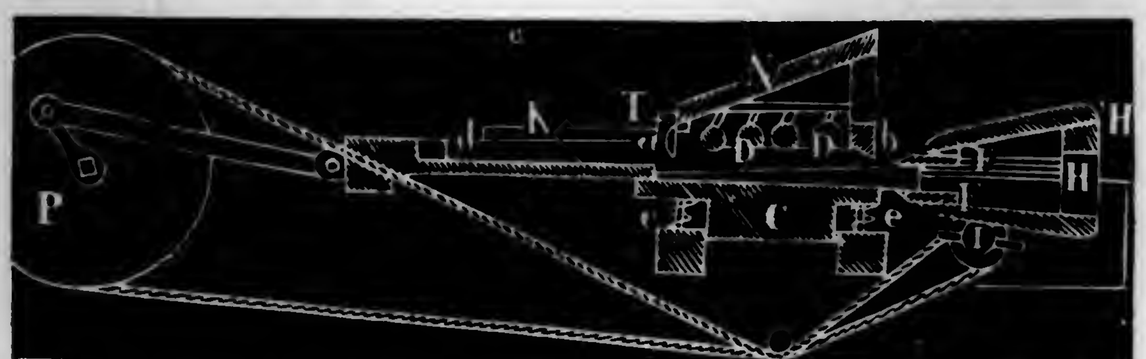
By applying to the two rollers R and *a* the support roller M, the plate is firmly held at or near its outer edge; the bending of it down is effected by the action of the bending-roller R. When the plate is put in revolution, the roller R is moved around against it, and turns down the edge against the conic surface of the roller *a*. B and C, the circular disks or gripes; E and D, rotary shafts; H and I, cutting-rollers; N, vertical arm supporting the roller M. The bending-roller R can be turned into position *y*.

Claim.—The combination and arrangement of the roller M with the

roller *a*, and the bending-roller R; so as to operate together and independently of the clamps B C, substantially as specified.

No. 9,983.—ELIJAH VALENTINE, of Palmer, Mass.—*Improvement in Shingle Machines.*—Patented August 30th, 1853.

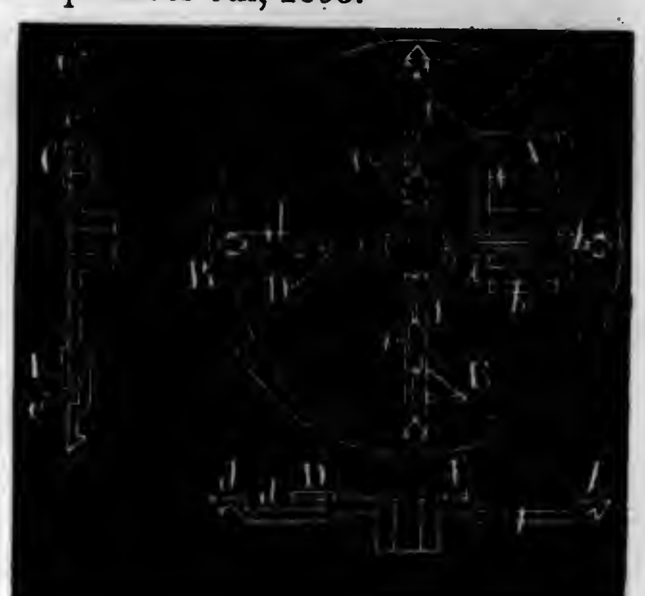
The shingle to be dressed is placed in the recess *d*, and is carried forwards therein past the mouth-piece T, and under the series of rollers D D. When the driver passes backwards, the catches *a* arrest the shingle, and cause it to fall on the platform C; and as the ledges K K pass from under the arbors of the rollers D D, they all in succession fall upon the shingle, and flatten it, in case it should be warped, and



cause it to pass freely under the after mouth-piece *b*, to be operated upon by the knives during the next return movement of the driver. As the next shingle is carried forward, the front end of the driver strikes against the end of the shingle first carried into the machine, and forces under the mouth-piece *b*, in contact with the knives F F; which knives, as they approach each other, impart the proper taper to the shingle.

Claim.—The inventor substantially claims the combination and arrangement of the several parts, for the purpose set forth.

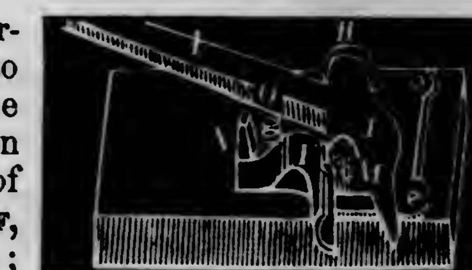
No. 9,984.—JAMES T. ASBURY, of Taylorsville, N. C.—*Improvement in Straw-Cutters.*—Patented September 6th, 1853.



The nature of this invention consists in so arranging the cutting-knives C, D, and E, that one-third of the feed shall be cut by each of the knives, as they successively come in contact with the straw. The knives are fastened to three arms of a vertical wheel. The fourth arm of the wheel is furnished with a cam for moving the feeding apparatus. The arms are constructed with recesses *c d e f*, to permit each to pass over the protruding straw. A is the cutter-box; *k* and *l*, feeding-rollers.

Claim.—The combination of the three cutting-knives, as described, with recessed arms, for the purposes substantially as set forth.

No. 9,985.—PHILOS BLAKE, ELI W. BLAKE, and JOHN A. BLAKE, of New Haven, Conn.—*Improvement in Nut-Crackers.*—Patented September 6th, 1853.



This improvement consists in the arrangement of the jaws in relation to each other, and to the axis on which the movable jaw turns, and in combination therewith stops, to limit the motions of the movable jaw in both directions. F, fixed jaw; I, movable jaw; N, stop; H M, axis on which the movable jaw turns. This axis is parallel to the plane in which the jaws diverge. The spring *o* keeps the jaws open.

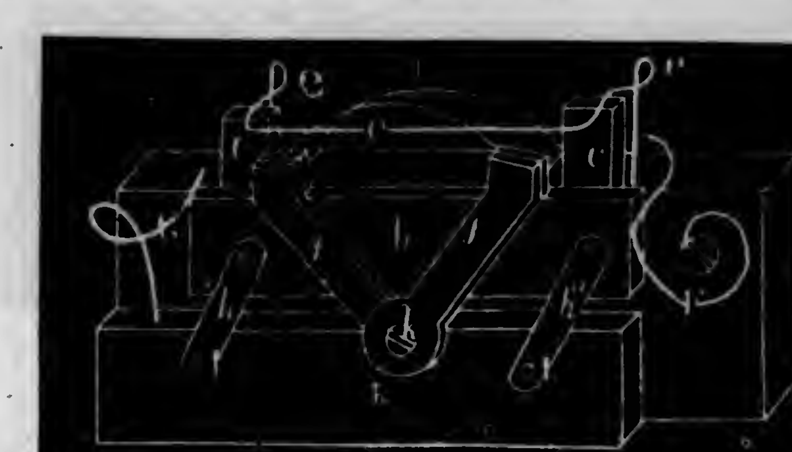
Claim.—The divergence of the jaws in a plane which is parallel to the axis of motion, whereby nuts of different sizes are all received at a uniform distance from the centre of motion.

Also the divergence of the jaws in a plane parallel to the axis of motion, in combination with the two stops, collectively.

Also the divergence of the jaws in a plane parallel to the axis of motion, in combination with their extension beyond the supports of the axis, whereby the line of the axis of motion is brought in close proximity to the acting faces of the jaws, without impairing free access to them, to introduce and remove the nuts.

No. 9,986.—JAMES BARNES, of Franklin, N. Y.—*Improvement in Machines for Edging Leather Straps.*—Patented Sept. 6th, 1853.

d is the circular knife; *e e*, spring to hold the leather tight to the gauge; *h h' h''*, three sides of a parallelogram jointed together, the



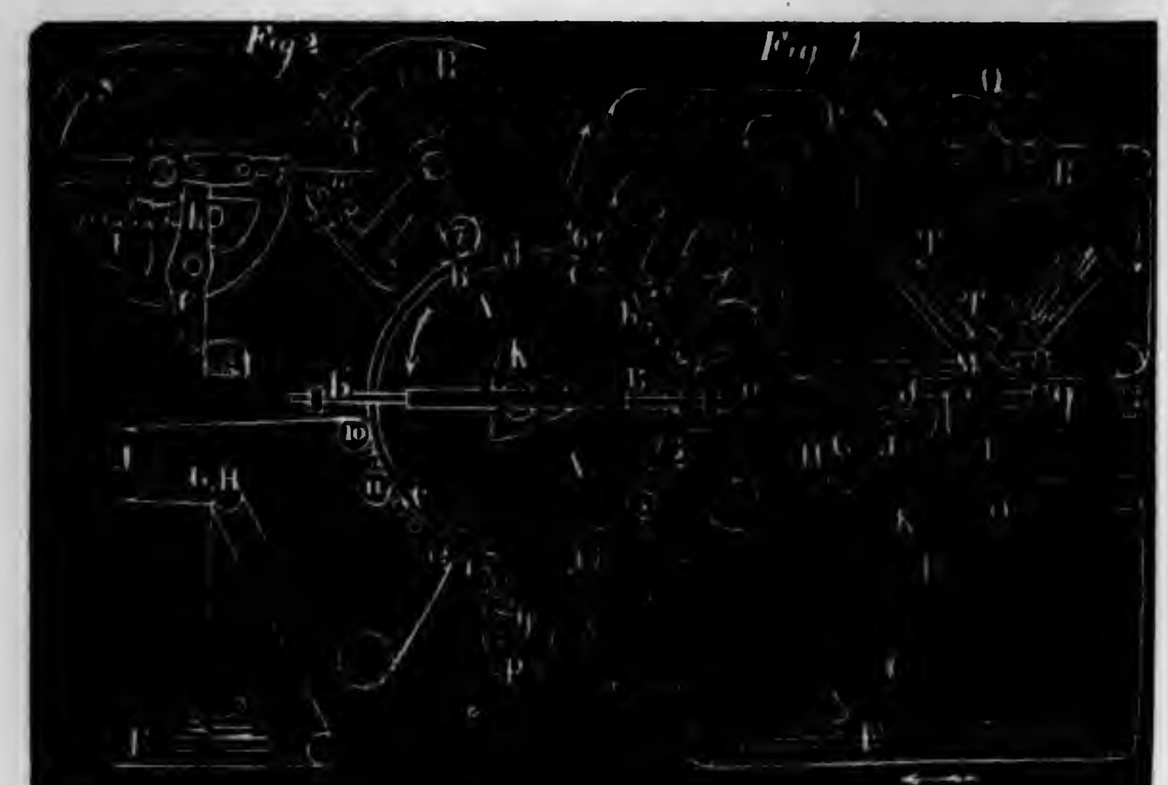
upper part *h* of which is movable round the points J J; *h* touches the front sides of the columns *c c*, and against its ends press the springs F and G; *f f* a pair of dividers inverted with a shoulder on each leg to

rest upon the upper edge of *h*, and hold the leather straight to the arc of the knife; *f f* turn round *k*. Strips of leather of different widths may be drawn through this machine, and their edges rounded; to be used in various parts of harness, &c.

Claim.—The combination of the parallelogram and inverted dividers as a regulating gauge, to work in front of the edge of a curved knife; so that strips of leather of different widths may be rounded to feather edges, with the same perfection, without the change of knife, or any part of the machine; the whole being constructed substantially in the manner herein described.

No. 9,987.—Victor Beaumont, of New York, N. Y.—*Improvement in Printing Presses.*—Patented September 6th, 1853.

This press consists of a printing cylinder A A (see figure), on a part of the surface of which, from B to B′, are fixed the forms of type; the remainder B C B′ of the surface being used as a distributing table. Around this large cylinder are fixed twelve impression cylinders, numbered 1 2 3 4, &c., and between them are elastic inking-rollers. Under the printing cylinder is the ink fountain *p*, the rollers *q* and *r*, to



distribute ink on the distributing table, and the shaft *s*, by means of which the machine is made to revolve.

Claim.—The combination of two or more impression cylinders, with a type cylinder, so arranged as to print all over on one side a continuous sheet of paper, in the manner described.

Also the combination of the eccentric K, rod *a′ b′*, and the folder

K L, so arranged as to lay the continuous sheet in piles, after being printed on one side.

Also the combination of the indented knife with the roller R and S, so arranged as to cut the sheet into proper lengths, as printed.

No. 9,988.—William Compton, of New York, N. Y.—*Improvement in Pianofortes.*—Patented September 6th, 1863.

a, sounding-board; A, rest-plank; *c c*, *g g*, strings; *b*, T; I I, pin. Fig. 1 is a top view of the apparatus. Fig. 2 is a side view of the strings *c c*, &c. Fig. 3 is a side view of the strings *g g*, &c.

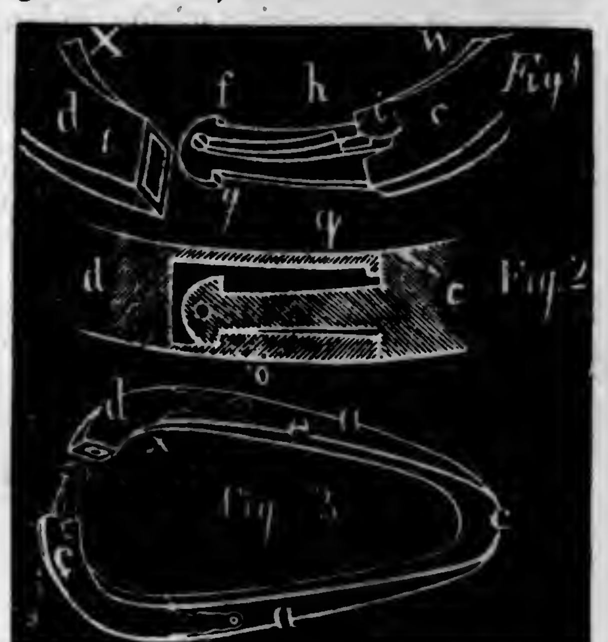
Claim.—The means for securing the strings into the angles of the T's, by the combined operation of the upbearing bridge or rest, to which the T's are connected; and crossing and drawing the strings together at said bridge or rest, for the purpose of relieving the sounding-board or rest-plank of vertical pressure.

No. 9,989.—Henry Hunt, of Brooklyn, N. Y.—*Improvement in the Mode of Preserving Fruit, &c.*—Patented September 6th, 1853.

The nature of this invention consists in excluding air from articles put up in canisters or other vessels, by providing the vessel with a small tube, and connecting the tube with the receiver of an air-pump; and, after exhausting the air, pressing or mashing the tube together, to make an air-tight joint until separated from the air-pump, and then soldering. A is the tube; and B, the canister.

Claim.—The above description embraces the inventor's claim.

No. 9,990.—Joseph R. Lindner, of New York, N. Y.—*Improvement in Horse-Collars.*—Patented September 6th, 1853.



This invention consists in forming the hame-plate so that it shall add security to the collar by its springs, and also combining with the spring hame-plate a lock with triple fastenings. Fig. 3 represents the flat piece of wrought-iron *e* in the shape of a collar; *a a* is the padded portion of the collar, secured to the hame-plate; *c d* are the lock-pieces. Fig. 1 represents them as open; and fig. 2, as closed.

Claim.—The union of the hame-plate and collar, in combination with the lock-plates. Also the triple fastening of the lock-plates, in combination with the outward and backward spring of the hame-plates.

No. 9,991.—John Moyle, of Martinsburg, Va.—*Improvement in Straw-Cutters.*—Patented September 6th, 1853.

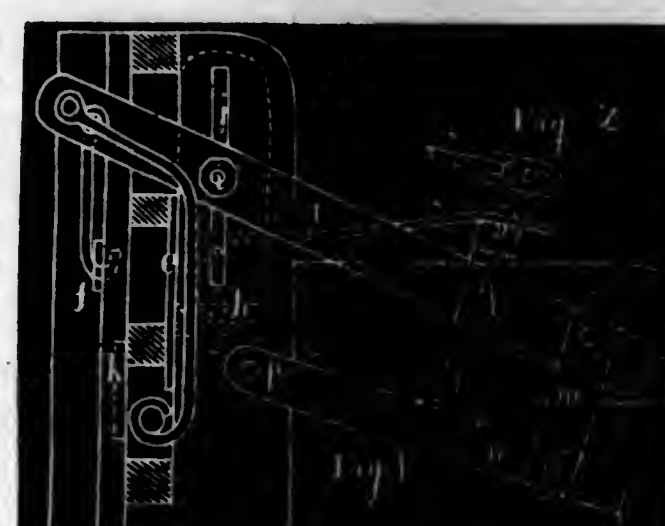
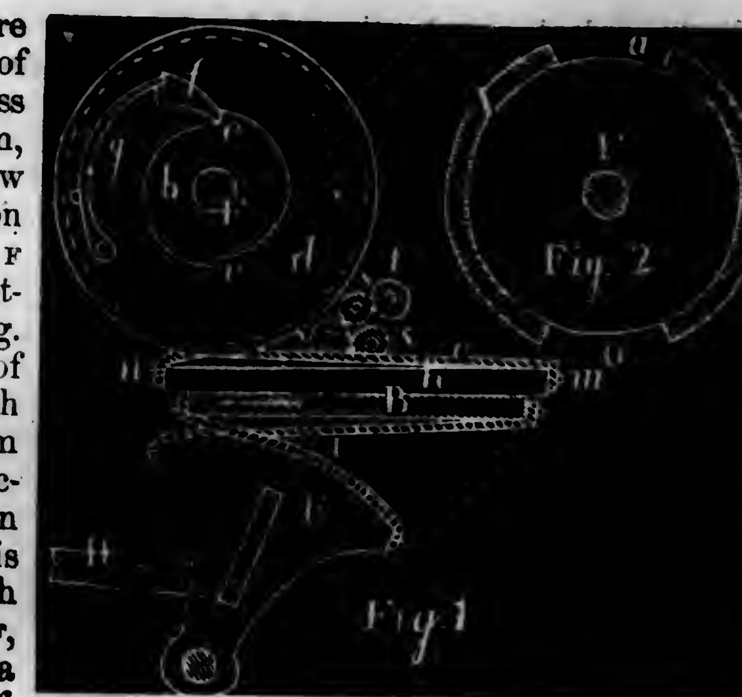


Fig. 1 is a section of the apparatus. Fig. 2, a top view of the spring *s*. From lever *f* the motion is transmitted to two levers J, and consequently to the holder *h*; the bar *i* moving in the slot *j* to accommodate this motion. *e*, knife; *k*, plate, limiting the protrusion of the straw; *m*, rods connecting the levers J and *n*; *p*, fulcrum of lever *n*. The connecting-rods *m* are drawn forward by the motion of *l*, and, striking the arms *r* of the rake *q*, pass forward the rake so as to move the straw.

Claim.—The combination of the rake *q* and holder *h*, for feeding the straw to be cut, and binding it to the box.

No. 9,992.—Charles Montague, of Pittsfield, Mass.—*Improvement in Printing Presses.*—Patented September 6th, 1853.

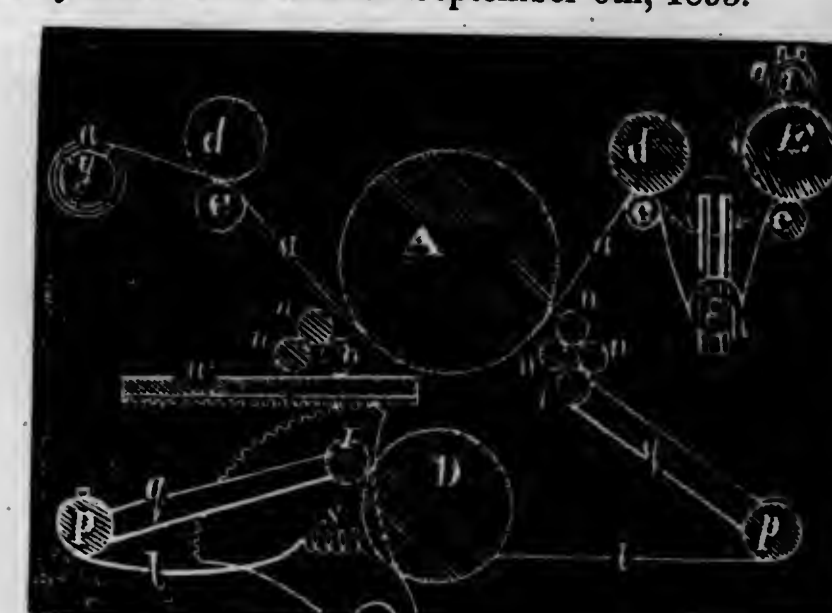
B, fig. 1, horizontal bed, to which a vibratory motion is imparted by the vibrating lever D, disk E, and cord J; *t*, reciprocating ink-distributing roller; *s s s*, ink-rollers. A, fig. 2, pressure-cylinder, divi-



ded into two or more sections respectively, of suitable width to press upon the entire form, and separated by narrow openings *a a*. Upon one end of the shaft F of cylinder A is attached a wheel (see fig. 1) *d*, the periphery of which is provided with notches *e e*, each of them opposite to the respective openings *a a*. On the side of this wheel *d* is placed a pulley, which plays freely on axis F, and carries with it a spring *g*, and a click *f*. Round said pulley passes a cord *c*, the ends of which are attached to the ends *m* and *n* of a projecting bar *h*, on bed B.

Claim.—Such a combination and arrangement of cylinder A and bed B, that whilst one sheet is receiving its impression, the sheet to receive the next impression will be carried forward upon the cylinder nearly to the bed, for the purpose of being in readiness to commence receiving its impression the moment after the bed starts upon its next forward movement.

No. 9,993.—Charles Montague, of Pittsfield, Mass.—*Improvement in Printing Presses.*—Patented September 6th, 1853.

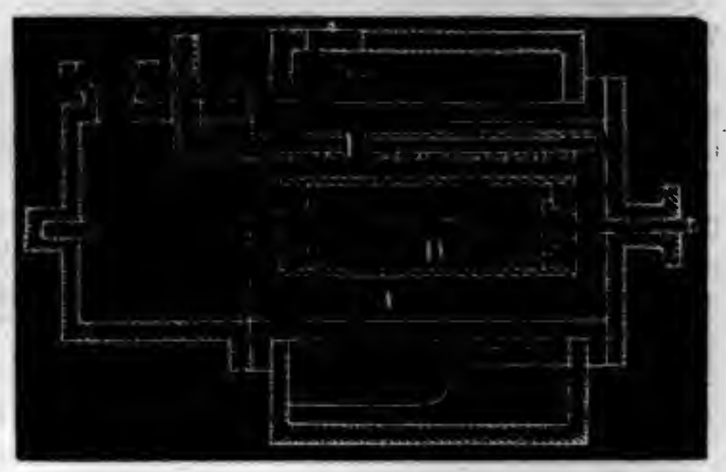


By reference to the figure, the claim will explain this improvement.

Claim.—The combination of the intermittingly winding cylinder E and feed-roller *h*, or their equivalents, with the reciprocating pressure

cylinder A, bed B, and rollers *d d* and *e e e*, arranged and operating in such a manner as to successively make an impression on the continuous sheet at each movement of the bed. Also, in combination with a double set of inking-rollers, the arrangement of the arms *q q* for inking both sets of rollers from a fountain placed vertically below the impression cylinder.

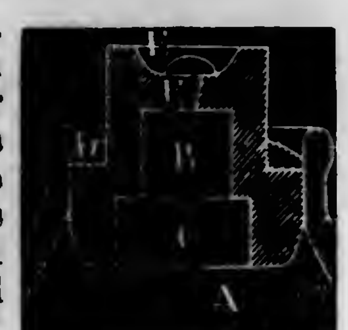
No. 9,994.—STEPHEN MEREDITH, of Erie, Pa.—*Improvement in Feed Apparatus to Gas-Generators.*—Patented September 6th, 1853.



The nature of this invention consists in the construction of a peculiar retort, by which a heated surface is constantly presented to the tar fluid. This is effected by placing within the retort C a revolving cylinder D, upon which the fluid drops from a perforated pipe E. (See figure.)

Claim.—The peculiar construction of the retort as described; viz., having the retort C of cylindrical shape, or of other suitable shape, and placing within it a revolving cylinder D, which, as it rotates, constantly presents a heated surface to the fluid, and converts it into gas, preventing the fluid from cooling the retort, and also preventing the formation of any incrustation on the same.

No. 9,995.—JAMES SPRATT, of Cincinnati, Ohio.—*Improvement in Bottle Fastenings.*—Patented September 6th, 1853.

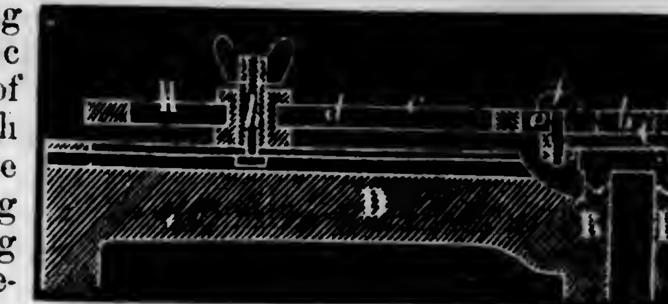


A is the bottle; B, ground stopple; D, cement. After expelling the air by placing the bottle in hot water or sand, a few drops of wax, gum, or the like, are melted into the orifice F, until it is filled, and slightly overflows the bottom of the cup E. The bottle is filled before the stopple B is placed in its mouth, and cemented; and the small aperture F, where the air and steam escape, is all that is necessary to seal by means of the melted gum.

Claim.—The application of the cup or cavity E, and aperture F, for sealing preserved edible substances.

No. 9,996.—WILLIAM W. SPAFFORD, of Boston, Mass.—*Improvement in Machinery for Planing Metals.*—Patented September 6th, 1853.

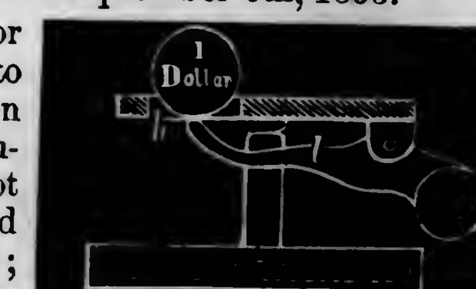
A is the main carriage or bed of a planing machine, sliding on frame B B; from which extends, at right angles, the brace D; through



the top of which is a long dove-tail slot *a*. C, metallic plate, fixed to the top of the planing table, on which rests the plate *b*. This plate *b* terminates in a radiating arm *c* H, which has a long slot *d*. The shorter slot *e* receives a pin *f*. The thumb-nut *n* serves to clamp the centre-pin *h* to any part of the brace; the screw-pin *f* is adjustable in its slot: thus the distance of the common centre of the two screw-pins from the plate *b* of the radial arm may be regulated at pleasure, so as to cause the centre, or any other point in such plate, when A is put in movement, to describe a circular arc of any required radius within certain limits. A piece of metal placed on the top surface of plate *b*, may be planed in curved lines.

Claim.—The combination of the receiving table, or plate *b*, and its arm *c* (composing the radial arm H), the adjustable centre-pins, or their equivalents, and the brace D, together with the main planing table A, and its supporting frame B; the same being made to operate substantially as specified, and for the purpose of adapting the planing machine to planing in curved lines.

No. 9,997.—GIDEON B. SMITH, of Baltimore, Md.—*Improvement in Counterfeit Coin Detectors.*—Patented September 6th, 1853.



This invention consists in a hole or slot *h* (see figure), just large enough to let the genuine coin pass through upon the end of lever *l*. If the coin is genuine, it will pass snugly through the slot *h*, and its weight will depress the end of the lever, and it will fall through; but if counterfeit, it will either be too large to pass through the slot, or be too light to depress the lever, which is so balanced as to require the exact weight of the genuine coin to depress it.

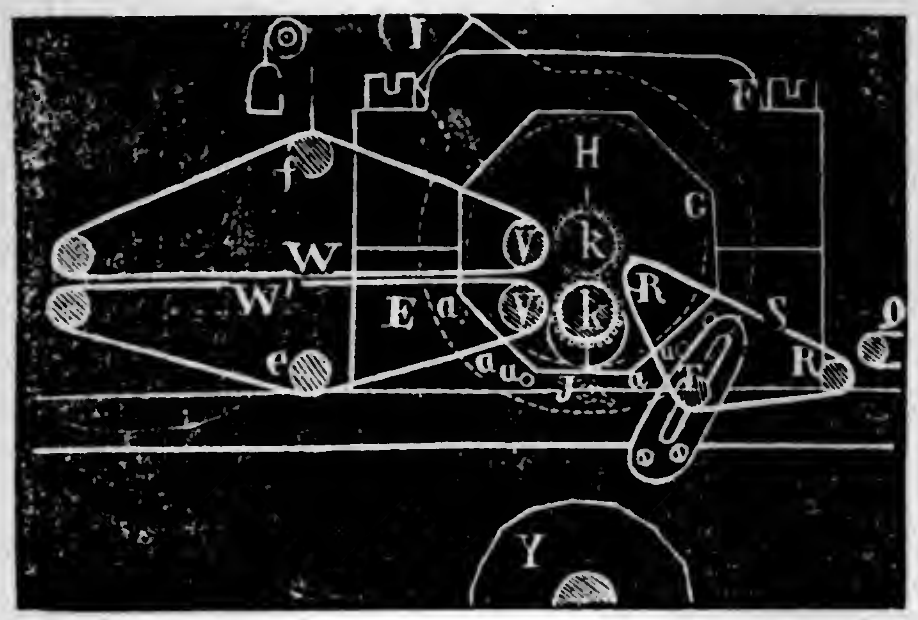
Claim.—The above description fully sets forth the inventor's claim.

No. 9,998.—HENRY L. WEEKS, of Hannahatchie, Ga.—*Improvement in Cotton-Gins.*—Patented September 6th, 1853.

The nature of this invention consists in arranging and securing the boxes in which the ginning rollers operate, in a revolving or adjustable frame or box; so as to adjust or fasten the box at such an angle as it may be necessary or desirable; so as to operate upon the cotton to the best advantage, whether it is dry or moist; so as to allow the seed, after the cotton is removed, to drop from the rollers, and thereby adapt the rollers to cotton with large or small seed, whether picked early or late. Also in the use of one or more fluted metal rollers, in conjunction with one or more covered with raw hide, leather, india-rubber, or gutta-percha. Also in the use of two feeding aprons, one moving

faster than the other, so as to spread the cotton, and allow the sand, &c., to pass out between them, through a space left for that purpose. Also, in arranging and operating two aprons, so as to take the cotton from the ginning rollers and condense it into thick sheets, and save the labor of one person.

H is the box, fitted so as to turn; E, the box containing the round hole, indicated by the dotted lines, to which the box H is fitted; I is a wrench made to turn the boxes to set the rollers at the desired angle; J is a pin to fasten the boxes; K K are the ginning rollers; T, roller to



keep the apron tight, when roller R is carried nearer or farther from roller R', by alterations in box H; S and Q are aprons; W W' are also aprons, surrounding the rollers V V'; *f* and *e* are tightening rollers.

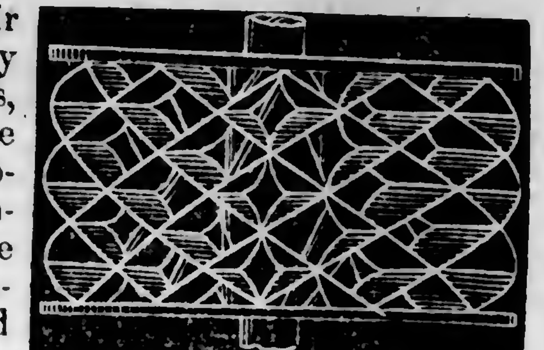
Claim.—Arranging and securing the boxes, in which the ginning rollers operate, in a revolving or adjustable frame or box, or its equivalent; so that the rollers can be adjusted or set at such an angle as may be requisite or desirable, so as to discharge the seed, or facilitate the falling from the rollers, after the cotton is drawn off by the roller. Also, giving to the feeding aprons different velocities, for the purpose of spreading, distributing, or drawing apart the balls of cotton; so that sand and dirt may fall out, and not be carried to the ginning rollers. Also, passing the cotton, after it is ginned, between double aprons, or equivalent devices, when the aprons move with less velocity than the ginning rollers, for the purpose of compressing and making more compact the cotton after it is ginned.

No. 9,999.—Thomas Warner, of Chicopee, Mass.—*Improvement in Twisted Gun-Barrels.*—Patented September 6th, 1853.

The object of this invention is to produce a gun barrel that will resist more effectually the explosive force of gunpowder. A bar of iron, of suitable quality and size, is first heated (equally and sufficiently), and then twisted in the manner of a strand of rope; the twisted bar is then upset (endwise), and the calibre, of any desired size, bored out.

Claim.—A new manufacture of gun-barrels, made out of a solid bar, with the fibres of the metal having a gradually increased twist, from the inside to the outside of the bar. Also, in the process, making twisted barrels, by twisting a bar of metal of the required size when in a heated state, and then boring out the calibre, in the manner and for the purpose specified.

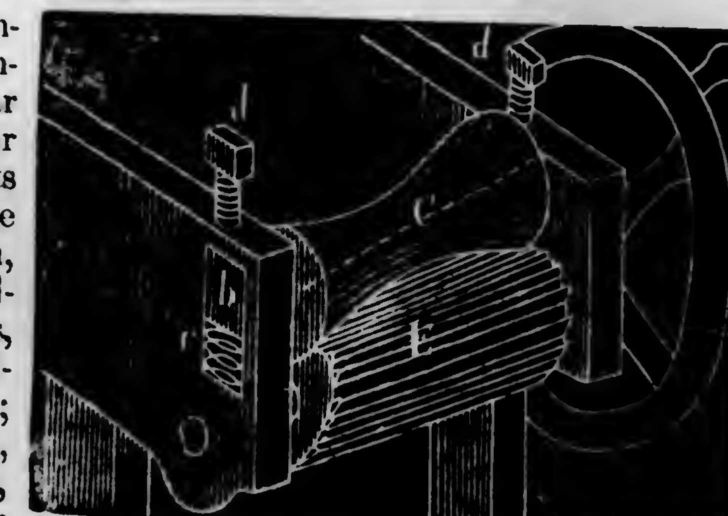
No. 10,000.—Benjamin Irving, of Green Point, N. Y.—*Improvement in Paddle-Wheels for Propelling Vessels.*—Patented September 6th, 1853.



The floats are arranged with their outer edges in lines running spirally round the wheel in opposite directions, at angles of about 75° to the axis; the crossing of these lines forms rhomb-shaped buckets, which have no openings except from and towards the centre of the wheel. The inner openings of the buckets are contracted endwise, for the purpose of giving the front angles such a form as to prevent back-lift in rising from the water; which makes the inner openings depart from the rhombic form, inasmuch as the side angles are cut off, and the figure is made six-sided. Close inside of the rings, a number of half-buckets are formed, of triangular shape.

Claim.—Arranging and combining the floats so as to form a series of buckets of rhombic or substantially similar form.

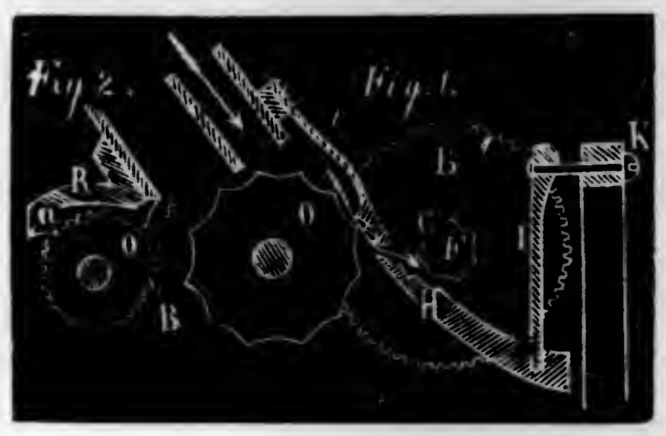
No. 10,001.—Thomas Allison, of Milton, N. Y.—*Improvement in Straw-Cutters.*—Patented Sept. 6th, 1853.



The nature of this invention consists in the employment of a peculiar shaped adjustable roller C (see fig.), which has its axis set at an angle to the axis of the feed-trough, in combination with a cylinder E, of straight knives, which are set longitudinally round its periphery; the roller being designed, by its shape and position, to facilitate the feeding of the straw, in such a manner as to cause the knives to operate upon the straw as effectually as though they were made spiral, and set obliquely round the cylinder. The object is to obviate the difficulty attending the sharpening of the spiral knives now in use, and save expense in constructing the same.

Claim.—The above description embraces the claim of the inventor.

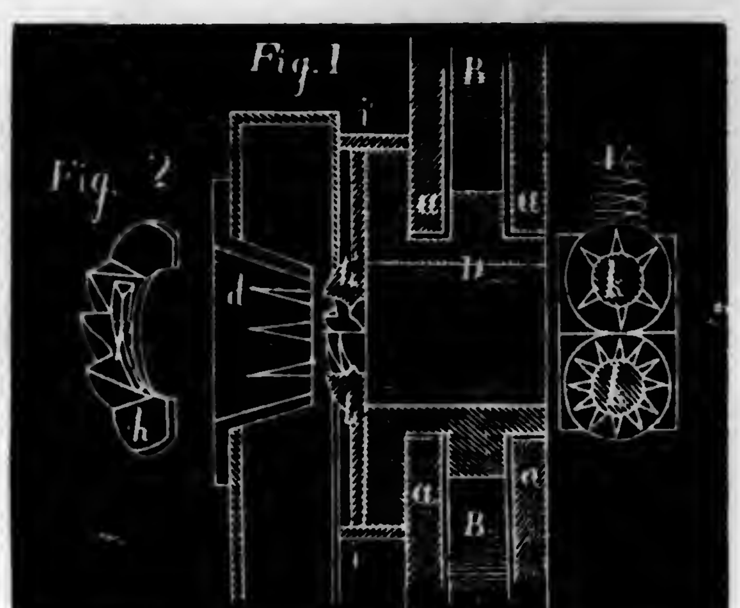
No. 10,002.—Levis H. Davis, of Kennett Square, Pa.—*Improvement in Corn-Shellers.*—Patented Sept. 6th, 1853.



This invention consists in placing below the common shelling-apparatus, another shelling-wheel G, upon the shaft F of the picker-wheel B, having in front a toothed arm H, attached by a spring I to the frame of the machine, so that when the cob is issued from the upper shelling arrangement, its extremity is caught in the lower sheller, which removes the kernels remaining upon it, and at the same time prevents the ear from falling suddenly and imperfectly stripped from the upper sheller. Also, in adding to the covering of the cog-wheel B, and pinion O (operating the machine), flanges *a*, on each side, to prevent the admission of grain to the gearing.

Claim.—The introduction of the wheels G and arms H, attached to the springs I, and regulated by the screws K, as described; for the purpose of stripping the ear of its kernels. Also, the flanges *a*, upon the gear-covering R, for protecting the gearing from the admission of shelled corn.

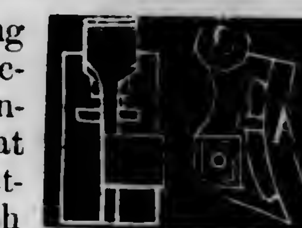
No. 10,003.—Porter Dickinson, of Amherst, Mass.—*Improvement in Corn-Shellers.*—Patented September 6th, 1853.



This improvement consists in the addition of a pair of toothed rollers to corn-shellers (similar to that patented by J. W. Gordon, Oct. 7th, 1846), which seize the cob after the corn is shelled from it, and drag it entirely through the machine (see fig.). B, gearing; D, hollow tube; *a*, bearings of tube D; *d*, guides; *h h'*, toothed shellers, pressed towards each other by springs *i i'*. *k k*, toothed rollers, the lower one revolving, and the upper one pressed down by springs E.

Claim.—The combination of the revolving spring shellers *h h'* with the toothed rollers *k k'* operating in the manner substantially as described.

No. 10,004.—Stephen Morse, of Springfield, Mass.—*Improvement in Iron Car-Brakes.*—Patented September 6th, 1853.

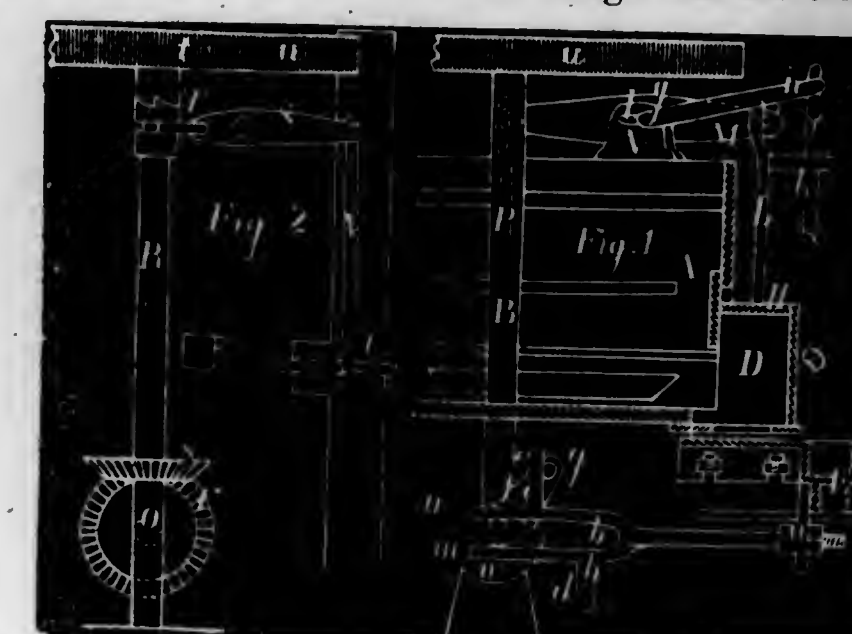


The nature of this invention consists in providing a brake, of cast metal, constructed so that the friction surface A (see fig.) will be worn off before impairing other portions, caused by the great heat generated when in operation. Also, in constructing it in one solid mass, thereby dispensing with bolts and pins. Also, in placing the point of suspension in such position that the brake, when relieved of pressure, will disengage with the wheel by its own gravity. C is the point of suspension.

Claim.—The spine, having the point of suspension C, and socket, with the open spaces and brace plates, in combination with the rubber or friction surface plate A.

No. 10,005.—Hiram Sands, of Cambridge, Mass., and Gary Cummings, of West Derby, Vt.—*Improvement in Brick Machines.*—Patented September 6th, 1853.

Figure 1 is a section of the apparatus; A, pug-mill; E, mould-carriage; D, mould-charger; H, piston within the mould-charger, which forces the clay out of the bottom of the charger into the brick-mould;



the rod L of the piston is jointed to the front end of lever M; N is the slotted bearing of lever M, which has a movable fulcrum *g*, which is attached to a connecting fork *h*, worked by a lever *i*, that turns on fulcrum *k*. Fig. 2 represents a front view of the apparatus. Lever M is worked by cams *m* and *n*, connected to rod *p*; *o*, horizontal shaft connected to vertical shaft R by bevel-wheels *r s*. The machine is used to temper the clay and press the brick.

Claim.—The modification of such arrangement, by substituting for the shaft with reversing gear, the shaft with continuous motion, operating the carriage, and producing the intervals of rest, by means of the crank-pin acting alternately upon studs *d* and *e*, connected with the

mould-carriage, whereby greater certainty and precision of action in the machine, with greater simplicity and durability, are obtained. Also, in combination with the piston and the lever M, the slot in the lever, the slotted bearings of the movable fulcrum-pin, the connecting fork and hand-lever; the same being for the purpose of increasing or diminishing the amount of pressure of the piston on the clay in the mould.

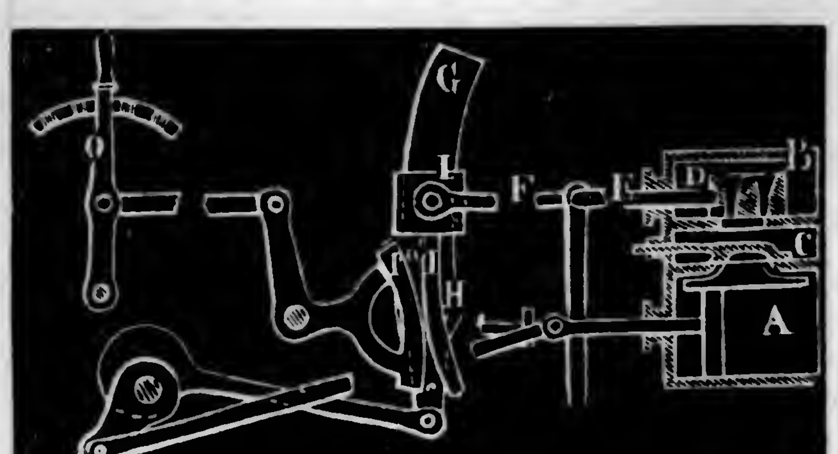
No. 10,006.—SAMUEL H. TURNER, of Brooklyn, N. Y.—*Improvement in Printers' Ink.*—Patented September 6th, 1853.

This improvement consists in the employment of "colophonic tar," in connection with other ingredients, in the manufacture of printing-ink. Also, in the employment of colophonic tar as a printing-ink varnish. What the inventor denominates colophonic tar, is the tarry residuum remaining in stills after the various stages of distillation, commonly employed in obtaining colophonic oil. The ingredients and the proportions are as follows: colophonic tar, 14 lbs.; fine lamp-black, 3 lbs.; fine pulverized indigo-blue, 8 ounces; fine pulverized Indian red, 4 ounces; yellow rosin soap, 1 lb. The ingredients are mixed by the aid of heat.

Claim.—The employment of colophonic tar, produced and combined substantially as set forth in specification, both in the manufacture of printing-ink, and also as a varnish to be used by printers, to modify the condition of their ink to suit the temperature of the weather and the kind of work to be executed.

No. 10,007.—MATTHIAS W. BALDWIN, of Philadelphia, Pa.—*Improvement in the Gear of Variable Cut-off Valves for Steam-Engines.*—Patented September 13th, 1853.

A, steam-cylinder; B, valve-chest; C, exhaust-valve; D, independent cut-off valve. The stem E connects by a rod F with a vibrating arm G, on rock-shaft H. F is jointed to a block I, that slides up and down



upon the arm. Block I has a stem I′, which is connected by straps *a a* and *c c* to a quadrant J; O, hand-lever.

The object to be attained by this invention is to obviate the rubbing

of the sliding-block upon the arm, while the arm is vibrating, and the rapid wearing out of that part of the arm on which the block is most used.

Claim.—The arrangement of the sliding pivot-block I, fitted with a stem I′, connected with a sector J, by straps, chains, or cogs, the hand-lever O, and the intermediate connecting mechanism.

No. 10,008.—JOHN CHILCOTT and ROBERT SNELL, of Brooklyn, N. Y.—*Improvement in India-Rubber Soles for Boots and Shoes.*—Patented September 13th, 1853.

The sole is made of three parts, viz., the india-rubber sole, a leather lining, and a leather border or edge. The india-rubber sole is made smaller than the sole it is intended to cover, and it has its edges bevelled off thin all round; the leather lining is of the full size of the bottom of the boot or shoe, and is united to the upper side of the india-rubber sole by water-proof adhesive material, leaving a margin of the lining all round the edge of the india-rubber part; the leather border or edge is of the same thickness as the india-rubber sole, and overlaps the bevelled part of it, and is also bevelled so that its outer face will be level with the outer face of the india-rubber. Thus is made the solid sole, of uniform thickness, which may be secured to a boot or shoe, by sewing, cementing, or pegging.

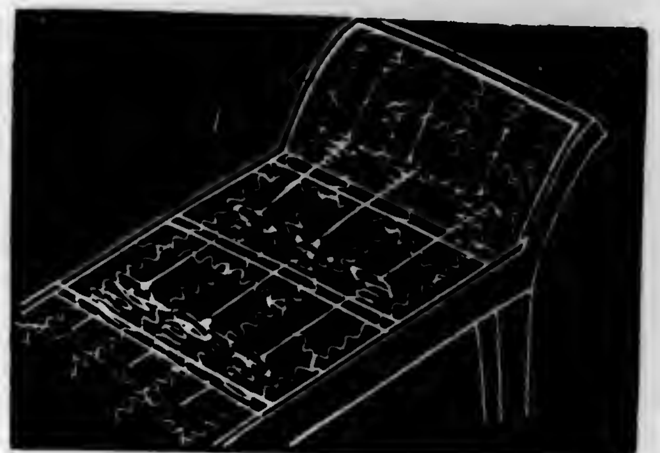
Claim.—Connecting the whole or any portion of the sole of a boot or shoe, substantially as described, of india-rubber, with its inside or edges covered and protected by leather, which is united with it by any water-proof cement, with or without stitching, and forms a hard, firm leather-edge.

No. 10,009.—JOHN CHILCOTT and ROBERT SNELL, of Brooklyn, N. Y.—*Improvement in Boots.*—Patented September 13th, 1853.

This improvement consists in cutting a boot out of a piece of leather, in such a form as not to require crimping (see fig.)

Claim.—The form of the piece of leather or other material, substantially as shown in the figure and described in the specification, by which the upper leather of a boot is made, so as to fit any leg, foot, and heel (not deformed), of one piece, without crimping or joining other pieces thereto; one half or side of the boot is formed of a part A, without joint, and the other half by the junction of a part B, folded from the back of the side A, and a part *c h*, which is partly cut from, or which, when flat, lies close or near to the front of A above the instep, and partly folded over from the instep; the part *c h* being of such form as to form one side of the foot, and extend round the heel to the other side A, and cover an opening made in the lower part of the back, to give the required form to the heel, and make part of the necessary stiffening.

No. 10,010.—Pierre Demeure and Auguste Mauritz, of New York, N. Y.—*Improvement in Bed-Bottoms.*—Patented September 13th, 1853.



(By reference to the figure, the claim will explain the nature of this invention.)

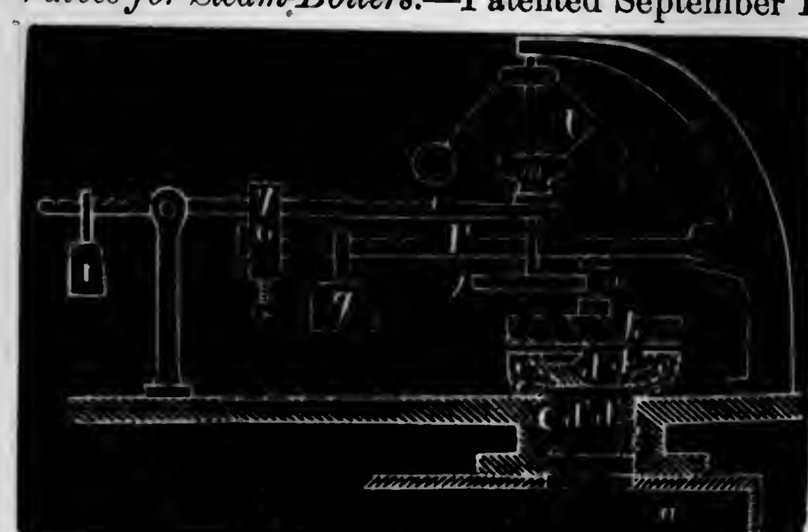
Claim.—The manner of constructing the spring-mattress, by combining the vertical springs with an elastic or spring net-work of spiral metallic springs, for supporting the vertical springs or for increasing the elasticity, so that a person lying on the bed will be equally supported on all sides.

No. 10,011.—William P. Greenleaf, of Washington, N. H.—*Improvement in Scythes.*—Patented September 13th, 1853.

a is the scythe-blade; *b*, the cutting edge, which is curved. The fastening is so accomplished as to leave the shank entirely free along its inner edge.

Claim.—Widening and curving the blade of the scythe at the shank, for the purpose of strengthening the same, and adapting it to cutting bushes as well as grass.

No. 10,012.—Zadok H. Mann, of Cincinnati, Ohio.—*Improvement in Safety-Valves for Steam-Boilers.*—Patented September 13th, 1853.

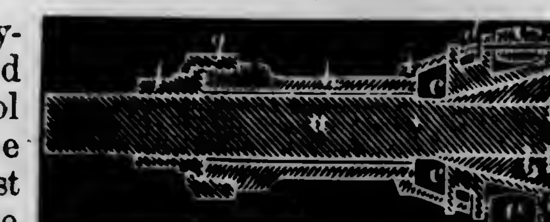


This invention has for its object, to insure the opening of the valve at the desired time, of the maximum of pressure; and, also, so as to increase the size of opening in proportion to the force of steam, and thus insure an adequate vent for the steam under all circumstances, and thereby remove all danger or possibility of explosion, with a suitable boiler. *a*, boiler; *e e*, channels for the steam to escape, formed

by the cup-like rims of the valve *d* and its seat c; *i* is a pinion, and *j* a spur-wheel, which transfer rotary motion to the governor *l*, whose sleeve *m* is connected to lever *n*. Lever *n* is connected with main lever p by a link *o*. Link *o* can be fastened to any one of the holes in lever *n*, by the pin *q*, in order to determine how much the play of the balls shall lift the valve; *r* balances the governor; *h* is the flutter-wheel.

Claim.—The construction and application to a safety-valve, of flutter-wheel, governor, and supplementary lever, or equivalent devices, in order to insure promptness of action and an increase of vent, according to the force of steam, with or without the adjustable link and counter-weight.

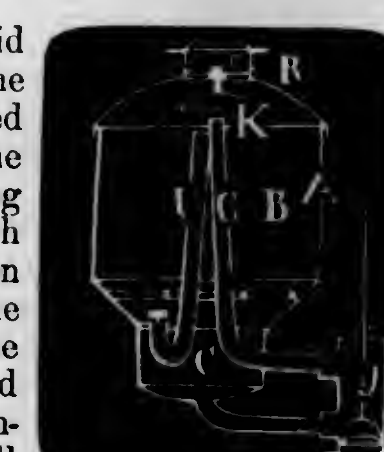
No. 10,013.—George Potts, of Cincinnati, Ohio.—*Lining Cast-iron Cylinders with Copper.*—Patented September 13th, 1853.



To perform this operation, a cylindrical sheet of copper is placed within the iron barrel, and the tool (see fig.) is advanced by suitable mechanism, until the rollers are just entered within the limits of the casing; the nut is screwed down so as to force the rollers apart as much as is requisite to commence the lining process, and the tool is then rotated and gradually advanced along the interior of the cylinder until it reaches the other end. *a* is the mandrel; *c c*, grooves of the conical head; *f*, nut; *g h i*, sleeve; *e*, cast-steel rollers.

Claim.—The revolving mandrel, furnished with one or more rollers, whose distance from the axis of the mandrel can be increased or diminished by means of a nut, sleeve, and conical head, or any equivalent device, for the purpose of lining with one metal the interior of a cylinder formed of another metal.

No. 10,014.—Andrew Robeson, Jr., of Newport, R. I.—*Improved Mode of Bowking or Bucking Cloth.*—Patented September 13th, 1853.



The goods to be bucked or bowked are laid in chamber b of the kier a, and around the pipes g and u, the chamber b being packed with the goods nearly up to the level of the top of the pipe u; the scouring or bowking liquor is placed in the chamber c, and such chamber is to be heated, or not, as occasion may require. The liquor is forced up by the force-pump *y*, through the pipe g, against the deflector k, by which it will be distributed upon the top surface of the cloth. The introduction of steam into the chamber b will aid the filtration of the bowking liquor through the cloth into the chamber c. In case more steam is introduced than is necessary to

cause the liquor to descend through the cloth, the safety-valve v will be forced open.

Claim.—The employment of a closed kier or vessel, above described, and extracting the bowking liquor from the lower part of it, and forcing it into the upper part of it, while steam is being injected only into the upper part of the vessel, and on the top of the goods; whereby, while the bowking liquor is being thrown on top of the mass of goods, the steam is constantly and simultaneously made to press upon and pass into and through the goods, and facilitate the action of the bowking liquor, and its passage through the cloth.

No. 10,015.—Hervy S. Ross, of Cincinnati, Ohio.—*Improvement in Fences.*—Patented September 13th, 1853.

The object of this invention is to so construct a fence, that it can be conveniently removed from one place to another.

Claim.—The zigzag and interlocked arrangement of panels, supported by a swivel-joint to posts at suitable intervals, and having the joint between the two middle panels furnished with inclined hook and eye, each of said middle panels being provided with boards sloping in opposite directions, so that by the action of a flood, each half of the intervening line of panels may separate midway, and swing in direction of the current; or devices substantially equivalent.

No. 10,016.—Samuel B. Sumner, of Grantville, Mass.—*Improvement in Boot-Jacks.*—Patented September 13th, 1853.

One foot being placed upon the body of the jack to keep it steady, the heel of the other foot is placed between the jaws, and the bar D being grasped by the hand, the shaft C is pressed down upon the toe of the boot, by which means it is easily withdrawn.

Claim.—The application to an instrument for taking off boots, of the side-bars, the shaft C, and the bar D, arranged and operating in the manner set forth.

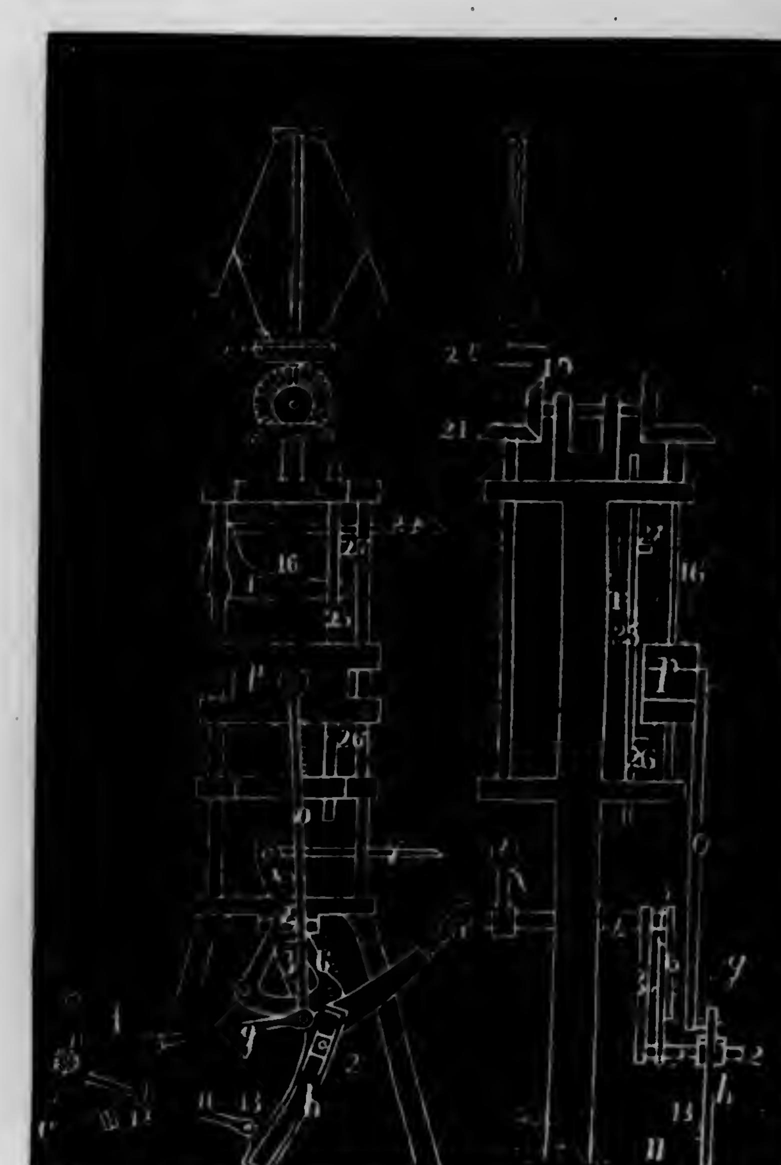
No. 10,017.—Josiah M. Smith, of New York, N. Y.—*Improvement in Cutter-Heads for Moulding-Machines.*—Patented September 13th, 1853.

This invention consists in an improvement in the construction of cutter-heads for cutting mouldings in wood, marble, and other like materials. The object of this invention is to put in order, and afterwards keep in order, the cutting edges of the series of chisels; which is accomplished by grinding the chisels while they rest in their

slots, against the sides $c' d'$. (See fig.) But during the cutting process (the motion being in the opposite direction), the chisels rest against the opposite sides $c\,d$ of the slots, and consequently present cutting edges d, as seen in fig. 2 in dotted lines.

Claim.—The combination of the supporting slotted flanges, or their equivalents, with the chisels, hinged and operated in the manner and for the purposes as set forth.

No. 10,018.—Richard H. Townsend, of New York, N. Y.—*Improvement in Valves for Steam-Engines.*—Patented September 13th, 1853.



This invention consists in the combination of the eccentric f and cam n, the eccentric working as usual to give the engine steam nearly the entire stroke; the cam is so shaped that when it is brought into operation, the valve is moved in such a way as to cut off at the smallest part of the stroke at which the engine is required to work. These motions are combined by means of a sector h, operated on by the governor. In case the valve does not supply the required steam, the throttle-valve is opened farther, by a peculiar apparatus.

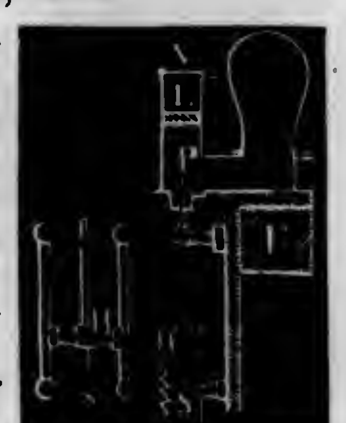
Claim.—The combination of a cam and eccentric, by means of the sector *h*, or its equivalent, to operate upon the valve, or parts that move the same, and cut off or work with the full pressure, by the eccentric, according to the position of said sector. Also, adjusting the position of the sector *h*, by means of the governor, through the screw or other suitable means, whereby the governor regulates the position of the sector, to communicate the desired motion to the valve of the engine, from the eccentric or cam, or both, according to the power required from the engine. Also, the rod 25, and points 26 and 27, to take motion from the block *p* at its extremes of motion, and communicate the same by means of the right-angle lever *r* to the throttle-valves.

No. 10,019.—Frederick W. Norton, of Lasswade, Great Britain.—*Improvements in the manufacture of Plain and Figured Fabrics.*—Patented September 13th, 1853.

(To fully explain the nature and operations of these improvements would require too much space for this Report.)

Claim.—The manufacture of woven fabrics by cross-weaving, by carrying the cross-warp alternately over a stationary warp, and binding the cross-warp on each side of the stationary warp by a shot of filling. Also, carrying contiguous movable cross-warps over and across each other's path, and over one or more stationary warps, and binding the cross-warps to the stationary warps by shots of filling. Also, the manufacture of ornamental fabrics by cross-weaving elongated printed warps.

No. 10,020.—James Rankin, of Detroit, Michigan.—*Improvement in hanging Mill-Saws.*—Patented September 13th, 1853.



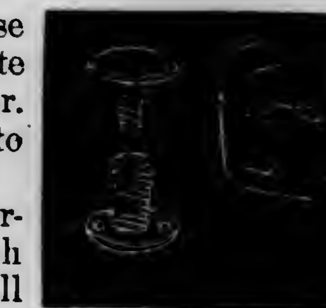
The nature of this invention consists in hanging mill and other saws, by providing them at one or both ends with a cylinder and piston, the piston being coupled to the end of the saw by its rod, and then applying atmospheric or other pressure with any elastic fluid, on the side of the piston nearest the saw.

F, frame; S, saw; H, clutch; L, piston; P, piston-rod; V, valve.

Claim.—The arrangement of an air-chamber cylinder and valve, in the manner substantially described, for the purpose of straining saws in motion by the elastic pressure of compressed air, or its equivalent.

No. 10,021.—John Chilcott and Robert Snell, of Brooklyn, N. Y.—*Improvement in Screw-Fastenings for Boots and Shoes.*—Patented September 13th, 1853.

The screw-fastenings consist of a double metal screw, or two male screws of different sizes, of which the larger is hollow, and contains



a female screw to receive the smaller; these screws are inserted through the sole from opposite sides, thus holding the parts securely together. The head of the inner or smaller screw is let into the leather forming the inner sole.

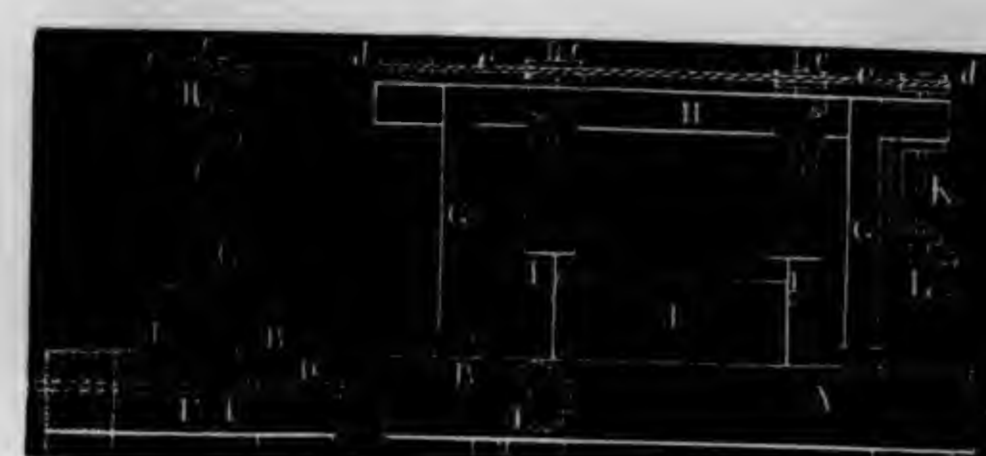
Claim.—The combination (as and for the purposes herein described) of the two screws, of which one forms a nut, and will hold it secure until all worn away.

No. 10,022.—Leonard A. Stockwell, of Batavia, N. Y.—*Improved Lard Lamp.*—Patented September 13th, 1853.

c c, cup which receives the lard; *e e*, tube for the heated air to pass down through; *f f*, holes for the heated air to communicate with the lard cup; *d d*, heated air-chamber. As the heated air passes from the chamber to the flame, the chamber is supplied through holes *h h* with cooler air.

Claim.—The combination of the reservoir of a lamp for burning lard or tallow, with an outer covering, so arranged as to form an air-chamber surrounding the reservoir, in the manner and for the purposes mentioned.

No. 10,023.—Thomas J. Alexander, of Westerville, Ohio.—*Improved Machine for sawing Sticks for Broom-Handles.*—Patented September 20th, 1853.

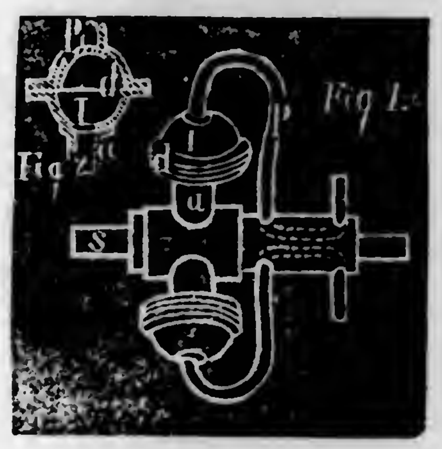


D, bed-piece; B, horizontal saw; E E, two vertical saws; G, frame, sliding on main frame A; H, top cross-piece, swinging on the upright frame G; I I, screw-rods; and *c c*, circular nuts; J, log held by I I; K, shaft; L, crank; *d*, pulley; and *e*, cord.

Claim.—The method (described in specification) of handling and adjusting the log to its place, and to its various positions for the several cuts, by means of the radius rods or clamping screws, coupled and

operated as specified, and suspended by a swinging frame; so that by bearing laterally on the screw lever or handle whilst turning it, the clamping screws are swung laterally, and raised or lowered simultaneously, to approach the log on the table and convey it with facility to the gauge, and to adjust the log expeditiously when under operation to its various sets laterally and vertically.

No. 10,024.—James Black, of Philadelphia, Pa.—"*Planetary Hydraulic Steam-Engine.*"—Patented September 20th, 1853.

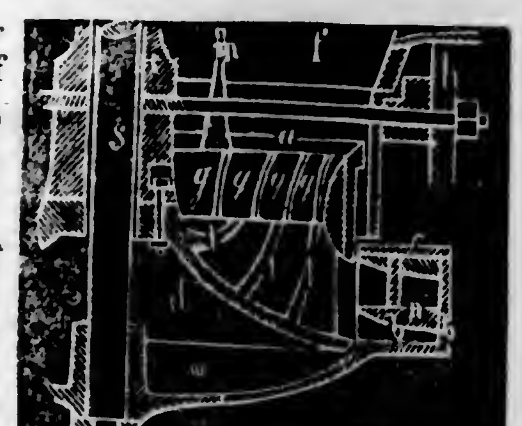


This invention consists in a revolving-shaft *s* provided with four hollow arms *a*, opening into four vessels *i* upon their ends, which vessels are furnished with flexible diaphragms *d* of vulcanized india-rubber; so that the vessels may be alternately filled with water and steam upon the opposite sides of the diaphragms *d*, without letting the steam come in contact with the water so as to condense it. *p* are supply steam-pipes.

Fig. 1 is a side view of the apparatus, and fig. 2 a section through one of the vessels.

Claim.—The arrangement of the vessels, pipes, and diaphragms, or their equivalents, upon a shaft, so as to revolve with or upon the shaft.

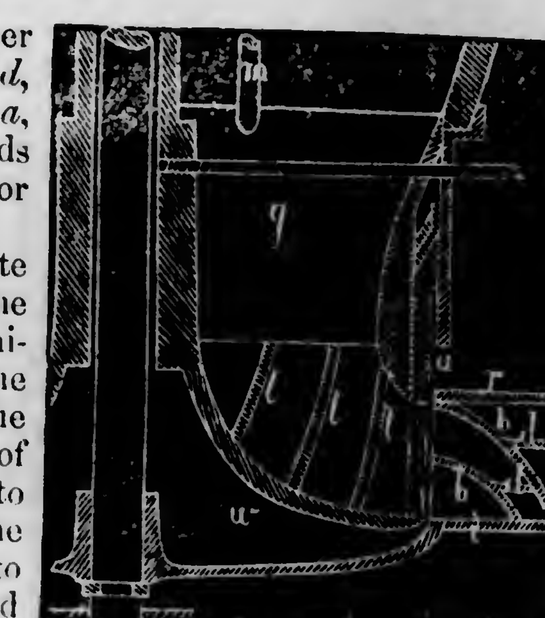
No. 10,025.—Uriah A. Boyden, of Boston, Mass.—*Improvement in Turbines.*—Patented September 20th, 1853.



d, disk; *l l l*, leading curves or guides; *a*, annular gate; *g g*, lining of gate *a*; *t*, tube; *w*, water-wheel; *r*, rim; *b b*, buckets; *n*, diaphragm; *s*, shaft; *m*, rod to raise gate *a*; *h*, frame; *f*, flume.

Claim.—The leaning or inclining of the leading curves or guides to the plane of the wheel. Also, the making of the inside of the garniture, or the part of the gate next to the disk, or both, of such a curve or form that the water at the upper part of the stream or streams where it leaves the garniture or gate will have a downward motion, inclining to the plane of the water-wheel, and making the upper sides of the passages for the water through the wheel, descending or inclining to the plane of the wheel, from the commencement of the passages next to the gate to about half way from the inner to the outer edge of the upper rim of the wheel, where they are nearly or quite horizontal, or nearly or quite parallel with the plane of the wheel; the inclination of that part of the lower surface of the upper rim of the wheel which is next to the gate, being the same or nearly the same as that of the lower surface of the gate next the upper rim, and the change from inclining to horizontal being gradual, as by a curve, or making the upper surface of the disk next the lower rim of the wheel to incline up towards this rim, and making the lower sides of the parts of the passages through the wheel which are next the disk ascending or inclining to the plane of the wheel, so that the stream will gradually diminish in height at the entrance or entrances into the wheel, so that the water which passes in the upper parts of the stream or streams will converge towards that which passes in the lower parts of the streams before striking the floats; and continuing this converging into the wheel to about one half the distance from the inner to the outer edges of the rims of the wheels. Also, the forming of the lower part of the tube which sustains the disk, and the forming of the top of the disk on that part of it next the tube, and fastening these parts together.

No. 10,026.—Uriah A. Boyden, of Boston, Mass.—*Improvement in Turbines.*—Patented September 20th, 1853.

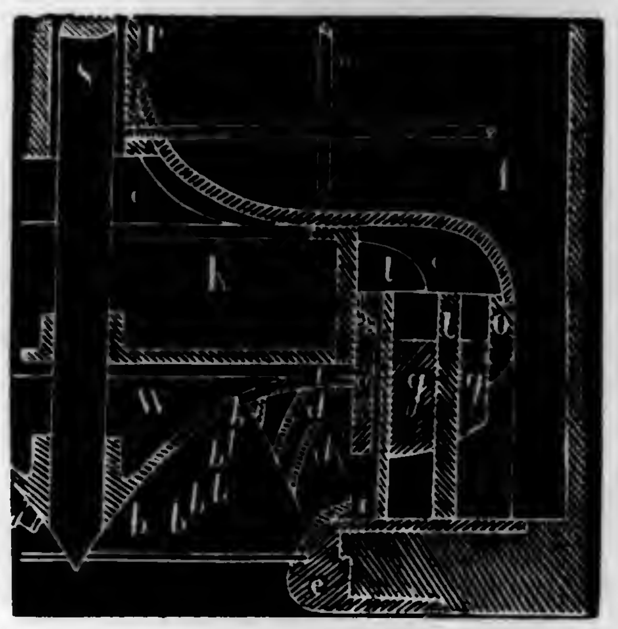


w, water-wheel, and *i*, its lower rim; *r*, upper rim; *b b*, buckets; *d d*, diaphragms; *l l*, leading curves; *a*, annular gate; *m*, one of three rods for moving the gate; *g*, garniture or lining.

Claim.—The arrangement of a gate at the entrance of the water into the wheel, with a part or all of the garniture or lining, and other parts of the turbine within, over, and about the gate, such that the gate and a part of the garniture, if any be attached to the gate, may move freely, while the part of the garniture not attached to the gate, and other parts over and about it, remain stationary; and so closely fitted that little or none of the water in the flume can run to the upper part of the gate, except by passing under the stationary garniture, and afterwards upward so as to diminish the liability of sediment being carried by the water to the upper part of the gate or movable part of the garniture, if any be attached to the gate, so as to obstruct the motion of the gate or movable part of the garniture. Also, the leaning or inclining of the floats of buckets of turbines to the rims of the wheels, so that the leaning of the floats will diminish the spreading or deflecting of the streams into the parts of the wheel opposite the gate. Also, the arrangement of the diaphragms or partitions in reacting wheels, and in the wheels of turbines, at different distances from the rims of the wheels in the several spaces between the floats, to facilitate regulating the motions of the wheels. Also, the combination of the device of making the gate at the entrance of the water into the wheel to move separately from the garniture, with leaning the guides or leading curves which direct the water into the wheel; so that when

the gate is partially open, the part of the water which passes by or near the surface of the gate in flowing towards this passage into the wheel made by such partial opening of the gate, has its motion directed the way the wheel turns, in consequence of the leaning of the guides.

No. 10,027.—URIAH A. BOYDEN, of Boston, Mass.—*Improvement in Hydraulic Motors.*—Patented September 20th, 1853.



Shaft *s* of this turbine is suspended. The same letters refer to the same parts in this figure as in the preceding figures.

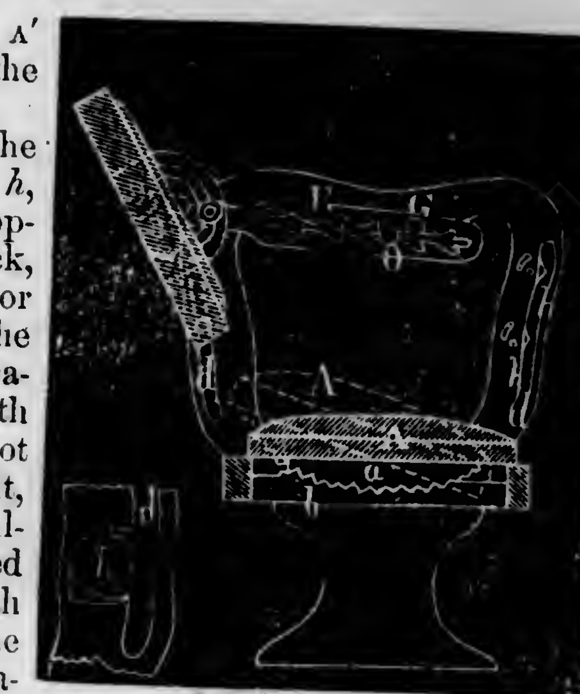
Claim.—The arrangement of the gates around and next outside of the peripheries of the water-wheels between the wheels and the guides, which causes the water to move obliquely towards the wheels in the way the wheels turn when the water first strikes the floats or buckets. Also, the device to cause the height of the wheel, or the position of the parts which partially confine the water which presses the wheel upward to vary as the height of the water or fall varies, so that the width of the aperture which lets the water escape from the place where it presses the wheel upward varies proportionably to the quantities of water pressed into it; so that the force with which the water presses the wheel upwards will be nearly or quite constant, though the height of the fall varies greatly. Also, the combination of a gate around and near the periphery of a water-wheel between the wheel and the guides, or other things which direct the water the way in which the wheels turn into the wheels, with the parts of the floats near the gate covered, so that the water will strike their concave sides. Also, the shape of the spaces between the rims of water-wheels which the floats are fastened to, in which they flare towards the axes of the wheels.

No. 10,028.—ALFRED F. CHATMAN, of New York, N. Y.—*Improvement in Razor-Strops.*—Patented September 20th, 1853.

This improvement is designed to renovate and elevate the centre of the strop *e* as often as it is pulled out, by its coming in contact with a piece of soft metal 7 (fig. 1); and also to hold the razor evenly or accurately by means of a concave end-piece *f*, and a convex piece 6. The machine is fastened to the edge of a table when in use by means of the screw *s*. Fig. 2 is a front view of the end-piece *f*.

Claim.—The metallic renovator, in combination with the spring-barrel, or its equivalent, to operate on the strop *e*. Also, the convex end *f*, and rest 6, to elevate the centre of the strop, as described and shown.

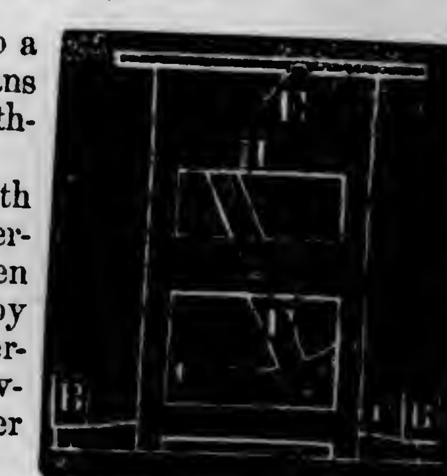
No. 10,029.—ISAAC FAY, of Cambridgeport, Mass.—*Improvement in Railroad Car-Seats.*—Patented September 20th, 1853.



G is a pin; O, sliding-bolt; A′ is one of the positions to which the seat may be changed.

Claim.—The combination of the groove *d*, and one or more dogs *h*, as applied thereto, and made to operate for the support of the back, and to enable it to be elevated, or its supporting-pin raised out of the groove *d*, as described in specification. Also, in combination with the inclined notches, and long slot of each bar E or F, the sliding-bolt, or slide O, as applied thereto. Also, the convex and concave toothed racks *a* and *b*, in combination with the seat and the chair-frame; the same being for the purpose of enabling the seat to be set with such inclination, either forward or backward, as may be conducive to the ease and comfort of the person sitting thereon, whether the person be in an upright or recumbent position.

No. 10,030.—DAVID FREED, of Huntingdon, Pa.—*Improvement in Toilet Furniture.*—Patented September 20th, 1853.



This invention consists in attaching to a piece of furniture an apparatus, by means of which pantaloons may be drawn off without stooping or sitting down.

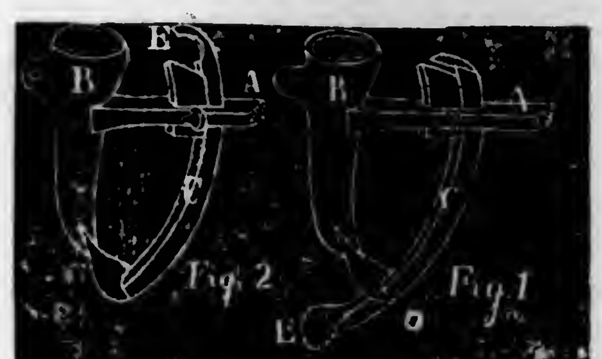
Claim.—The attaching or combining with a wash-stand, or other toilet or chamber-furniture, the brackets B and bolt C, when the bolt is thrown against the brackets by means of a crank or knob E, at or underneath the top of the stand through the levers H F, or their equivalents, in the manner and for the purpose herein set forth.

No. 10,031.—Samuel Hulbert, of Ogdensburgh, N. Y.—*Improvement in Ploughs.*—Patented Sept. 20th, 1853.

This plough is constructed with a convex mould-board from front to rear, and from top to bottom, uniformly; so that a concave arc of a circle, when applied to the mould-board horizontally, will fit in every part, and a concave arc, when applied vertically to the line at the base, shall also adapt itself to every part of the mould-board, which is so curved as to turn the furrow-slice.

Claim.—Constructing a mould-board of a plough, so that a horizontal line drawn at any height across its working side, shall describe the convex arc of a given circle, and any line drawn across its working side at right angles to its base, shall also describe the convex arc of a circle, substantially as set forth.

No. 10,032.—Samuel Jenkins, of Portsmouth, Pa.—*Improvement in Seed-Planters.*—Patented Sept. 20th, 1853.

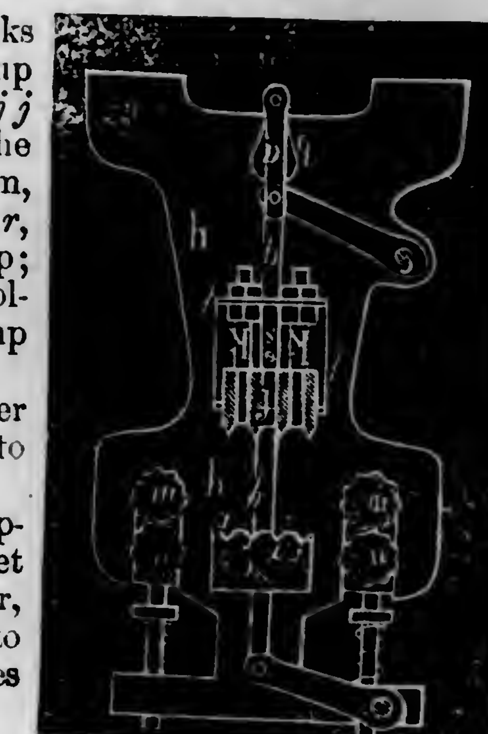


c is a steel cutter, which is adjustable, for the purpose of regulating the depth of tooth or tube B; E, runner; A, drag-bar attached to the front part of the frame.

Fig. 1, position of cutter when necessary to regulate the depth in soft soil, and pass over any obstructions. Fig. 2, position of the cutter when necessary to pass over any obstructions in hard soil.

Claim.—The peculiar shape and construction of the adjustable cutter, its passing through the drag-bar, and fitting in a dovetail in the point of the shovel; all in combination as herein described, for the purpose of allowing the tooth to pass easily over any obstructions, and especially to regulate the depth of furrow.

No. 10,033.—Oliver S. Leavitt, of Marcellus, N. Y.—*Improved Hemp-Breaker.*—Patented Sept. 20th, 1853.



q, frame; *a*, driving-shaft, with cranks *b*, which carry the upright pieces *g g* up and down; to these pieces the spring *j j* is bolted (*s*, bolt); and to this spring the beater is attached by bolts *k*; *e*, beam, made fast on frame *q*, in the grooves *r r*, into which the beater *f* presses the hemp; *c*, rock-shaft; *n' m'* and *n m*, fluted-rollers for the purpose of passing the hemp under the piece *c*.

The beater is composed of a number of blades, made to strike rapidly into the grooves of the fluted beam.

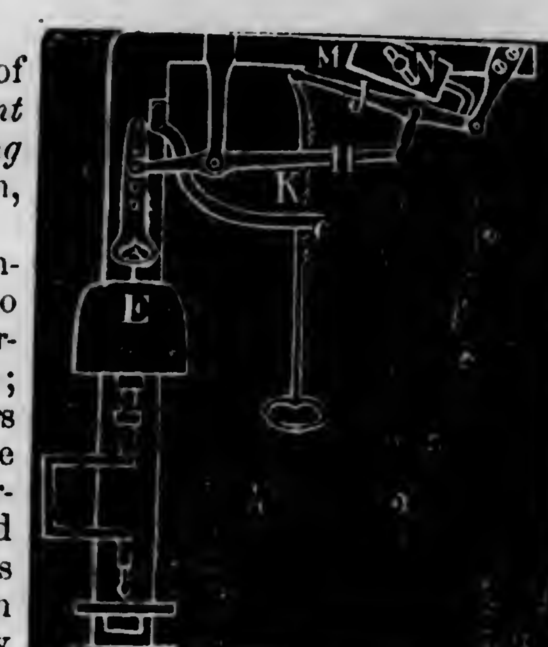
Claim.—The combination of a reciprocating beater with parallel blades, set at decreasing distances from each other, with a fixed bar, fluted or serrated, to correspond with the blades and spaces of the beater.

No. 10,034.—Oliver S. Leavitt, of Marcellus, N. Y.—*Improvement in Drawing-Frames for Hemp and Flax.*—Patented Sept. 20th, 1853.

The object of this invention is to introduce the material in an advantageous manner to the machine.

Claim.—The peculiar form of the gill-bar, in combination with the rocking-lever *m*, the dog *i*, and the cam or tappet *j*, for the purpose of withdrawing the gill-pins from the material, and directing the bar's backward movement. Also, the device by which the rods are pressed down, for the purpose of making the gill pins penetrate effectually the material to be drawn, being operated by the lever, in the manner specified.

No. 10,035.—Warren Lyon, of New York, N. Y.—*Improvement in Drilling and Counter-sinking Machines.*—Patented Sept. 20th, 1853.

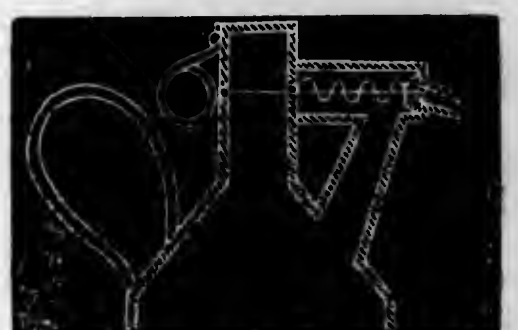


The nature of this invention consists in having a weight attached to the arbor of the drill, for the purpose of giving the requisite pressure; and in having a system of levers and a counterpoise connected to the upper part of the arbor, for the purpose of elevating the arbor and graduating the pressure which is given the drill by the weight upon the arbor. When it is necessary

to withdraw the drill from the hole, the rack-bar K is drawn downward, and the rack is made to catch into the side of the recess *c*, thereby keeping the drill suspended. The pressure of E can be changed by adjusting counterpoise N, on rod M.

Claim.—The combination of the weight E, levers H J, and counterpoise N, constructed, arranged, and operating in the manner and for the purposes substantially as herein described and shown.

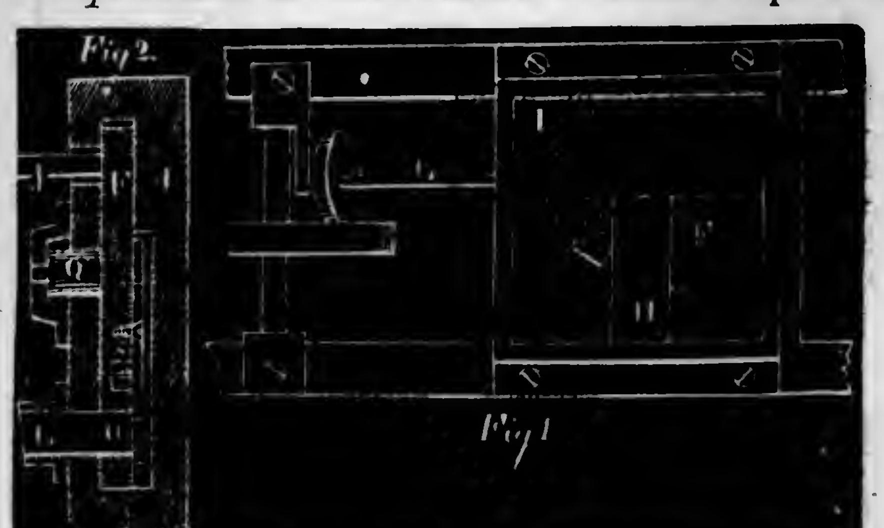
No. 10,036.—JAMES R. NICHOLS, of Haverhill, Mass.—*Improvement in Lamp-Feeders.*—Patented Sept. 20th, 1853.



By reference to the annexed figure the claim will explain this improvement.

Claim.—The application to the ordinary decanting vessel of a spring valve or valves, easily and conveniently opened by the thumb or finger while replenishing lamps, or decanting therefrom, whether said spring and valves be made and arranged in the manner as shown, or other mode substantially the same, by which similar results shall be produced.

No. 10,037.—HENRY PERRIN and WILLIAM RUDDUCK, of Wilmington, Ohio.—*Improvement in Seed-Planters.*—Patented Sept. 20th, 1853.



The object of this invention is to effect, in a simple and certain manner, uniformity in planting, and to prevent the clogging of the seed from obstructing the discharge, and otherwise improve the distributing mechanism of seed-planters.

Fig. 1 is a top view, and fig. 2 a section through the centre of F, on a larger scale. F is an oscillating disk-valve, turning on a centre pivot Q; F is perforated with an aperture *a* to receive seeds or kernels, one at a time; G, receiving-tube; F is vibrated by means of a pin J sliding in an endless groove, which runs obliquely round a cylinder on the end of axis L.

Claim.—The method of supplying the distributing-tube with grain

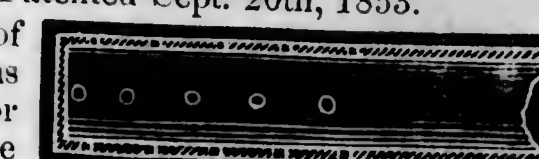
or seed from the hopper, by means of the reciprocating or vibratory valve F in the hopper, in combination with the cap H, and the discharging plate S, and receiving chamber G.

No. 10,038.—PHILO SYLLA and AUGUSTUS ADAMS, of Elgin, Ill.—*Improvements in Grain and Grass Harvesters.*—Patented Sept. 20th, 1853.

This machine is constructed with suitable and convenient platforms, to enable the binders, as well as raker, to remain upon the machine during its progress, when in use, and bind the cut grain thereon; there is also attached to the machine a box to receive the sheaves, which box may, by means of the mechanism, be easily upset, and thus the machine carries the grain together to be shocked.

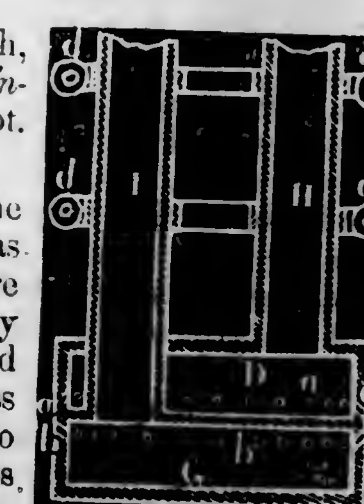
Claim.—The weighted levers, or their equivalents, which carry the sickle-bar and sickle, and allow them to vibrate perpendicularly, and accommodate the sickle to uneven ground in cutting grass, which levers may be made permanent when cutting grain. Also the link or hinged brace, in combination with the weighted levers, which brace prevents the sickle-bar from being traversed longitudinally by the action of the sickle, but allows it to vibrate perpendicularly, and accommodate itself to uneven ground. Also, the stands of the binders, constructed so as to allow them to stand so much lower than the horizontal platform, that they can bind the gavels into sheaves with greater facility, far less labor, and much faster than by any of the modes heretofore practised.

No. 10,039.—ANCIL STICKNEY, of Norwich, Vt.—*Blow-Pipes for Enlarging Blasting Cavities.*—Patented Sept. 20th, 1853.



Claim.—An improved process of enlarging the drill-hole by means of an air-blast and charcoal, or other combustible fuel placed in the hole; the same consisting in the employment of a blast-tube made with lateral perforations, and a closed or nearly closed bottom.

No. 10,040.—ANCIL STICKNEY, of Norwich, Vt.—*Improvement in Blow-Pipes for Enlarging Blasting Cavities.*—Patented Sept. 20th, 1853.

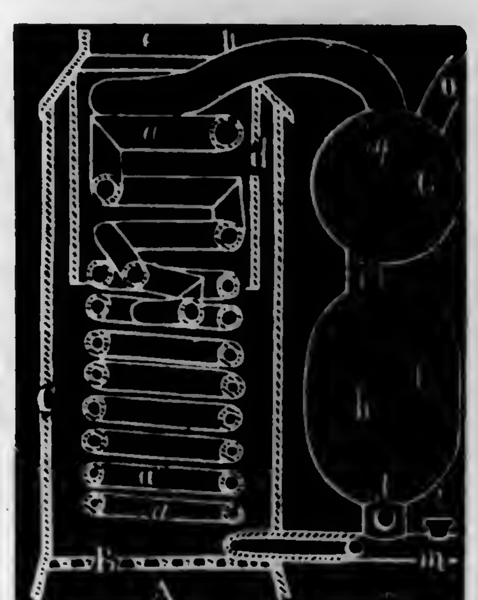


The object of this invention is to enlarge the lower portion of the drill-hole, in rocks, so as to afford sufficient space to contain the charge of blasting powder. The rock is decomposed by means of an extreme degree of heat, produced by the employment of a cylindrical box of less diameter than the drill-hole, partitioned into two chambers, D and G (see fig.); hydrogen gas is forced down one of the pipes H I and oxygen down the other, into chambers D and G, and out of the orifices *a* and *b*.

When inflamed, the gases will burn with intense heat, and decompose part of the rock. *d d* are guide friction-rollers.

Claim.—The instrument for enlarging the drill-hole, by the employment of gases, viz.: the two chambers, the perforations or orifices *a a*, *b b*, &c., and supply-tubes H I, as arranged, for commingling the gases and disseminating flame therefrom, entirely around and against the sides of the drill-hole, whereby the drill-hole is speedily enlarged for a suitable charge chamber.

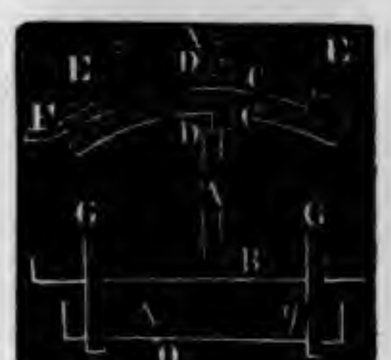
No. 10,041.—Abel Shawk, of Cincinnati, Ohio.—*Improvement in Steam-Generators.*—Patented Sept. 20th, 1853.



The nature of this invention consists in a tubular generator *a′ a″ a‴*, which extends gradually from *a′* up to *a‴*, and has a forced circulation, and which, while it lines the fire-box, and is expanded in its diameter from above the fire-box to its termination, is connected to a steam chamber, or receiver outside of or exterior to it. c is the outside jacket; *d*, inside jacket; *e*, chimney; *f*, air vessel; G, steam chamber; *g*, end of the generator; *h*, blow-off pipe; *i*, cock in blow-off pipe; J, cock in supply pipe; *l*, safety valve; *m*, supply pipe; *o*, steam pipe from steam receiver.

Claim.—A tubular generator which has a forced circulation, and is arranged and operates as above described and shown.

No. 10,042.—Oscar Willis, of McDowell County, N. C.—*Improvement in Saws for Inserting Iron Buckets in Water-Wheels.*—Patented Sept. 20th, 1853.

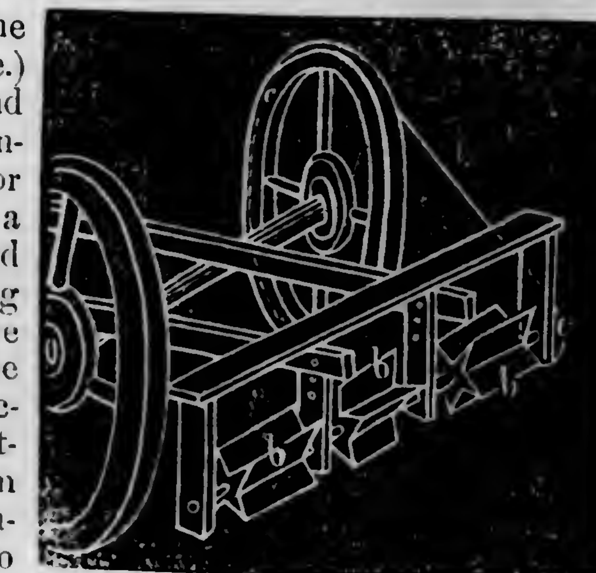


This saw is designed for cutting the grooves, for inserting iron buckets in wooden water-wheels.

C C are circling pieces of iron, with the two-edged saw fastened between them, by the screws E E. The distance of the saw from the centre of motion is regulated by the two nuts D D. F is the handle to work the saw.

Claim.—An adjustable apparatus for sawing out the grooves or fillets in water-wheels, for the reception of the buckets, composed of a two-edged saw, sprung between clamps, and connected by a screw-rod A to a sliding-bar B, when the sliding-bar is made adjustable upon a radius arm O, hung to the centre of the wheel. The whole being combined and operating as set forth.

No. 10,043.—George Gorman, of Lamar, Miss.—*Improvement in Cotton-Stalk Cutters.*—Patented Sept. 20th, 1853.



(By reference to the figure the claim will explain this machine.)

Claim.—The construction and arrangement of the machine, consisting of rotary whippers or reels *b b*, on a bar supported in a frame admitting of elevation and depression; the whippers being driven by band-wheels *c*, on one or both supporting wheels of the machine, for the purpose of effectually reducing the stalks of cotton, and thus rendering them useful as a manure, and in a condition to offer no obstructions to the plough in the after cultivation of the land.

No. 10,044.—Halvor Halvorson, of Hartford, Conn.—*Improvement in Looms for Weaving Hair-Cloth.*—Patented Sept. 27th, 1853.

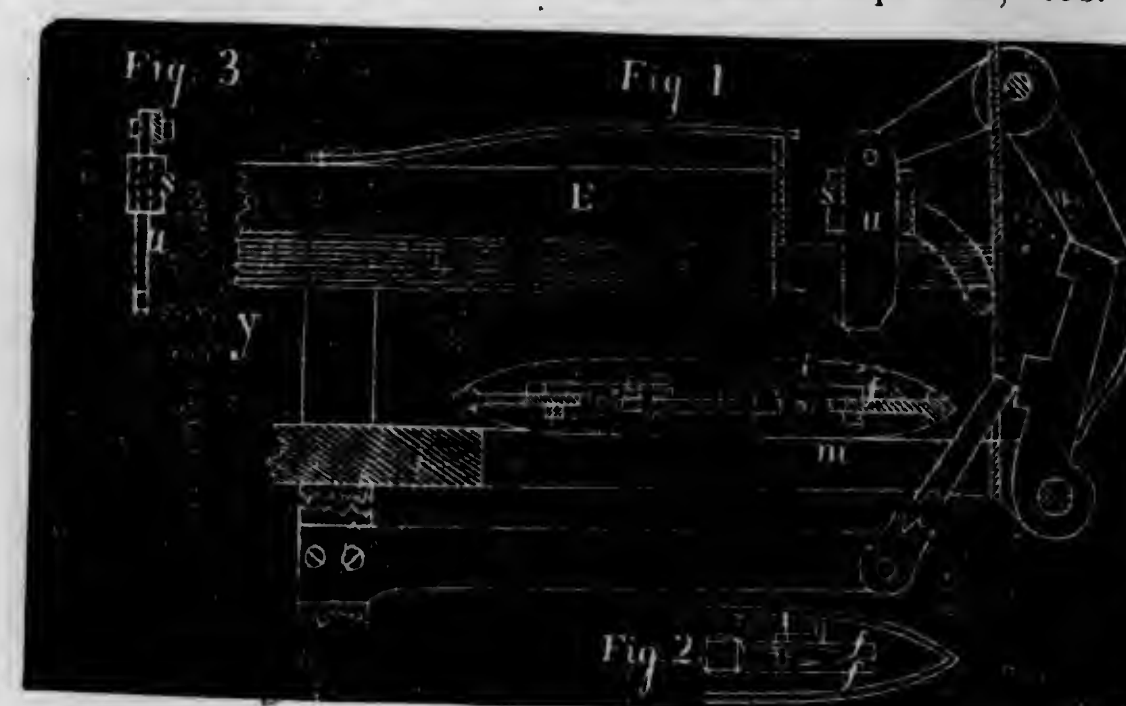


Fig. 1 is a section of the apparatus. Fig. 2 a top view of shuttle. Fig. 3 a side view of depresser.

y, cloth-making part of the apparatus; E, trough; *f f*, pair of pincers; *u*, depresser, which has on its lower end a groove just large enough to catch one hair; the hair is caught by the pincers, which are at the same time screwed together, by the screw-head *i* striking against the projection *m*. After that, the shuttle returns to the other end of the table, and there catches another hair, and so on.

Claim.—The combination of the trough or troughs, one or two de-

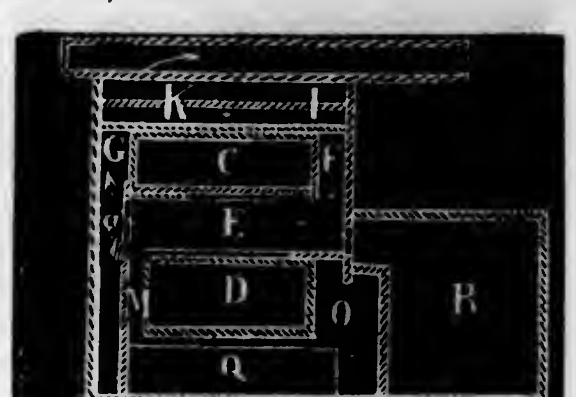
pressers, one or two sets of pincers applied to the shuttle, and mechanism for opening and closing the pincers; the whole being applied to one or both ends of the lay and to the shuttle, and made to operate together, for the purpose of carrying the hairs into the shed of warps. Also, the arrangement of one or both troughs with respect to the depresser or depressers, and to the shuttle boxes and the lay; the trough in such arrangement being made to extend from the depresser towards the middle of the lay.

No. 10,045.—Henry Hochstrasser, of Philadelphia, Pa.—*Improvement in Sash Fasteners.*—Patented Sept. 27th, 1853.

m m, catches; *o*, a spring detent secured to one of the lugs *e*; *f*, catch-bar; *s*, stump or recess; *a*, plate through which the catch protrudes; *n*, spring.

Claim.—The self-acting catch, made and operating substantially as herein described and shown in figure.

No. 10,046.—Nicholas Mason, of Roxbury, Mass.—*Improvement in Cooking Ranges.*—Patented Sept. 27th, 1853.



B, fire-box; C, upper oven; *a*, damper. When but one oven is to be used, *a* is opened as seen in fig. The heat fills F, and passes through E G to a flue in the rear of C, thence to I, and round a partition to K, and thence escapes through the upper flues. When both ovens are to be used, *a* is shut, and the heat passes through M, round Q into the space O, thence through Q into flue G.

Claim.—The employment of two ovens, in combination with the peculiar arrangement of the flues around their top, bottom, back, and sides, by which five sides of either one or both may be heated at the same time.

No. 10,047.—Henry McCarty, of Pittsburg, Pa.—*Improvement in the Manufacture of Sheet-Iron.*—Patented Sept. 27th, 1853.

Claim.—Imparting to the surface of sheet-iron the peculiar mottled appearance of Russia sheet-iron, by passing the sheet between a pair of planished or hammer-dressed rollers.

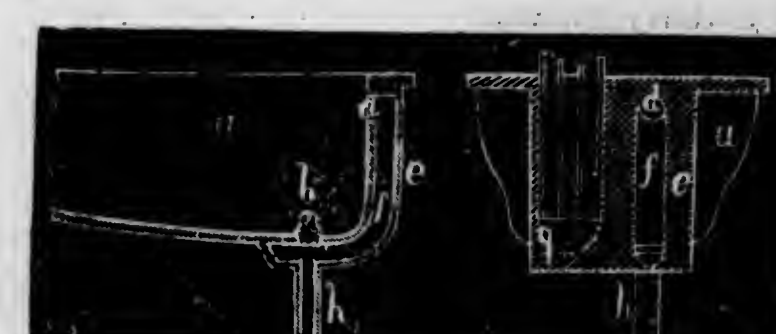
No. 10,048.—Jordan L. Mott, of New York, N. Y.—*Improvement in Cooking Stoves and Ranges.*—Patented Sept. 27th, 1853.

a, series of bottom flues or tubes, with small spaces left open between each two of them; these flues are held together by end plates *d d*, and are removable through the oven door *e*; *c*, top plate of bottom flue *f*; *m*, ash-pan; *k*, grate; *s*, journals on which grate *k* turns; *n* upright arm of lever.

Claim.—Connecting the top plate of the bottom flue with the lower part of the series of flue-tubes, so that in taking out the series of flue-tubes for cleaning, the top plate of the bottom flue shall be removed at the same time, and thereby expose to view the lower flue space, greatly facilitating the operation of cleaning. Also, the combination of the swinging grate with the self-acting weighted latch *n*, connected with the plate below the grate, whereby the contents of the grate can be readily discharged, and the grate readjusted, by a slight use of a poker.

No. 10,049.—Jordan L. Mott, of New York, N. Y.—*Improvement in Bathing-Tubs.*—Patented September 27th, 1853.

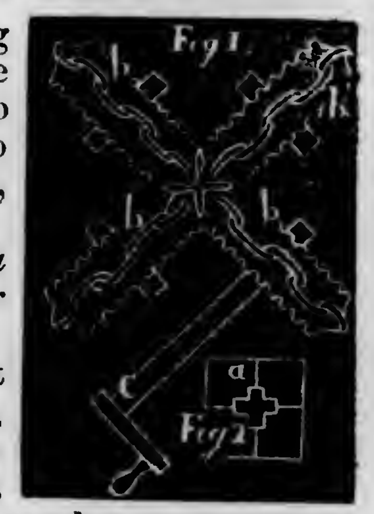
a is the tub, with a waste-hole *b*, and waste-pipe *h*; *d*, overflow-hole; *f*, channel connecting the overflow and waste-hole; *g*, supply-



hole, for the hot and cold water to enter at the bottom and commingle.

Claim.—The mode of combining with a bathing-tub either one or both of the channel-ways, and making, when constructed, part of the tub; one of which channel-ways connects the overflow and the waste-holes with the waste-pipe, and the other is adapted to the insertion of the hot and cold water pipes, and discharging the hot and cold water together, at or near the bottom of the tub, and in a horizontal position.

No. 10,050.—CHRISTIAN SLEPPY, of Newport, Pa.—*Improvement in Machines for making Chains.*—Patented September 27th, 1853.



This machine consists of four rollers, having cogs, by which they are propelled. On the edge of each roller are steel dies, with sharp edges, corresponding to the size of the chain to be forged. The dies converge to a point, and, in passing each other, make the chain.
The red-hot bar first passes through guide *a* (see fig. 2), and then comes between the four cog-wheels *b b b b* (fig. 1).

Claim.—The forging and making chains out of a solid bar, without the welding process, which is done instantly as the bar passes through between the four rollers, which mould the links into form; and of any size desired, and of any metal.

No. 10,051.—DAVID STUART, of Philadelphia, Pa.—*Improved Mode of Annealing Hollow Iron-ware.*—Patented September 27th, 1853.

The nature of this invention consists in covering the inside of iron hollow ware with a paste made of a composition to exclude the air, and which resists the influence of the heat; when the hollow ware is properly prepared in this manner, it is placed in the oven and heated to a cherry-red, which takes the chill out of the surface, and renders it so soft that it can be turned bright in a turning lathe, or by other means. The composition may be soapstone-dust and carbon; the more carbon in the mixture, the better. These ingredients are mixed with water, to about the thickness of thick cream, and with it the inside of the article is to be completely covered. The heating takes from twenty to thirty minutes.

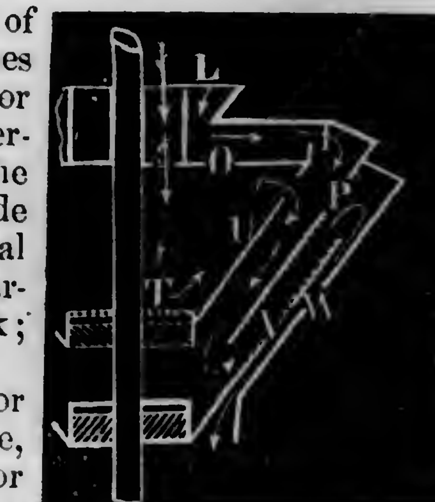
Claim.—The above process, consisting in coating the articles, in the manner specified, with some composition that will resist heat and exclude air from the surface, and heating the articles about the length of time specified.

No. 10,052.—ROBERT WASKEY, of Mill Creek, Va.—*Improvement in Smut-Machines.*—Patented September 27th, 1853.

This improvement consists in inserting between the head of the beating cylinder A (see figure) and the fan-chamber E, a diaphragm F, with inclined openings *f f f*, &c., for the purpose of preventing the grain from being carried off with the smut by the action of the blast.

Claim.—The construction of the diaphragm F, the central part being solid, and that near the periphery made into several oblique valvular passages, to check or throw back the kernels of grain.

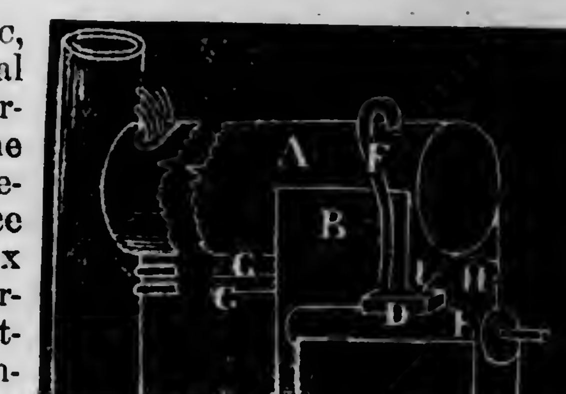
No. 10,053.—WILLIAM ZIMMERMAN, of Quincy, Ill.—*Improvement in Smut-Machines.*—Patented September 27th, 1853.



The nature of this invention consists of a series of two or more stationary cones W P (see figure), with one, two, three, or more revolving cones U V, placed alternately between the stationary cones. The grain is carried up the roughened inside surfaces of U and V, by the centrifugal force, and follows the direction of the arrows. L is the hopper; O, rotating disk; T, perforated ventilating box.

Claim.—(In the described machine for cleaning and scouring grain, hulling rice, pearling barley, hulling buckwheat, or other operations upon grain, seed, &c.) a series of two or more stationary cones, with one, two, or three, or more revolving cones, placed and operating as above described, so made and arranged as to perform the service required.

No. 10,054.—CHAS. E. WETHERED, JOHN WETHERED, and SAMUEL WETHERED, of Baltimore, Maryland.—*Improvement in the application of Steam.*—Patented September 27th, 1853.



A is the boiler; B, furnace; C, chimney; D, steam-chest; F, usual steam-pipe; E, cylinder; G, surcharging pipes passing into the chimney, thence into the flue beneath the boiler, and thence through the furnace into the box H, which receives the three surcharging pipes; I, pipe connecting the box H and the steam-chest D.

The steam is converted into what is known as superheated steam, by its passage through the pipes which pass through the furnace. By means of this apparatus, which unites the ordinary and superheated steam, any water in the ordinary steam is at once converted into steam, and thus the expansion of the steam is increased as it passes into the cylinder.

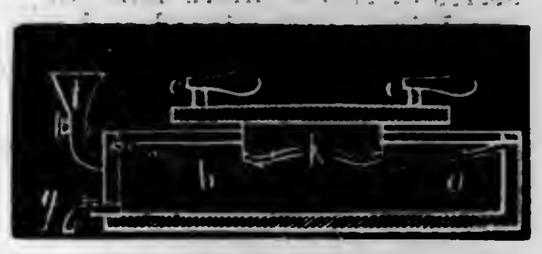
Claim.—The combining of steam and surperheated or surcharged steam, for actuating engines, when generated, the elasticity increased, and operated as herein set forth.

No. 10,055.—William Brown, of Glasgow, Scotland.—*Improvement in Distilling Coal*, &c.—Patented September 27th, 1853.

To fully describe the several operations or processes (by means of which the inventor produces lubricating oil, paraffine, and eupione, from coal or other bituminous matter) would require too much space for this Report.

Claim.—The use of superheated steam, as specified, for the purpose indicated. Also, the mode of separating and purifying eupione, lubricating oil, and paraffine, obtained by previous process.

No. 10,056.—Caleb B. Burnap, of Hartford, Conn.—*Improved Method of Veneering Surfaces.*—Patented September 27th, 1853.



The object of this invention is to make a more perfect and equal pressure on the surface of veneers, in gluing them to articles of any shape. The veneers are pressed on the surfaces to be veneered, by means of a fluid acting on a flexible substance interposed and making part of a vessel containing water or other fluid. The fluid may be used in a heated state, to keep the glue warm. (See figure.) *a*, vessel containing the water, which is covered with a sheet of vulcanized india-rubber *b*; *g*, discharge pipe, with a stop cock; *f*, pipe for letting in the water; *c c*, screws to screw down the veneer against the india-rubber sheet.

Claim.—The above description substantially embraces the inventor's claim.

No. 10,057.—Daniel P. Fales, of West Poultney, Vt.—*Improvement in Car-Wheels.*—Patented September 27th, 1853.

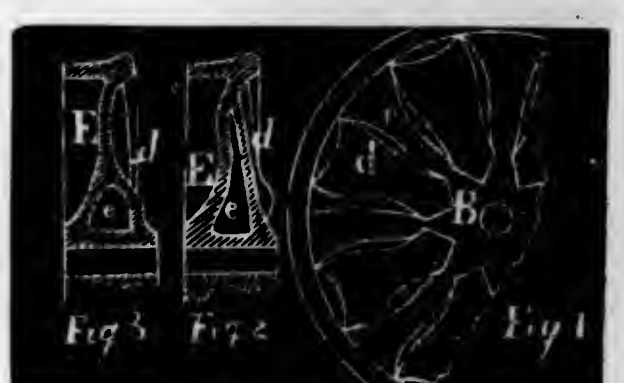


Fig. 1, front view. Fig. 2, section through *d*. Fig. 3, section through *e*. This improvement is intended to give strength to the rim of the wheel.

Claim.—The improved car-wheel composed of the face-plate E, which curves first inwards, then outwards, and then inwards, and expands into the rim, and the rear-plate B, which, by the series of curves represented in figures 2, 3, and 4, combines the inner end of the hub with the face-plate, and with alternate portions of the inner edge of the rim.

No. 10,058.—James M. Dick, of Buffalo, N. Y.—*Improved Railroad Switch.*—Patented September 27th, 1853.

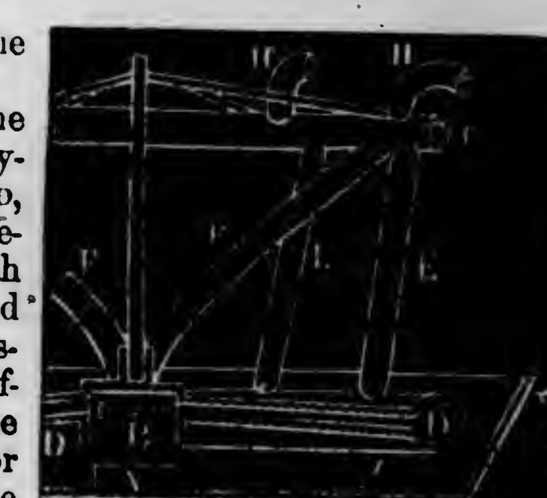
The switch-rails A turn round pivot *a*, and are attached by bolts *b* to a cross-piece F, which is provided with flanges *c c*, and covers the whole length of cross-piece G.

Claim.—The construction of the slide F with the depending flanges or side-plates *c*, which inclose the slide and cross-piece upon which it works, and afford a certain and effective protection against gravel, dirt, snow, sleet, ice, and other substances, which might otherwise enter between them, and derange the operation of the switch.

No. 10,059.—Charles H. Platt, of New York, N. Y.—*Improvement in Ships' Blocks.*—Patented September 27th, 1853.

Claim.—The employment or use of the rods E, passing through the cheeks A A in a direction transversely to their fibre, for the purpose of preventing the splitting of the cheeks; said rods also securing the plates F G to the cheeks, and forming a staple for the hook H. Also, the rods D D, placed underneath the ends of the shaft C, for the purpose of preventing the wearing of the cheeks, and thereby forming double bearings for the shaft, as set forth in the specification.

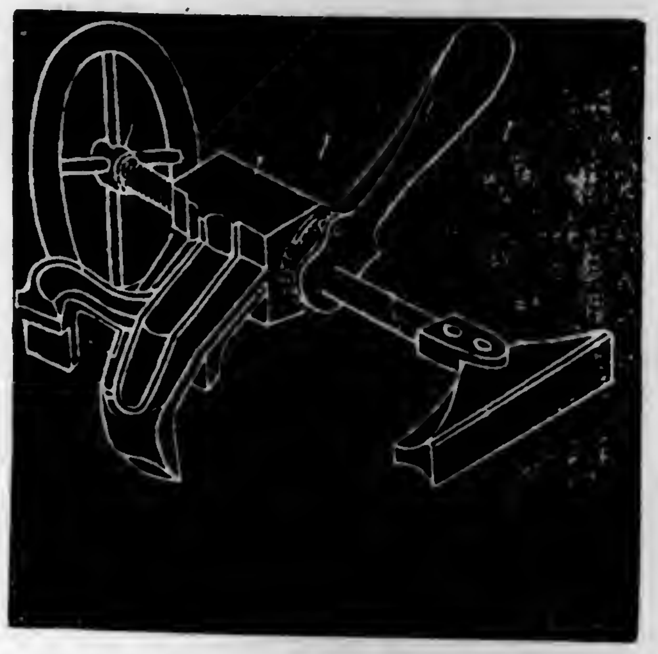
No. 10,060.—William Richardson, of New Orleans, La.—*Improvement in Centrifugal Draining-Machines.*—Patented September 27th, 1853.



By reference to the figure, the claim explains this machine.

Claim.—The arrangement in the tub *y* of the induction-tube A, supply-bulb B, and annular tube or ring D D, placed below the water-line exterior to the tub, in combination with the ascending tubes E E and F F, and a second annular tube G, having discharges H H, for the purpose of self-priming, protecting the machine from the resistance of water exterior thereto, and giving steadiness to the ascending column of water discharged by the machine.

No. 10,061.—Stephen E. Parish, of New York, N. Y.—*Improved Machine to Aid in Laying Floors.*—Patented September 27th, 1853.



The nature of this invention consists in making a brace, having a forked end, with shoulder pieces attached to its under side, so as to straddle one of the flooring beams, in combination with a screw working at right angles to the brace, and having on it a ratchet-wheel and lever, and pawls for working up the screw against the edge of the plank.

Claim.—The use of the brace having clawed ends, for acting at opposite sides of a beam, in combination with a screw working at right angles to the same, substantially in principle of construction and operation as set forth.

No. 10,062.—Joel Baker, of Boston, Mass.—*Improvement in Railroad Car-Wheels.*—Patented October 4th, 1853.

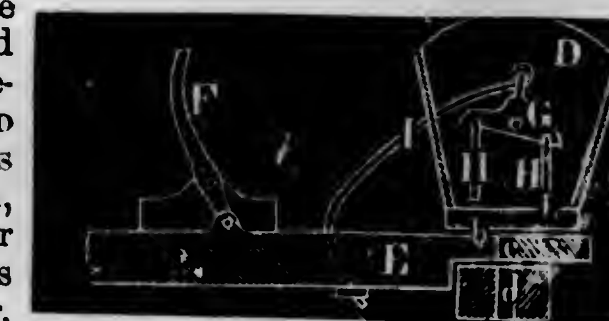
The inventor constructs the wheel of two distinct convex hub-plates, and two distinct rim-plates, each being connected by a number of short, small branches, which pass through openings of the opposite convex-plate, up to the rim-plate, interlacing the convex and rim plates at proper intervals, in such a manner as to form a whole compact wheel of great strength. (See fig.)

Claim.—The connection and intersection of the convex and rim plates, by independent and interlacing branches, substantially as set forth.

No. 10,063.—Elihu R. Benson, of Warsaw, N. Y.—*Improvement in Window-Blinds.*—Patented October 4th, 1853.

Claim.—The arrangement for moving the hollow augers back and forth, in performing the milling of both ends of the slats at once, combined with the slide, operated substantially in the manner and for the purposes set forth in the specification. Also, the manner of feeding the dressing and sticking portions of the machine, by means of a slide. Also, the method of sticking the wires by means of hooks and drivers, operated as specified.

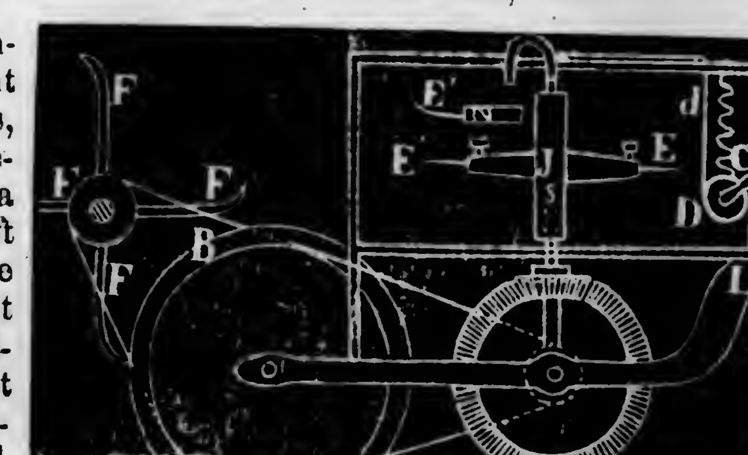
No. 10,064.—Gardner A. Bruce, of Mechanicsburgh, Ill.—*Improvements in Drills for Planting Corn.*—Patented October 4th, 1853.



This invention consists in the manner of distributing the seed by means of a small balance-beam G, placed in the hopper D (see fig.), the beam having wires H H attached to each end, which, as the beam is operated, fit or work alternately in apertures *b b* in the bottom of the hopper, and properly adjust the seed in the apertures *c c* of the dropping slide E, which extends entirely across the frame. Underneath the hopper there is a hole *d* through the side-piece of the frame. The rod I connects the balance-beam G to E; E is worked forward and backward by means of the lever F.

Claim.—The employment or use of the balance-beams G G, with the rods H H attached to them, and operating as described, for the purpose of properly adjusting the seed in the holes of the dropping slide, and also to prevent the clogging of the same, as shown and described in the body of the specification.

No. 10,065.—A. A. Dickson, of Griffin, Ga.—*Improvement in Machines for Topping Cotton.*—Patented October 4th, 1853.



This invention consists in the employment of two sets of cutters, one set E E being secured horizontally on a vertical revolving shaft over the centre of the machine, so as to cut off the tops of the cotton; and the other set F F being arranged vertically on a horizontal revolving shaft, at the back end of the machine, or just behind the propelling wheel B, so as to lop off the ends of the branches which lap across the middle of the row. The motion of the cutters is caused by the propelling wheel. The cutters are made adjustable to suit the width of the rows by means of the set-screws, and to suit their height by means of the cap of J, which is made to slide up and down on the square top part *s* of the shaft. This latter adjustment is effected

by turning crank C, and thereby winding the cord *d* round the drum D. E′ is a top view of E. The machine is moved like a wheelbarrow, the handles being at L.

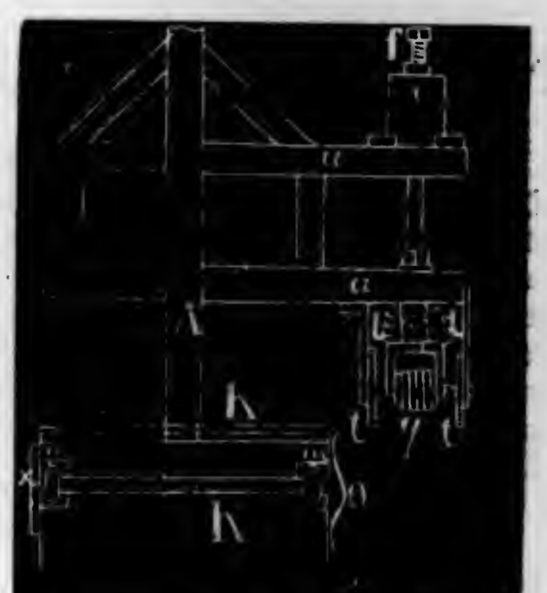
Claim.—The employment of two sets of cutters E E and F F, one set being adjustable and revolving in a horizontal direction, and the other being fixed and revolving in a vertical direction, and both sets being set in operation by the action of the driving-wheel B in any manner described, and for the purpose specified.

No. 10,066.—Mark Fisher & John H. Norris, of Trenton, N. J.—*Apparatus for Polishing Anvils.*—Patented October 4th, 1853.

(See figure.)

Claim.—Suspending the anvil in the sliding and vibrating frame, and arranging it in respect to the polishing part of the apparatus, and operating them as described fully in the specification.

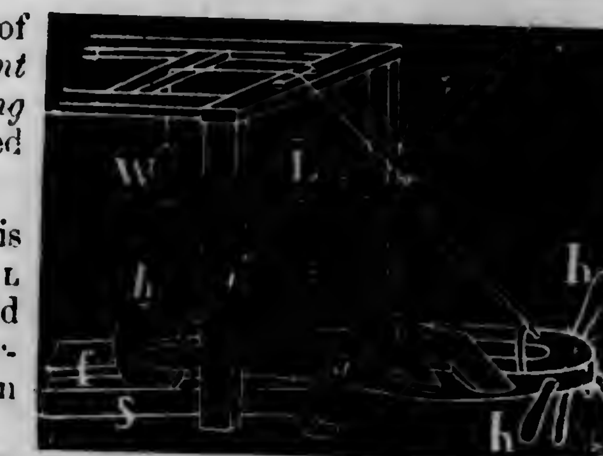
No. 10,067.—Joseph F. Flanders, of Newburyport, Mass.—*Improvement in Machines for Dressing Leather.*—Patented October 4th, 1853.



The main features of this invention consist, first, in the employment of a vertical shaft A (see fig.), with arms extending from its sides, for the purpose of carrying the tools; in the peculiar construction of the tool-holder; and, lastly, in the construction of the horizontal table.

Claim.—The employment of a vertical-shaft A, with arms *a a* extending from its sides, for the purpose of carrying the tools and their accompanying mechanism, in combination with a plain surface horizontal table K, for the purpose described in specification. Also, the jointed tool-holder, either with or without springs, constructed substantially as described. Also, the arrangement of the movable table, permitting of an endwise, and at the same time downward motion, or the equivalent thereof.

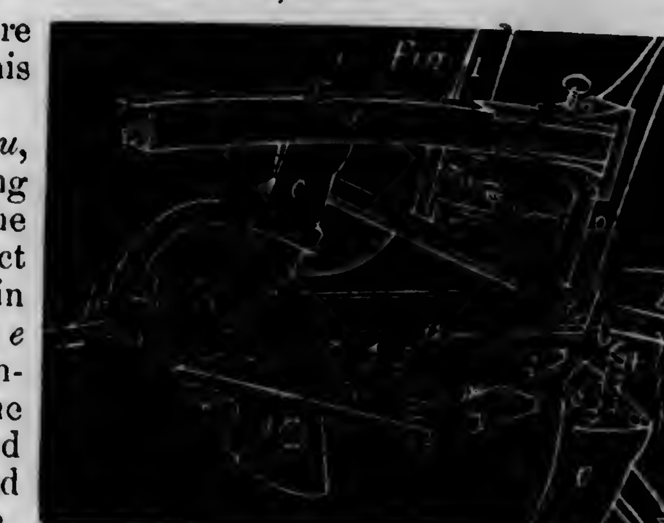
No. 10,068.—Joshua Gibbs, of Canton, Ohio.—*Improvement in Apparatus for Grinding Plough Castings.*—Patented October 4th, 1853.



(See fig.) The carriage *a* is moved along under the stone L by the operator, who takes hold of the handles *h h*, for the purpose—the wheel *b* moving in groove *f* of stand *s*.

Claim.—The carriage *a*, upon which the casting *c* is fastened by means of weight W, and grooved stand *s*, upon which the carriage is moved.

No. 10,069.—Robert A. Graham, of New Paris, Ohio.—*Improvement in Ploughs.*—Patented October 4th, 1853.



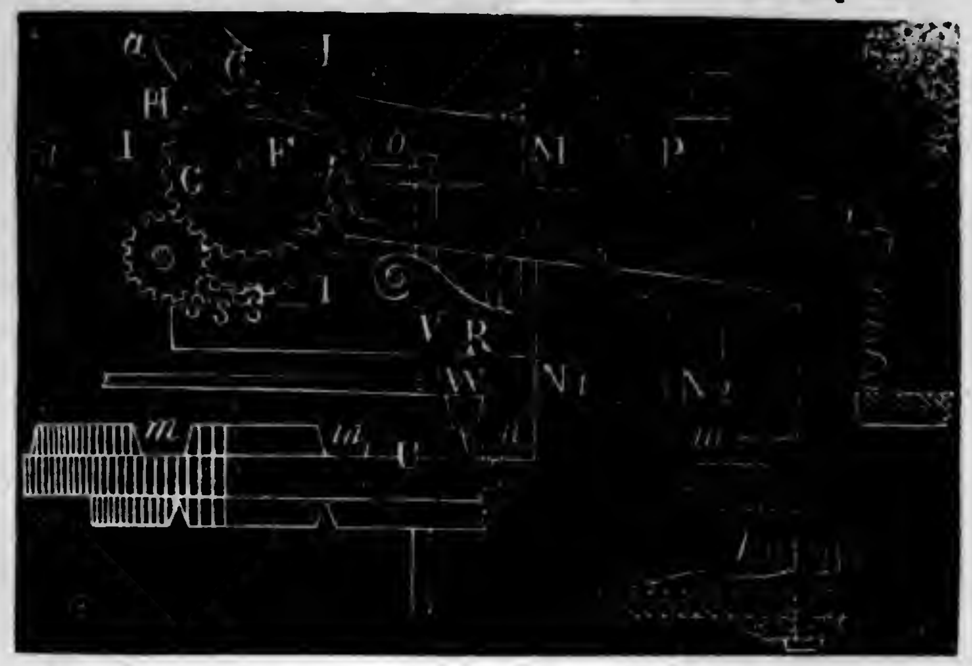
By reference to the figure the claim will explain this improvement.

Claim.—The screw-bolt *u*, or its equivalent, for setting out or in the rear edge of the mould-board, with respect to the land-side, acting in combination with the bolts *e* and *f*; which, being tightened, attach to each other the mould-moard, sheath, and lipped or flanged share; and which bolts, being temporarily relaxed, permit the vibration of the mould-board about the bolt *e*, without interrupting the continuity of ploughing surface, or disconnecting the several parts. Also, the shifting or adjustable socket attachment of the beam to the sheath, in combination with the dove-tail and adjustable connection of the rear end of the beam to the helve, or equivalent devices, so as to vary the direction of the draft of the plough, to suit the requirement of a change in the flare of the mould-board, and other objects, as explained in the specification.

No. 10,070.—Thomas C. Hargreaves, of Schenectady, N. Y.—*Machine for Husking Corn and Maize.*—Patented October 4th, 1853.

(See fig.) The ears of corn, having first been broken from the stalks or gathered, are placed in the passage-ways *m m* of the circular plate U, with the stalk end towards the centre of the plate, above the rim *n*, and the base of the ear against the rim *n*. The machine is made to operate by turning the handle *a*; M and P are gates with cutters N^1 N^2, to descend and pierce the ear: the chisels being about five-eighths of an inch broad, they partially sever some of the leaves on the upper side of

the husk, and divide the cob at or through the first row of kernels, but do not cut any of the sides or underpart of the husk. When thus cut, the cam-wheel I acts on the cogs *s s s* on the slide R, and forces the gate P with cutter N^2, and the ear of corn free from any husk to the



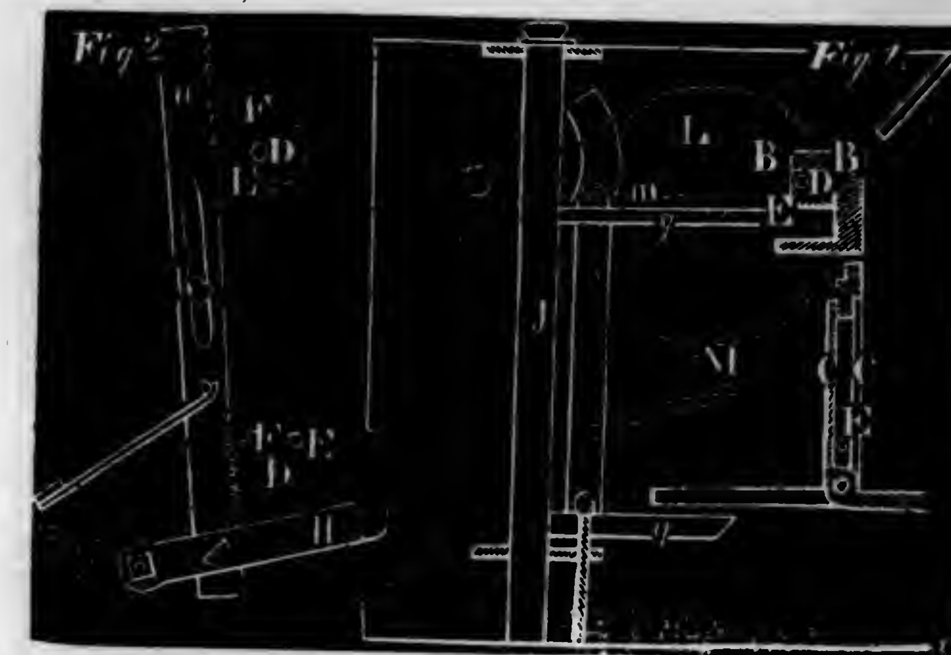
outer edge of the circular plate U, into the receiving trough. The husk is finally removed from the machine by the elbow W. The spring *i* returns gate P to its position for action. G and I are cams, *j* is a lever acting on spring and lever *k*.

Claim.—The application of the chisel or chisels, cutter or cutters N, in combination with the gate M, or gates M and P, operated by gearing or other means. Also, the construction of the circular plate U or its equivalent, in combination with the cutters for severing the cob, and the elbow-lever for discharging the husks. Also, the combination of the cam F, lever *j*, and spring *k* with stud *l*, for holding the circular plate U stationary, whilst removing the ear and husk from the machine, or any other equivalent.

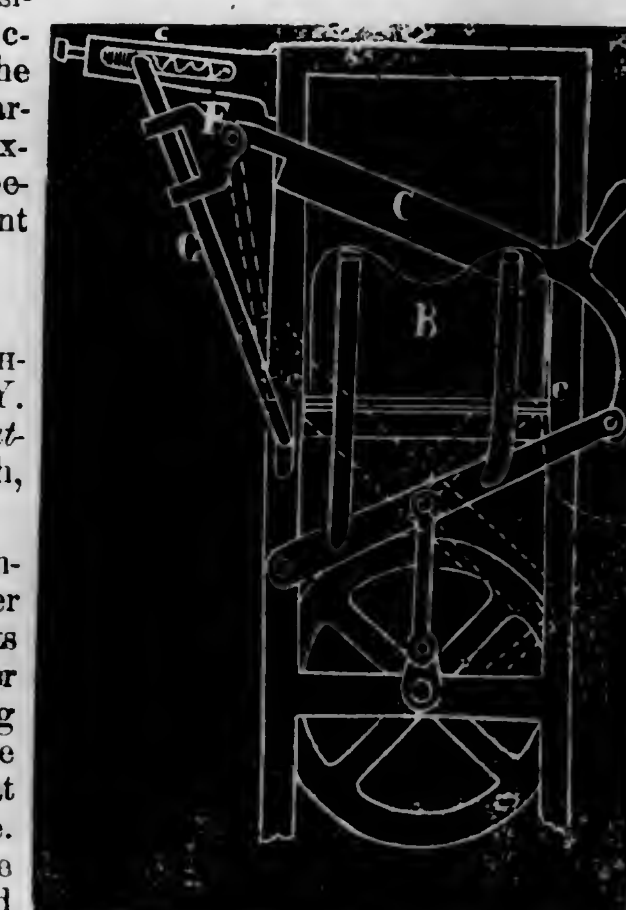
No. 10,071.—WILLIAM HORSFALL, of New York, N. Y.—*Annunciators for Hotels, &c.*—Patented October 4th, 1835.

The rod J (fig. 1), having a horizontal lifting or tripping arm *g*, which extends underneath each of the swinging index-plates B; the rod and arm being arranged in such relation to the rocking-frame which carries the alarm bell L, that as either of the rods is raised for the purpose of tripping one of the index-plates, and exposing its number to view, the frame and bell will also be raised, and the pendulous hammer M allowed to descend some distance; and consequently when the rod descends, which it does instantly after the index-plate has been tripped, the rocking-frame and its alarm bell will descend also, and cause a short finger of the pendulous hammer to be operated upon by a lever connected to the arm *m*, which sustains the bell, and the long arm or weighted end of the pendulous hammer to rise, strike the bell, and sound the alarm. B vibrates on horizontal rod D; B is thrown back after indicating its number, by means of the eccentric-

rod E; D is secured in the cog-wheel F (fig. 2), which gears into the movable rack-bar *a*, and the rod E is also secured eccentrically in the same cog-wheel.



Claim.—The constructing and arranging the index-plates B B B or C C C, in combination with the alarm and its necessary attachments, so that each plate can be operated, and its number exposed to view, and also the alarm sounded instantly after, by simply employing a rod J, having a tripping-arm *g*. Also, the manner of throwing the index-plates back to their proper position, by means of the eccentric-rod E, in combination with the peculiar construction and arrangement of the said index-plates, the eccentric being operated in any manner equivalent to that shown and described.



No. 10,072.—RICHARD KETCHAM, of Seneca Castle, N. Y.—*Improvement in Straw-Cutters.*—Patented October 4th, 1853.

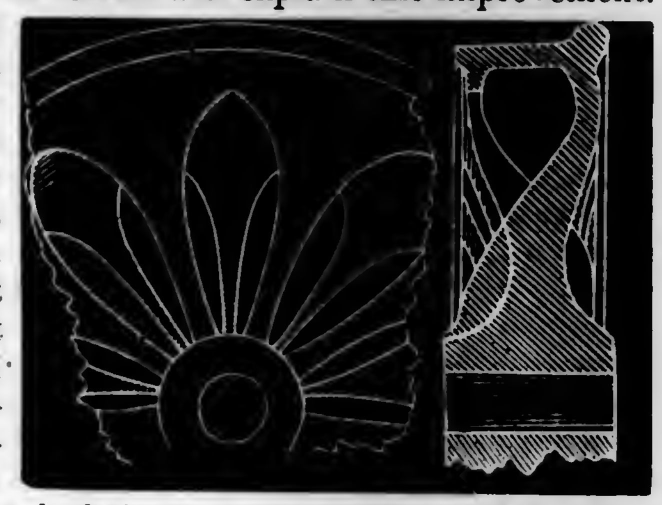
The main feature of this invention consists in the manner of hanging the knife, so that its "draw" may be increased or diminished, to suit the varying resistance of the straw to be cut; also to prevent clogging at the finishing end of the knife. *e e* is the cutting edge of the table; C, the cutter; the dotted

lines represent the position of the knife c and the gauge B, after the cutting has been performed.

Claim.—The method herein described, of hanging and operating the cutter by means of its pivoted attachment to the slide F, in combination with guide-rod G, the latter being made adjustable by the helical-spring *c* at the top, or other equivalent device. Also, in combination with the inclined reciprocating knife, and simultaneously with the descent thereof, giving to the gauge B a lateral curvilinear or oblique downward action away from the rear end of the knife towards the front end thereof, and below the cutting edge of the table, whereby the straw is restrained from being crowded towards the back end of the knife by the inclination of the cut, and a free escape is established for the cut particles to pass off.

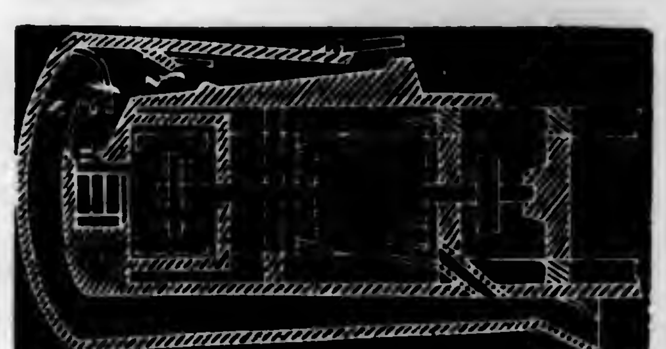
No. 10,073.—Zadock H. Mann, of Newport, Ky.—*Improvement in Cast-Iron Car-Wheels.*—Patented October 20th, 1853.

By reference to the figure, the claim will explain this improvement.



Claim.—The construction as described of a cast-iron car-wheel for railroads, whose web, or portion connecting the hub and rim, consists at the hub of broad radiating plates in the plane of the axis, whence turning alternately to the right and to the left, they contract in the direction parallel with the axis, and expand proportionally in the direction of revolution, those of each alternate set uniting as they approach their respective margins of the rim-concave, so as to form flanges having openings left for each intermediate plate on the other side, forming a braced and counterbraced wheel, possessing the requisite lateral stability and continued support at the rim, together with adequate provision for the strain arising from shrinkage, &c., whether the web be formed in a "cyma-reversa" curve as described, or in any way substantially equivalent.

No. 10,074.—Benjamin Rutter and Henry Rouzer, of Piqua, Ohio.—*Machine for Cleaning and Separating Grain.*—Patented October 4th, 1853.

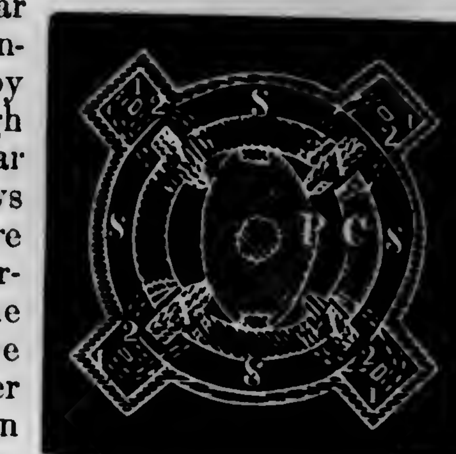


By reference to the annexed figure, the claim explains this machine.

Claim.—The narrowing of the spout near the grain discharge *m*, in combination with the curved passages *s*, *t*, *u*, and *z*, which receive and discharge at their respective apertures the light grain and trash taken from the grain-discharge aperture.

No. 10,075.—John C. F. Salomon, of Washington, D. C.—*Improvement in Rotary Steam-Engines.*—Patented October 4th, 1853.

(See figure.) C is the cylinder; P is the piston of the same height as the cylinder, and elliptical in form, its greatest diameter being equal to the inner diameter of the cylinder; at top and bottom it has an annular flange, which fits an annular groove in the bottom and top of the cylinder, and is made to fit steam-tight by packings. Four abutments slide through four sides of the cylinder A. The annular space *s s* outside of the cylinder always being filled with steam, the abutments are always pressed against the elliptical surface of the piston, thereby dividing the space between the elliptical surface of the piston and the inner side of the cylinder in spaces which have no communication with each other; by means of valves, these spaces are made to communicate with the supply pipes 1 1 1 1, and the exhaust pipes 2 2 2 2, and thereby the piston is made to revolve. The valves are moved by two cams placed on the axis of the piston.



Claim.—The combination of the elliptic wheel and its cylinder, with the sliding abutments or stops, arranged in such manner that a continuous propelling force may be communicated to the wheel without exposing it to the unequal pressure of the fluid on opposite sides of its axis throughout the entire revolution in either direction. Also, in combination with the revolving wheel or piston, the arrangement and operation of the valves in such a manner, that as the effective propelling area of the piston surface exposed to the impelling fluid between either two abutments diminishes, the wheel is assisted by an increasing area of piston surface, exposed to the action of the fluid on the opposite sides of the abutments, as specified, whereby the propelling fluid may be worked expansively without impairing the uniformity of the active power of the engine, as herein set forth.

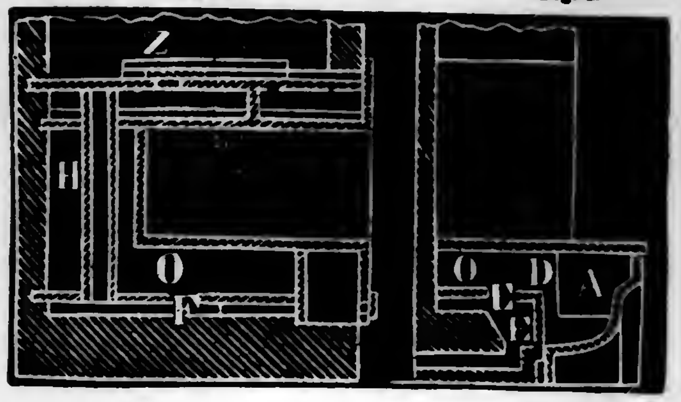
No. 10,076.—George S. G. Spence, of Boston, Mass.—*Improvement in Cooking-Ranges.*—Patented October 4th, 1853.

Figure 1 is a section through the fire-grate.

Figure 2 is a section through the middle of the oven.

Claim.—The arrangement of the openings Y Y, and damper Z, with respect to the arrangement of smoke-flues above and below them, substantially as above specified; whereby the heat is caused to pass under the back half of the bottom of the oven up alongside the entire back of the oven, and up the rear portion of the left side of the oven, and over the top of the oven into the chimney, instead of carrying it entirely around the oven. Also, the arrangement of the fire-place A,

Fig. 2 Fig. 1



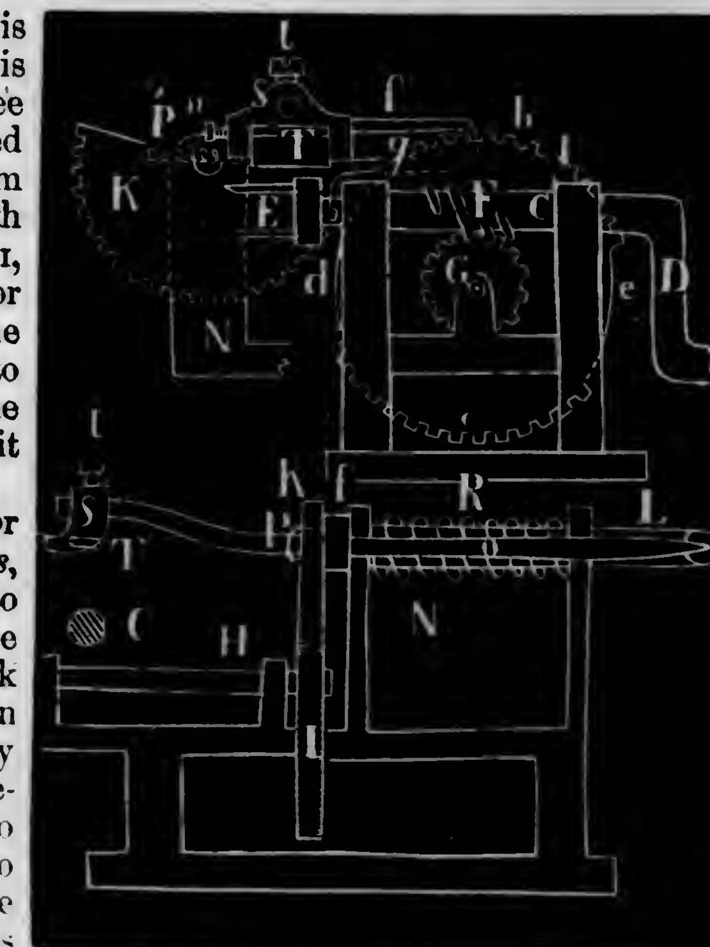
boiling-chamber D, and smoke-flues leading under the oven, and in rear of the back thereof, in combination with the peculiar arrangement of the hot air-chambers E, F, and H; whereby the fire-place and oven-flues are not only made to heat the air-flues, but the bottom plate of the boiling-chamber is also made to impart heat thereto, and the back as well as the front of the upright air-flue H is also heated by the smoke-flue, through which it passes.

No. 10,077.—EDWARD BROWN, of Rindge, N. H.—*Improved Burglars' Alarms or Annunciators.*—Patented October 4th, 1853.

B, door-frame; *b*, slot in cylindrical tube D; E, cylindrical slider with tube D resting on spring F, and provided with a horizontal arm *c*; G, friction match holder; I, arm projecting laterally and passing a short distance over the door, and beyond its edge when the slider is depressed; *k*, notch at the lowest position to which it is desired to depress the slider, the notch being large enough to receive the horizontal part of arm *c* when the slider is turned for the purpose of moving it into the notch to hold the slider down; L, spirit-lamp, to which is fixed a piece of sand-paper M for the match to rub against. Plate I being forced downwards and laterally until it catches in the notch, the apparatus is set for sounding an alarm and lighting the wick W of the lamp. The door, on being opened, is moved against arm I, and thereby *c* is released out of the notch.

Claim.—The improvement of so connecting the match-holder and the bell-spring *o* with the slide E. that the spring F of the slide, on being set free by the opening of the door, shall not only elevate the match-holder, but set the bell in motion.

No. 10,078.—EPHRAIM L. PRATT, of Worcester, Mass.—*Improvement in Apple-Paring Machines.*—Patented October 4th, 1853.



When this machine is to be operated, the apple is placed upon the fork E (see fig.), and the shaft C turned by the crank D. The worm F turns the gear G, with the shaft H and gear I, which drives the sector gear K, which carries the shaft L and rod O, so as to move the knife T over the surface of the apple as it is turned by the fork E.

Claim. — Hanging or connecting the block *s*, which carries the knife to the rod which carries the block, so that the block and knife can vibrate in one or either direction (by means substantially as described in specification), so as to allow the knife to vibrate and accommodate itself to any irregularities in the surface of the apple (as it is turned by the fork E).

No. 10,079.—JOSEPH C. STRODE, of East Bradford Township, Pa.—*Hydraulic Ram.*—Patented October 4th, 1853.

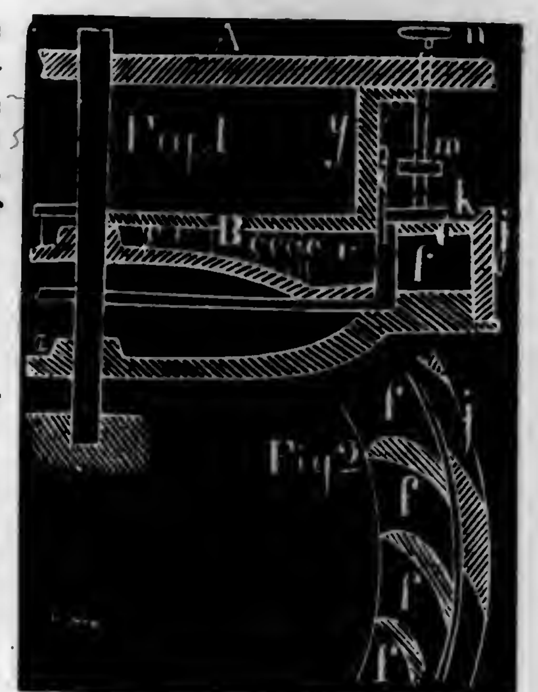
This invention consists in laying the driving-pipe which conveys the water from the head to the ram in the brachystochrone curve, which is that curve in which a body will descend from one point to another point not in the same vertical line in the shortest time, and therefore with the greatest mean velocity. This property of the above curve will enable a greater quantity of water to be raised by a machine of a given size, than can be raised with the driving-pipe laid in any other direction, and will cause a greater reaction of the water to take place after the closing of the valves leading to the air-chamber, and thus more perfectly insure the opening of the discharge-valve.

Claim.—The application of the brachystochrone curve to the conduit pipes of hydraulic rams, in the manner and for the purposes set forth.

No. 10,080.—HENRY VANDEWATER, of Albany, N. Y.—*Improvement in Turbines or Water-Wheels.*—Patented October 4th, 1853.

In fig. 1 A is the penstock; B, chute-chamber; *f f*, buckets of the turbine; *b*, annular ring which covers the chutes *c c c c*, and rises in a perpendicular

y, which is fastened to the underside of the penstock; e, annular ring covering the buckets of the turbine; the circular band i between the chutes and buckets can be raised or lowered for the purpose of regulating the size of the openings of the chutes. The turbine is surrounded by a cylinder j, which has a horizontal annular flanch k; j has openings all round corresponding to the discharge openings of the buckets, and similarly bevelled off. (See fig. 2.) The inside of ring k is provided with teeth in which the little wheel m can be made to gear by lowering it; and then by turning the hand-wheel n, the cylinder j can be turned so as to shut more or less the discharge openings of the buckets.



Claim.—The method of regulating the discharge openings of the buckets from the outside, in combination with the central gate i, for adapting the wheel to varying heads of water, and to the nature and amount of work to be done by it, consisting of the circular gate j, constructed, arranged, and operated with the wheel.

No. 10,081.—James A. Woodbury, of Winchester, Mass., and Joshua Merrill and George Patten, of Boston, Mass.—*Improvement in Air-Engines.*—Patented October 4th, 1853.

The main feature of this improvement consists in taking into the air-pump dense or compressed air (so as to exert a greater pressure than atmospheric air) in commencing to operate the engine.

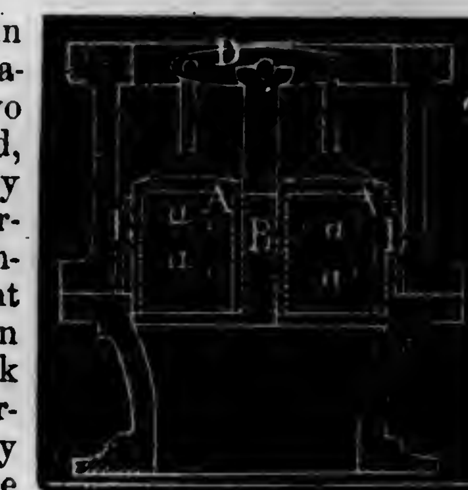
Claim.—In this improvement in atmospheric-air engines, supplying the air-pump from a receiver, into which air has been condensed by a hand-pump, auxiliary engine, or otherwise (the hand-pump or auxiliary engine being used for the purpose of charging and sustaining a uniform pressure in the receiver, from which the air-pump is supplied), when the same is done in combination with a second receiver, into which the air is to be still more compressed, and maintained at a uniform pressure, or nearly so, by the application of heat to the air on its passage to the working cylinder.

No. 10,082.—Elizur Wright, of Boston, Mass.—*Improvement in Stop-Cocks.*—Patented October 4th, 1853.

Claim.—The combination of a ball e, with an elastic cylindrical ring-seat $d\ d$, constructed with or without a wire, for the purpose of forming a valve.

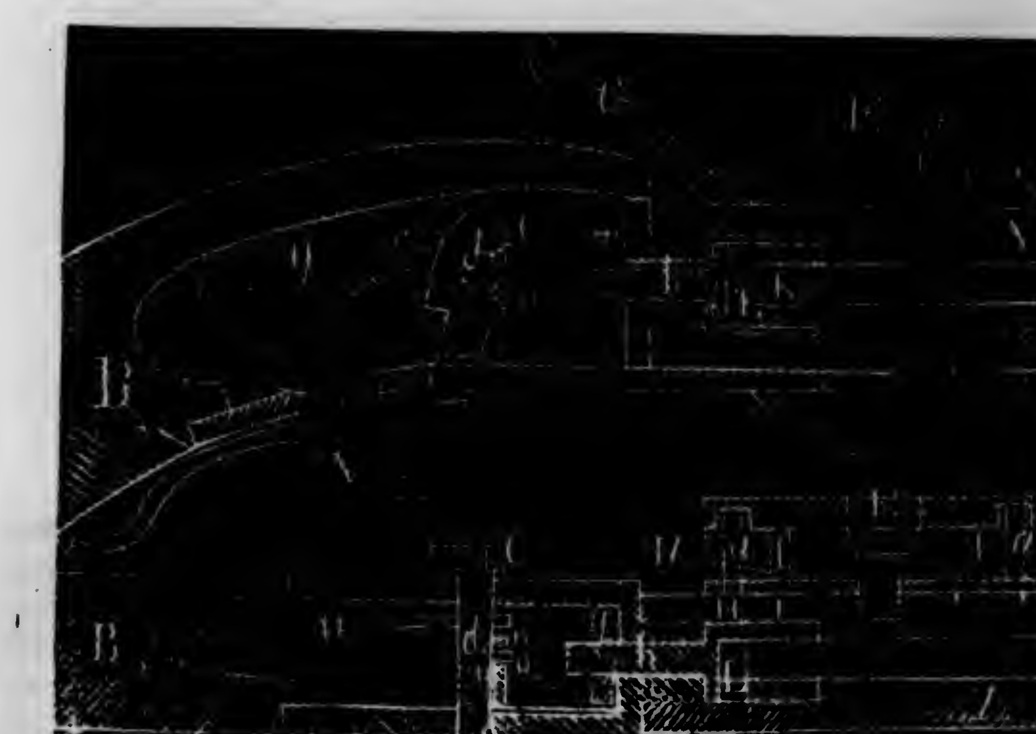
No. 10,083.—John E. Anderson, of New York, N. Y.—*Improvement in Regulator-Valves for Steam-Engines.*—Patented October 4th, 1853.

The nature of this invention consists in the employment, as a throttle or regulator, in connection with a governor, of two cylindrical valves, constructed, arranged, and operating in such a manner that they will at all times balance each other perfectly, and that their effect upon the engine will be varied by an extremely slight movement. The object of the invention is to produce a valve which will work with very little friction, will wear correctly for a long time, and will be very sensitive to the slightest changes in the operation of the governor.



Claim.—The combination, to serve the purpose of a throttle-valve or regulator, of two hollow cylindrical valves A A, connected with a lever D on opposite sides of its fulcrum, and having slotted openings $a\ a$ corresponding with similar openings in the cylindrical valve-seats B B, the several openings being arranged in the manner substantially as specified.

No. 10,084.—Edmund H. Graham, of Biddeford, Maine.—*Improved Magazine Gun.*—Patented October 4th, 1853.

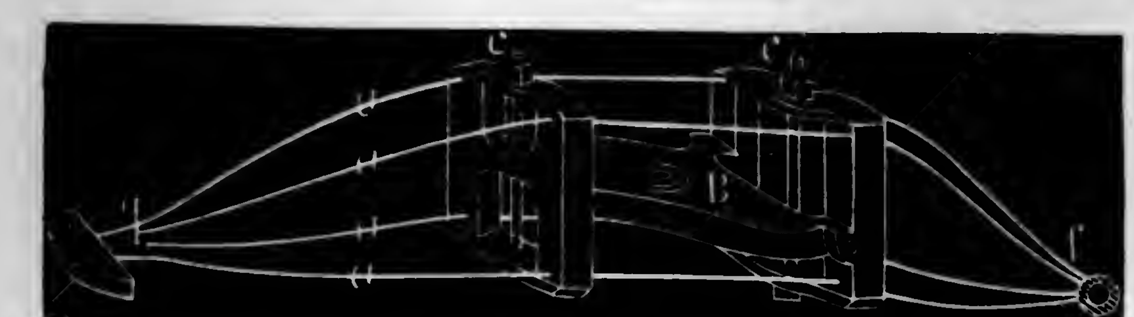


By depressing the trigger-guard N, the charge-receiver K and magazine E are simultaneously rotated, the former far enough for the reception of the charges of powder and ball, or shot, and the latter so as

to carry a load of such powder and ball, or shot, directly into line with the connecting-passages I and H of the barrel. By turning the gun a little, the load will pass from the magazine into the charge-receiver through passages L and M.

Claim.—The arrangement of the series of ball-chambers *b b b*, &c., and the series of powder-chambers *a a a*, &c., in concentric circles, and on the side of the gun-barrel, and out of the sight-range, and so as not only to revolve and work against a common plate E affixed to the side of the gun, but to operate in conjunction with a rotary charge-receiver K placed within the barrel; such arrangement of the magazine of chambers not only causing the powder of the charges to be kept in separate chambers, so as to lessen the danger of accidents, but causing the magazine to be so arranged as to be out of range of the sight in taking aim. Also, to so combine the percussion-hammer or cock, the rotary charge-receiver, and the rotary magazine with the trigger-guard, that by the movement of the guard away from the stock they may be simultaneously put in motion, and the hammer brought up to full cock.

No. 10,085.—Levi B. Griffith, of Honeybrook, Pa.—*Improvement in Plough-Beams.*—Patented October 4th, 1853.

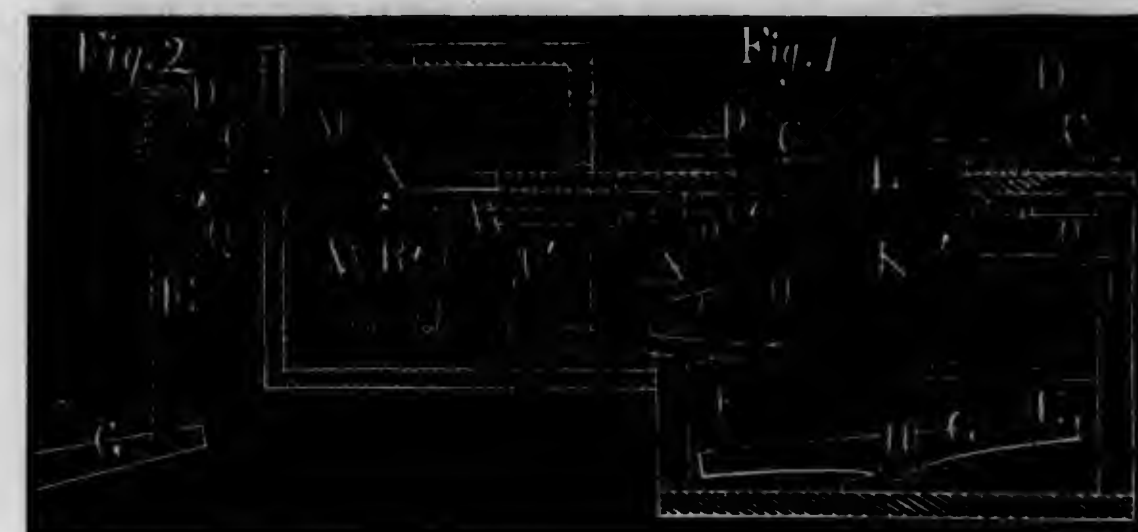


The rods *a a a a* are welded together at *q*.

Claim.—Constructing a plough-beam of four round iron rods *a a a a*, centre-piece B, and clamps *c c* in combination, the rods being of uniform size from end to end, curved to the shape specified, and welded together at the places designated, the centre-piece and rods being held firmly in their position by the clamps.

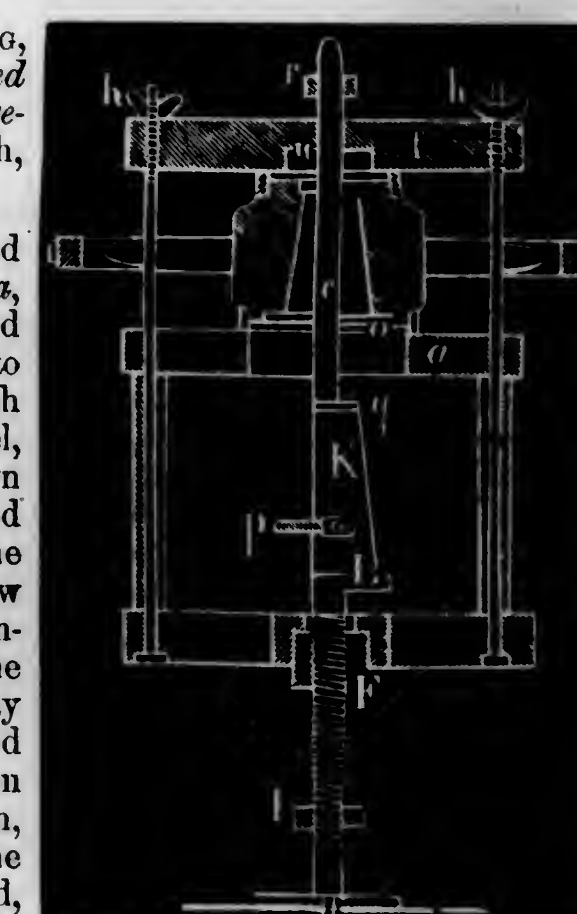
No. 10,086.—Archibald S. Littlefield, of Portland, Me.—*Improvement in Safety-Switches for Railroads.*—Patented October 4th, 1853.

The principal object of this invention is to enable a moving car or train to bring into alignment with a main or sidling track a switch that may be out of engagement with that one thereof on which such car or train may be moving towards the switch, and this in order to prevent accident, or running off the track, which must otherwise result to the car or train. The figure represents a transverse, vertical, and central section, taken through the switch-lever; the switch-rails being applied to the main-track and turnout rails, so as to be capable of having a movement into or out of alignment with one or the other, as the case may require.



Claim.—The combination of the transverse rocker-lever G, the shaft H, the toothed sector K, and the rack L, as applied to the switch, and the main and turnout tracks. Also, in combination with the toothed sector, the locking-plate O, provided with notches, the same being for the purpose of locking the switch.

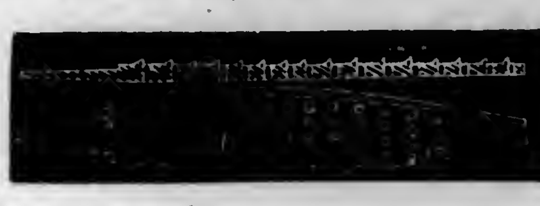
No. 10,087.—Leonard S. Maring, of Westport, Mass.—*Improved Machine for Boring Carriage-Hubs.*—Patented October 4th, 1853.



The wheel is placed with one end of its hub on the middle of bar *a*, the shaft *c* being inserted and fixed in a bench or floor, and made to stand vertically and pass through the hole in the hub of the wheel, and the bar *f* brought down upon the upper end, and forced down upon it by setting down the screw-nuts *h h*. The clamp-screw H is then unscrewed so as to unclamp the screw-nut F from the frame, in order that the frame may be put in revolution on the said nut. By adjusting the slide *r* on the shaft *c* to the proper position, the descent of the cutter into the top of the hub will be arrested, when the top of the bar *f* is brought up against the slide *r*.

Claim.—Combining the backer *p* with the shaft *c* and the knife K, for the purpose set forth.

No. 10,088.—Hiram Powers, of Florence, Italy.—*Improvement in making Files or Rasps.*—Patented October 4th, 1853.



See figure.

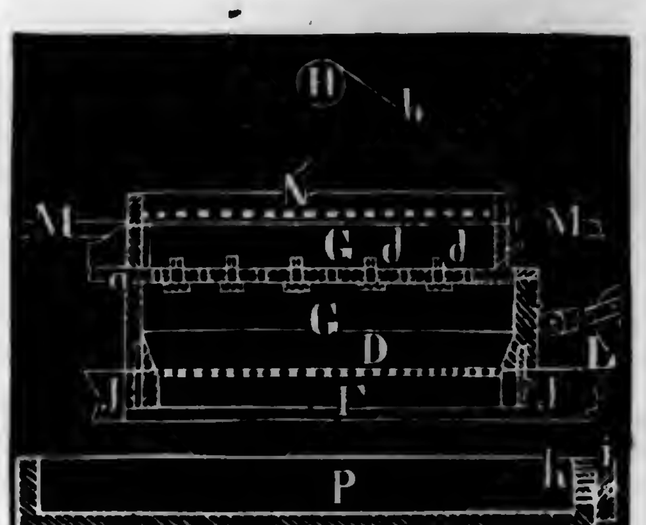
Claim.—The forming of perforations or throats to the cutting edges of files or rasps, for allowing the particles cut away to pass through, and to prevent the instrument from clogging or choking.

No. 10,089.—Philip P. Ruger, of New York, N. Y.—*Improvement in Machines for Turning Spiral Mouldings.*—Patented October 4th, 1853.

The claim of the inventor explains the nature of this invention.

Claim.—Combining with a rotary progressive motion of the article to be cut (of any desired configuration) a series of cutters placed around the article, to form and complete the pattern upon the article, the cutters being made to revolve in a stationary frame perpendicular to the axis of motion of the article to be wrought, either in a radial line or somewhat inclined thereto, so as to form the desired figure and undercut to any extent desired.

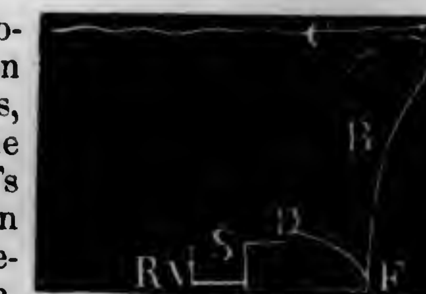
No. 10,090.—John H. Ward, of Sonora, Cal.—*Improvement in Machines for Washing and Separating Gold.*—Patented October 4th, 1853.



The nature of this invention consists in the method of arranging the several parts one above the other, and operating them so arranged, as to perform the whole washing and separating process in a compact machine, easily transported, and at great saving of water. (See figure.) Wheel L gives a reciprocating motion to the boxes G and G′. The studs *d d* are for the purpose of separating the material by the friction on them, in combination with the action of water. On the top of box G′ is a pan N, with a perforated bottom, through which the water enters. The pan N slides on ways M M, and can be run out if box G′ is to be filled or emptied. The second operation is performed by box D, with its perforated bottom. F is an apron over which the heavier material passes out. P, reservoir for the finer particles to settle, while the water gradually passes out through holes *h* when the slide *i* is withdrawn.

Claim.—The employment of the reciprocating perforated box or trough armed with cutters or breakers, in combination with the sieve and decanting trough, arranged beneath the reciprocating trough. Also, the percolating plate arranged above the same.

No. 10,091.—Charles T. P. Ware, of New York, N. Y.—*Improvement in Propellers.*—Patented October 4th, 1853.



The blades are constructed of india-rubber or the like material, in combination with elastic ribs, or with inflexible parts, and are attached to the shaft or shafts. The dotted curves C R represent the vessel's counter; B represents a blade in a certain position relative to the shaft S; the blade, decreasing in thickness from its point of junction with the shaft at D towards every point of its outward and inner boundaries F T and D T, has its inner boundary D T much stiffer than F T, so that it shall yield much less to the resistance of the water than the outer boundary F T. The shaft passing into the vessel at V, is acted on by alternate partial revolutions. While D T retains a stiffer bearing against the resistance of the water, the blade presses upon the water obliquely like the blade of a screw, the angle accommodating itself to the amount of such resistance, which of course is greatest towards the tip T, so that the blade being forced round with great velocity, the tip, according to its degree of flexibility, will tend to be drawn through the water edgewise, exerting but very little if any power of propulsion. But at the point where the blade commences its return sweep, the checking of the momentum gained by the previous sweep causes the combined forces of such momentum and of the motive power applied, to accumulate, as it were, at the extremity of the blade, and down along the outer boundary towards the shaft, before it can again be drawn through the water, by being thrown backward in a direction parallel to the shaft. This mode of construction combines the propulsive action of the paddle and the screw.

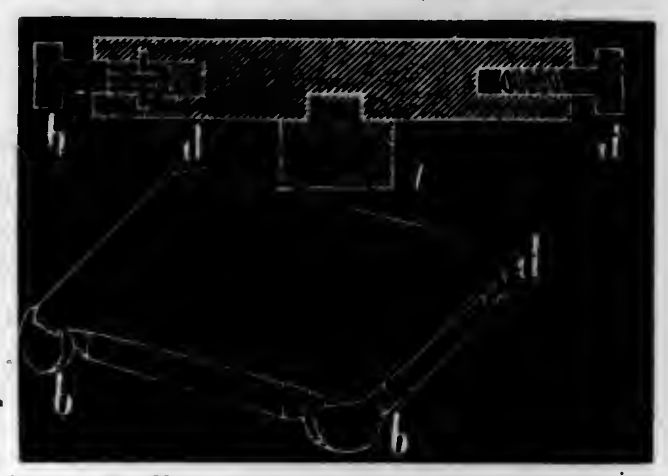
Claim.—A propeller having one or more blades, the front and rear edges of which are of unequal stiffness, these blades being arranged upon an oscillating shaft, and operating substantially as set forth.

No. 10,092.—William C. Dean, of Jacksonville, N. Y.—*Improved Guide for Dowelling Felloes for Wheels.*—Patented October 4th, 1853.

The end of the felloe is inserted at A; on each side of groove A is a guide B, and on one side a set-screw C to fasten the felloe with; in the centre of the groove is a metallic tube D running through to guide the bit when boring for the dowel. The object of this guide is to prevent the grain of the wood from drawing the bit.

Claim.—The combination and arrangement of the tube, guides, and set-screw, for the purpose of holding the wood and guiding the bit.

No. 10,093.—Marshall Finley, of Canandaigua, N. Y.—*Improved Daguerreotype Plate Holder.*—Patented October 4th, 1853.



The figure and claim illustrate and explain this improvement.

Claim.—Constructing a solid daguerreotype plate holder, or block, having fastenings at each corner made by spiral springs, in combination with tightening bolts having concave heads, into which the bent or turned corners of the plate to be buffed are hooked, so as to admit of a uniform buffing.

No. 10,094.—Charles B. Hutchinson, of Syracuse, N. Y.—*Improved Machine for Jointing Staves.*—Patented October 4th, 1853.

Claim.—The use of the circular guide-ways in combination with the movable piers, and the cams, or levers, or other suitable means of moving the same simultaneously and equally along the circular guide-ways, so that the saws or other cutters may be instantaneously adjusted for any required width of stave, without stopping their motion or changing their direction towards a constant central point. Also, the use of the wing or leaf-gauge N, in combination with the index moving over a graduated arc or dial, both moving in connection with the saws, so as to indicate at a glance the width between the saws, and to guide the operator in setting the stave on its bed-plate, and in adjusting the saws. Also, the mode of jointing staves to any required bilge and bevel, without bending or springing them, by rotating them endwise in a plane perpendicular to their width, between saws or other cutters so inclined as to give the correct bevel, whether adjustable as above or not, said rotation being upon a circle or other proper curve, such as to present each part of the stave to the action of the inclined cutters at the precise point or height requisite to give it its exact proportionate width or bilge; the rotation being obtained by means of a central arch-piece moving over rollers about a constant centre of motion, substantially as described.

No. 10,095.—I. Augustus Roth, of Philadelphia, Pa.—*Removing Chlorine from Bleached Fabrics.*—Patented October 4th, 1853.

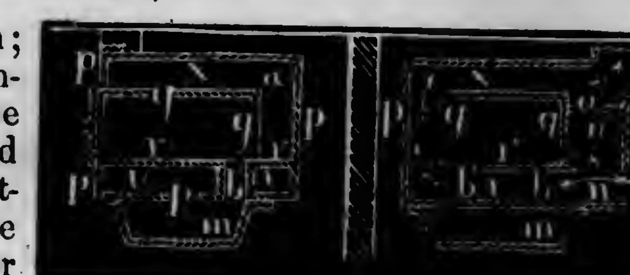
The inventor says that the strength of fabrics and the permanence of their colors are increased by removing the chlorine after they have been bleached. For this purpose he employs a solution to be applied to the fabric, which he denominates sulphite of soda (and is prepared by a process described in his specification).

Claim.—The process of removing chlorine from fabrics by means of the solution described in specification.

No. 10,096.—James H. Murrill, of Richmond, Va.—*Improvement in Looms for Weaving Coach-Lace, &c.*—Patented October 4th, 1853.

Claim.—The revolving pliers, operated by the spindle, whirl, connecting-rod, lever, and cams, in combination with the finger, wedge, and cylindrical stand, by which combination the needles upon which the pile is formed are seized, removed from the finished portion of the fabric, carried up, inserted under the colored warp selected by the jacquard for the figure, and released. Also, the construction of the stationary shuttle-box, having its front sustained by and movable about the projecting rod, so as to operate the ungearing apparatus upon a miss-throw of the shuttle, in the manner specified. Also, the combination of the sliding-reed with the stationary shuttle-box. Also, the combination of the notched wheel, rock-shaft, and arms, with the lever, spring, shaft, rod, and bar, for operating the ungearing apparatus when a derangement occurs in the machinery operating the needles. Also, the springs K, as arranged upon, in combination with the rods *d*, by means of which the strain upon the eyes of the harness is diminished.

No. 10,097.—John P. Hayes, of Boston, Mass.—*Improvement in Cooking Ranges.*—Patented October 4th, 1853.

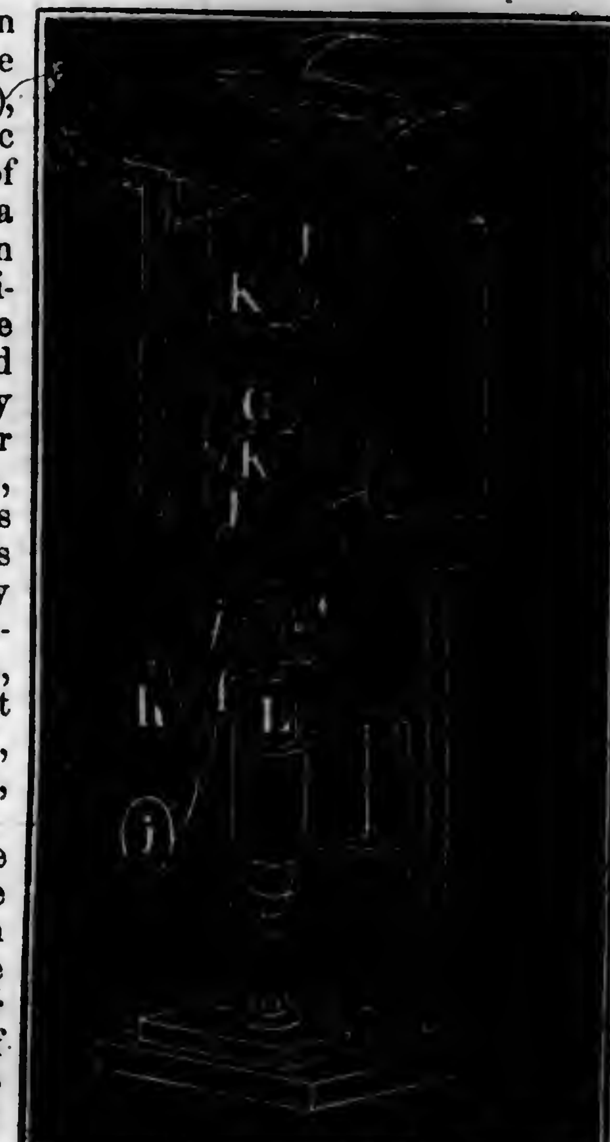


p p, outer casing of oven; *g g*, inner movable oven, composed of three sides and the top, the bottom being formed by the stationary plate *r* attached to *p p*, on which plate the oven can be moved in or out. The smoke, &c., of the fire-pot passes through aperture *t*, and then follows the direction indicated by the arrows into *v v*, *x x*, being made to pass round the oven by the partition *a*, which prevents it from passing directly into the smoke-pipe. The hot air is received from the chamber about the fire-pot into the receiving-flue *m*, and then passes through a box-flue *b′ b′* into the oven. The object is to prevent the smell of any thing being cooked in the oven from passing into the hot-air chamber, and providing means whereby the odor may be carried off in the flues.

Claim.—The receiving or box flue *m m* formed under the oven for the purpose specified. Also, combining the movable oven, sliding

upon a stationary bottom, through which the hot air is admitted, with the smoke-flues about the same, so as to cause the smoke, &c., to pass about and over the oven, and the hot air to pass into the same.

No. 10,098.—O. J. DAVIE and THOMAS W. STEPHENS, of Erie, Pa.—*Improvement in Machines for Punching and Shearing Metals.*—Patented October 4th, 1853.



The nature of this invention consists in disconnecting the punch, or its stock L (see fig.), from the yoke J, by an automatic movement at each operation of the machine, by means of a weight *i* acting in connection with a wedge *j*, in which position the punch ceases to operate until the metal to be punched is properly in place, when, by a slight touch of the operator upon the rising of the punch, the connection between them is again made, and the punch is again thrown into operation, by this means allowing the machine to continue in motion, whilst the punch is only brought into action when required. K K, friction and pressing rollers; *d*, eccentric.

Claim.—Disconnecting the punch-stock from the machine automatically at each operation of the punch, by means of the weighted lever and key or their equivalents, for the purpose of affording the operator time to place his sheets, without regard to the motions of the machine, when, by a slight movement of the ball or lever upon the rising of the punch, the connection can be again formed.

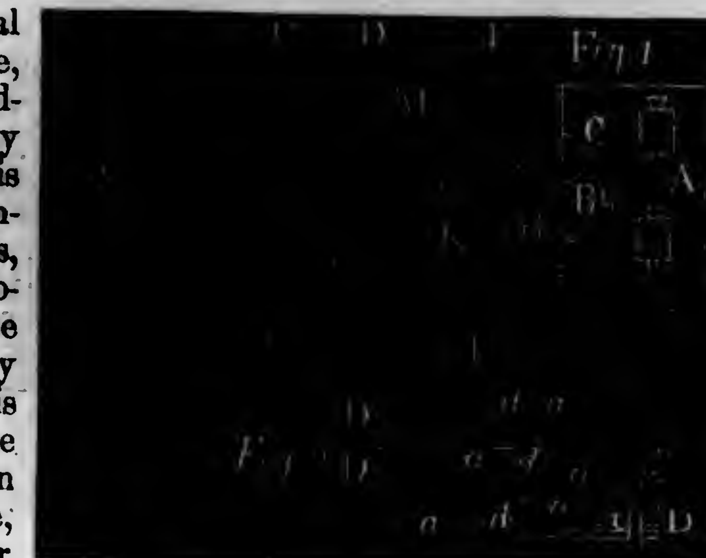
No. 10,099.—JOHN NEWELL, of Boston, Mass.—*Improvement in Camphene Lamps.*—Patented October 4th, 1853.

This improvement is fully set forth in the inventor's claim.

Claim.—Silvering the perforated metal or brass, copper, or iron wire-gauze, used in safety lamps and cans or other vessels designed to prevent explosions from the vapor of camphene, burning-fluid, &c., the silvering being applied for the purpose of preventing the corrosion of the metal or wire-gauze. Also, the introduction of perforations in the

caps of lamps used for burning camphene, burning-fluid, &c., so small as not to admit the communication of flame through them, for the purpose of allowing the escape of the vapor formed within the lamp from camphene, &c., and thereby preventing the bursting of the lamps by the pressure of the vapor.

No. 10,100.—RICHARD PINDELL, of Fayette County, Ky.—*Improvement in Planing-Machines.*—Patented October 4th, 1853.



In frame A, two equal pairs of wheels B revolve, carrying the endless feeding and planing bed *c*, by the planes D. This bed is constructed of slats E, connected by hinge-joints, and has slight chisel projections, on which the plank is impressed by pressure-rollers F, as it is fed to the machine. The ends of these bars slide in grooves G in the frame, and are concave at their parts of contact with the wheels, to fit snugly thereon. The axle of one pair of wheels is adjustable to regulate the tension of the travelling-bed. The power is applied to the crank H. Tongueing and grooving knives can be attached to the machine on the side opposite the planes.

Claim.—The combination of the differential velocities of feed-motion and the motion of the knives; that is, when their relative speed is such that the knives shall cut on their back as well as on their forward motion. Also, giving to straight-edge planes for dressing lumber a partial reciprocating rotary motion about their own centre. Also, the yielding pressure-roller placed in front of the stocks, in combination with an endless planing-bed, for the purpose of feeding planks, &c., to the planes.

No. 10,101.—C. R. BRINCKERHOFF, of Batavia, N. Y.—*Improvement in Ploughs.*—Patented October 11th, 1853.

The width of the furrow is gauged by adjusting the wheel D to a greater or less distance from the beam L. Wheel G (on the land side) is provided with a slip-collar, so that the axle may be taken out of its supporter when necessary. This plough requires no holding, except when turning round, and can be attended by a boy.

Claim.—Combining with the plough-beam, between the plough and the clevis, two wheels, one on each side of the beam, and of different diameters, the one resting in the furrow and the other on the land, for the purposes set forth. Also, making the tread of the furrow-wheel narrow, so that it may press lightly against the land, and gauge the

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width of the furrow-slice, and cast aside any small stones that may roll against the land. Also, making the wheels, especially the furrow-wheel, adjustable in the direction of its axis, for the purpose of adapt-

ing its position to furrows of different widths. Also, making the furrow-wheel bevelling outward on the side which presses against the land. Also, making the small wheel adjustable vertically with reference to the shaft B and the large wheel.

No. 10,102.—H. P. BYRAM, of Louisville, Ky.—*Improved Machine for Cleaning Blue-Grass and other Seeds.*—Patented October 11th, 1853.

The nature of this invention consists in removing the chaff or hulls from the seed, by pressing and holding it up against an emery or sand wheel, by an unvarying pressure, whether the hopper be more or less full.

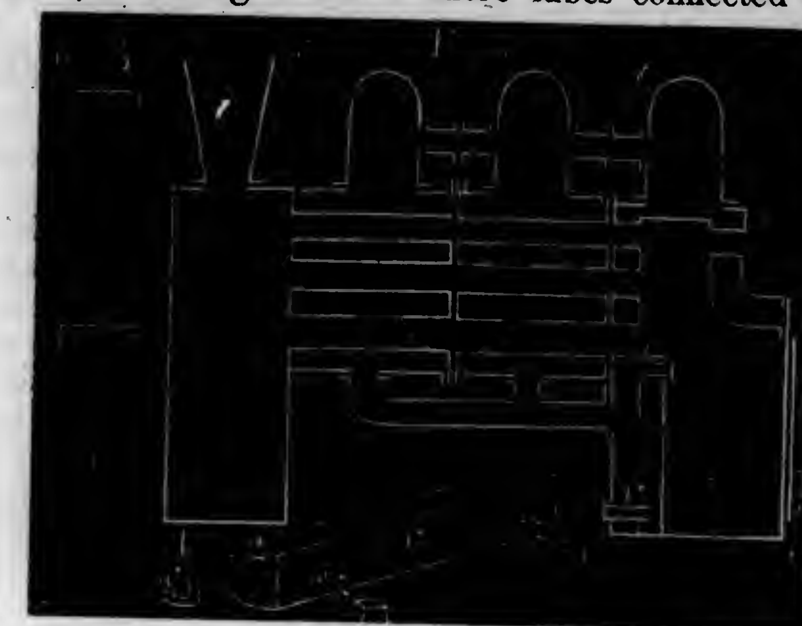
B, hopper; follower C fits close in said hopper, and its arm D is carried in guide E; cord F and weight G draw forward follower C, and thereby the seed is forced up to the sand-wheel H, with sufficient power for the wheel to cut away the chaff. The seed drops down on to the screen I.

Claim.—In combination with the rubbing or scouring wheel, the method of feeding up and holding against the wheel the seed to be cleaned, by a pressure which is unvarying, whether the hopper be full or not.

No. 10,103.—J. B. COLLAN, of Reading, Pa.—*Improvement in Steam-Boilers.*—Patented October 11th, 1853.

By reference to the figure, the claim will explain this improvement. Fig. 2 represents one of the D-shaped water-linings.

Claim.—A detachable lining for the sides and ends of fire-boxes of steam-boilers, consisting of one or more tubes connected with the ad-



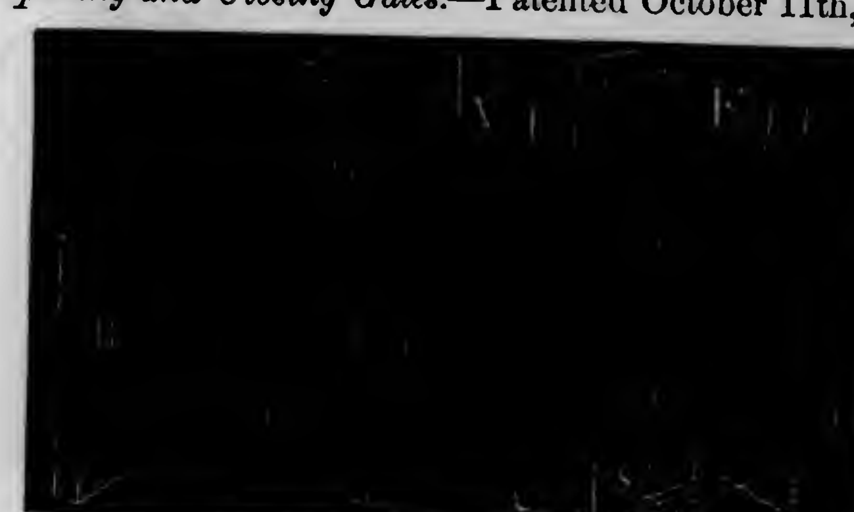
jacent water-space by means of hollow bolts or their equivalent, substantially as described, so as to admit of the ready removal and replacement of the tubes.

No. 10,104.—GILMAN DAVIS, of Roxbury, Mass.—*Improved Ash-Pans for Locomotive Engines.*—Patented October 11th, 1853.

The arrows indicate the direction of the current of air.

Claim.—The taking in of the air in front of the ash-pan, and introducing it into the fire-box, in a direction opposite to the furnace-doors, to protect the firemen from the back-lash of the fire when the doors are opened.

No. 10,105.—S. G. DUGDALE, of Richmond, Ind.—*Improved Apparatus for Opening and Closing Gates.*—Patented October 11th, 1853.



Pin *b* moves in grooves *s*, *c*, *t*; when the gate is shut it rests in *c*; when open, in *t* or *s*; the cord *v* is firmly connected to the lower end

m of pin *b*; at some distance from gate G, on both sides of it, the cord *v* is attached to a combination of levers, in such a manner that the gate opens as soon as the carriage-wheel strikes one of the levers, and stands open until the wheel strikes one on the other side of the gate, after having passed the gate. Fig. 2 shows the levers A and B on both sides of the gate, and *f* extends into the street, and the carriage-wheel is to pass over it. The weight *w*, attached to lever A, turns A so that it strikes lever B when the carriage-wheel passes over *f*.

Claim.—Opening, closing, fastening, and unfastening the gate, by moving the bottom of the gate in an oblique direction from and to the post upon which it is hung. Also, the use of the pendulous and vertical levers *f f* and *i i*, and arms *g g* and *h h*, in combination with the hinges of the gate, the whole being operated and arranged in the manner and for the purpose as above set forth.

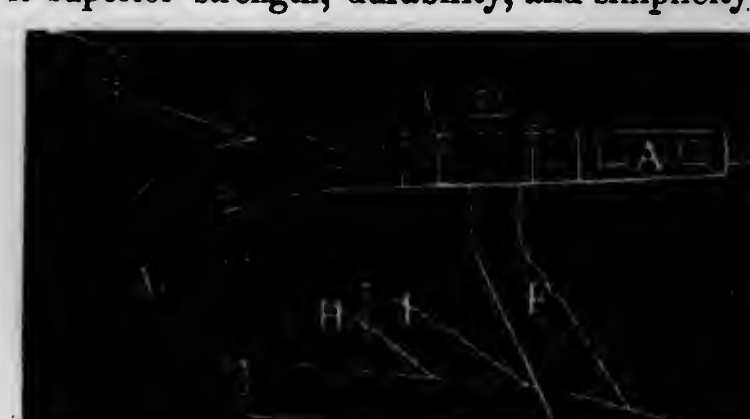
No. 10,106.—Charles Goodyear, of New York, N. Y. *Improvement in Coating Metals with Gutta-Percha.* Patented October 11th, 1853.

The nature of this invention consists in the application of "caoutchouc or gutta-percha," when mixed with pulverized sulphur (six or eight ounces of sulphur to one pound of gum), to the surface of metal. The article covered is subjected to a high degree of heat, from 260° to 300° Fahrenheit, from three to seven hours. The hard compound covering may then be polished and varnished.

Claim.—The art or method of coating articles composed wholly or partly of metal with compounds of caoutchouc or gutta-percha, and subjecting the same to a high degree of artificial heat, or the process of vulcanization, substantially as specified.

No. 10,107.—Nathan Harrison and John W. H. Metcalf, of Ridgeville, Va.—*Improved Hill-side Plough.*—Patented October 11th, 1853.

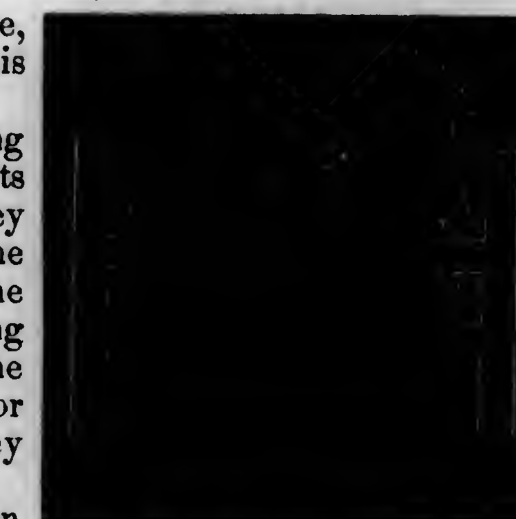
The nature of this improvement consists in so constructing the plough as to give it superior strength, durability, and simplicity, and render



it not so liable to get out of order as those heretofore in use. The entire plough is made of wrought iron, except the mould-board, which is cast.

Claim.—Curving downward and inward the beam A in the rear part, so as to cause it to support the rotary part of the plough, which it performs in combination with the standard.

No. 10,108.—Joseph Harris, Jr., of Boston, Mass.—*Machine for Driving Circular Saws.*—Patented October 11th, 1853.



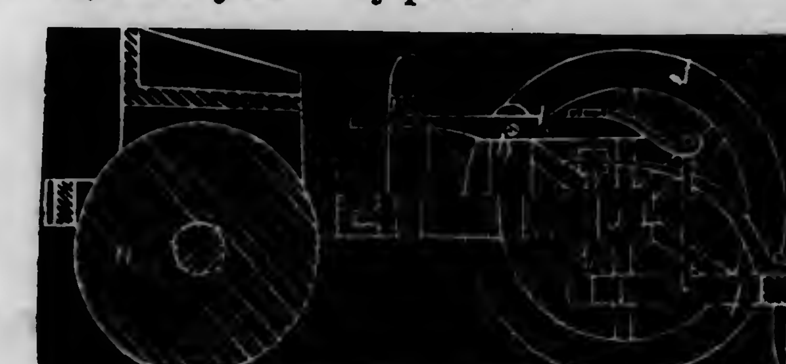
By reference to the annexed figure, the claim will show the nature of this improvement.

Claim.—The method of hanging the arbor-frame on journals, for its axis, each side of the driving-pulley bringing the axis of the arbor-frame within the circumference of the driving-pulley, or on a line passing through the driving-pulley, so that the act of feeding the stuff to the saw or cutter will press the arbor-pulley against the driving-pulley.

Also, hanging the arbor-frame on such an angle that the act of feeding the stuff to the cutter will press the arbor-pulley against the driving-pulley, in combination with a spiral spring, or its equivalent, for holding the arbor-pulley firmly against the driving-pulley.

No. 10,109.—Daniel Hill, of Bartonia, Ind.—*Harrow and Roller combined.*—Patented October 11th, 1853.

f f are a pair of wheels; *d*, the axis of the wheels; *a*, roller; *g*, harrow; *h h*, rods carrying the harrow, and sliding in staples *i i*. The object of this arrangement of the parts is to permit the harrow to accommodate itself to every inequality of the ground; *k* is a lever turning on pivot *b*, and adjustable by pin at *n*.

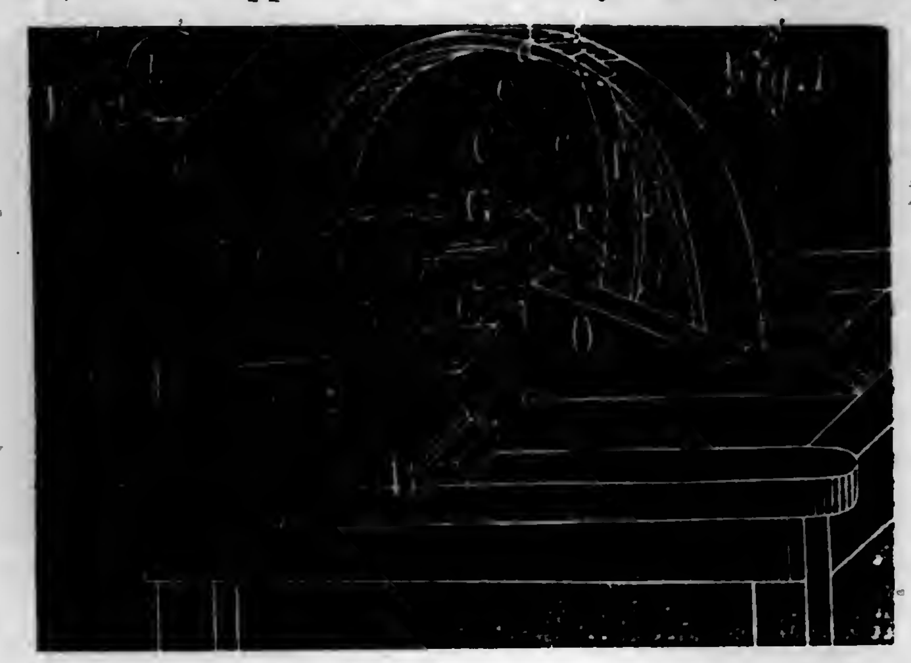


Claim.—The arrangement and mode of attaching the harrow to the forward axle of a roller, in the manner and for the purposes specified.

No. 10,110.—Thomas B. Jones, of Carloville, Ala.—*Improved Straw and Cob Cutter.*—Patented October 11th, 1853.

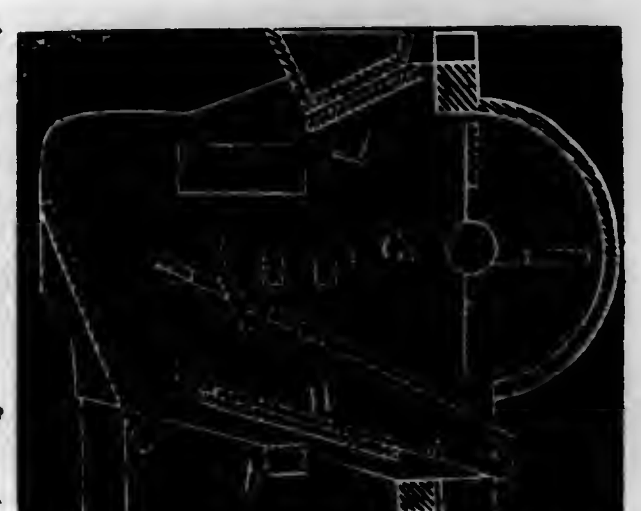
In fig. 1, B represents the shaft which supports the shelling and cutting wheel, which consists of a metallic disk C, with a series of

shelling teeth e, cast fast to its face; d is the rim of the disk, and it projects beyond the face and back, thus increasing its stiffness, and furnishing a support for the knives f. The inner extremities of the knives are made fast to the hub of the wheel, which also projects beyond the face and back; their outer extremities are made fast to the raised rim, and are supported at intervals by bosses i i, cast fast to the



disk. E is the feed-tube: the feed-trough F is secured to the back of the frame, for the introduction of the straw. The feed-trough is provided with a feed-roller g (fig. 2), which is toothed; and its gudgeon, which projects through the box, is fitted with a screw-wheel h, which has teeth that engage with the threads of screw k, on the shaft of the cutting and shelling wheel; l is a roller, supported above the first by frame m; the beam o supports, at its inner extremity, the trough F. G is an inclined feed-tube, for the presentation of corn-cobs to the action of the cutters; r is a ring-gauge, which limits the length of pieces cut. The wheel t engages with a pinion on the shaft B, to which wheel the power is applied.

Claim.—The combination of the feeding-trough F, its gauge-disk C, the tube G, and its gauge-ring r, with the knives f; whereby the same knife will, at the same time, cut fodder coarse and cobs fine, and thereby improve the quality of the product as feed for animals.



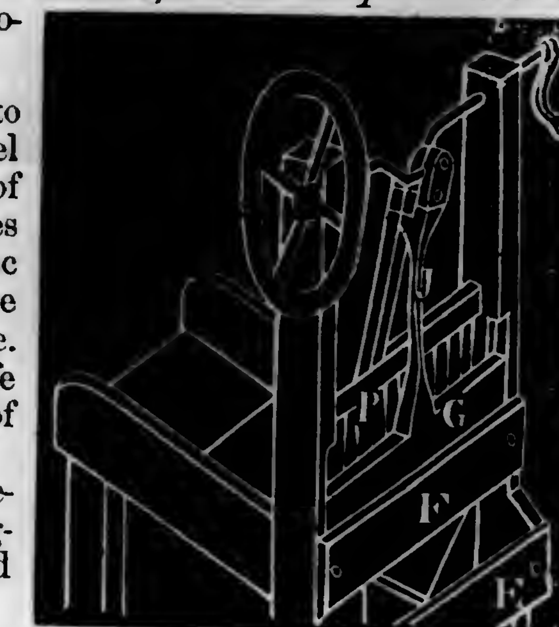
No. 10,111.—H. M. KELLER, of Newark, Ohio. — *Improvement in Fanning-Mills.*—Patented October 11th, 1853.

The front end of screen H can be raised or lowered by straps o, to let the grain pass off more or less rapidly; and the revolutions of fan-

wheel G are made to give an oscillating motion to the hopper, the riddle, and the screen H. The trap-door m is shut when no screening is necessary.

Claim.—The trap-door m, in combination with screen H, arranged and operated in the manner and for the purposes described in the specification.

No. 10,112.—J. J. PARKER, of Marietta, Ohio.—*Improvement in Straw-Cutters.*—Patented October 11th, 1853.



G is a reciprocating-gate, to which is attached an iron or steel plate H, extending up the sides of the gate as far as the gate moves on the knife F; J, pitman, of elastic wood or metal; E, board to gauge the length of the straw cut; P, rake. The gate G is pressed against knife F, on account of the elasticity of pitman J.

Claim.—Operating both the reciprocating-gate and the feeding-rake, by means of the compound spring pitman.

No. 10,113.—SAMUEL SNOW, of Fayetteville, and ALEXANDER HINE, of Lafayette, N. Y.—*Improvement in Cultivators.*—Patented October 11th, 1853.

The figure and claim illustrate and explain this improvement.

Claim.—The combination of the two toothed cylinders with the receiving-box, all being arranged and suspended on an adjustable frame, in the manner and for the purposes set forth in the specification.

No. 10,114.—J. L. VAN VALKENBURGH, of Ogdensburgh, N. Y.—*Improved Machine for separating Cockle, &c., from Wheat.*—Patented October 11th, 1853.

In the figure, A represents the frame; B, the receiver, which is

supported adjustably by rods o from the frame; c, coarse sieve, which permits the grain to pass through freely; D, sieve fine enough to retain the grain; E, bottom of receiver; F, opening to let the coarse dirt pass off; G, opening for the grain to pass out; I, driving-pulley on shaft J; K, crank, with slot s, for the reception of shaft J; the end pivot P of crank K turns in the centre of a bar L, which is attached to the two sides of the receiver. The rotation of I will set the receiver in rotary motion.

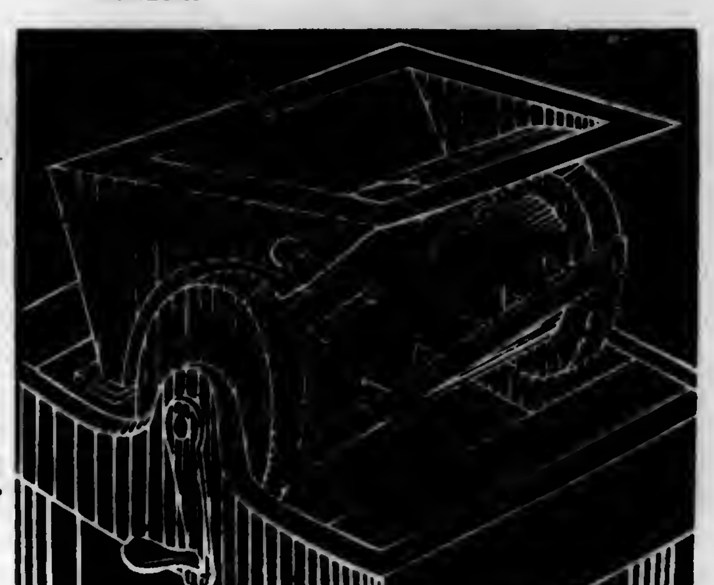
Claim.—The communication of a reciprocating rotating motion to the sieves or separators, and also the construction of the machine in the manner substantially as set forth, for separating grain from cockle and other impurities.

No. 10,115.—H. W. Woodruff, of Watertown, N. Y.—*Improved mode of treating Metals in Casting.*—Patented October 11th, 1853.

The object of this invention is the expulsion of impurities which are mechanically mixed with the metal in the molten state. The process is as follows: After the iron has been run from the furnace into the ladle in the usual manner, a large potato, secured on the end of an iron rod, is plunged into the molten iron, and kept at the bottom as long as may be desired: the mass soon becomes violently agitated, by which all foreign substances are thrown up to the surface, from which they can be skimmed off or otherwise removed.

Claim.—Treating metals while in a molten state, to expel impurities therefrom, by immersing therein some porous or cellular non-conducting substance or substances, containing liquid matter, substantially as described.

No. 10,116.—D. H. Whittemore, of Chicopee Falls, Mass.—*Improved Machine for Cutting Vegetables for Fodder.*—Patented October 11th, 1853.

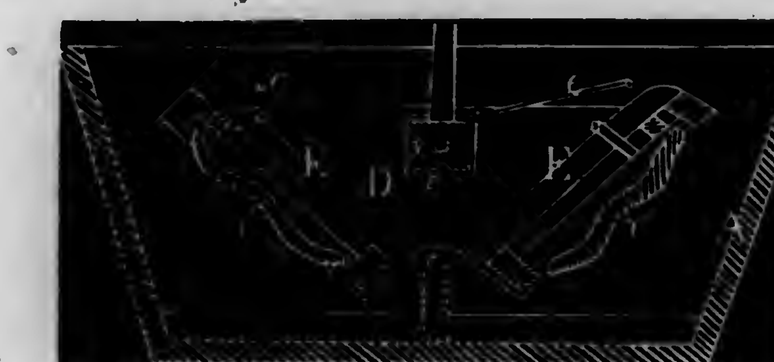


The figure and claim illustrate and explain this improvement.

Claim.—The combination of the long and short knives on the periphery of the cylinder, with the hopper, arranged as described and represented.

No. 10,117.—H. G. Robertson, of Greenville, Tenn.—*Improvement in Washing-Machines.*—Patented October 11th, 1853.

This machine consists of a rocking-frame D (see fig.) on a rocking-shaft C, having hinged slatted washing-boards E arranged inclining, and having cords *e e* for holding the cloths under its bottom while being washed. A is the tub, divided into two compartments, for washing white and colored clothes at the same time. The bottom of the tub is also slatted, and works in combination with the wash-boards. The rocking causes the clothes to strike parallelly the horizontal bottom and the hot suds, which latter are forced through the pores of the clothes by the two slatted surfaces coming together.



Claim.—The employment of the double-chambered slatted-bottom tub A, in combination with the vibrating or rocking-frame D, constructed as described; the wash-boards being made movable or swinging, so that the clothes can be easily laid on the cords; the whole being constructed, arranged, and operated in the manner set forth.

No. 10,118.—Banford Gilbert, of Pittsburgh, Pa.—*Improvement in Griddles.*—Patented October 11th, 1853.

Claim.—Constructing griddles of two pieces, separated by flanges furnished with openings to admit of the passage of cool air between the upper and lower pieces of the griddle, which openings may be closed at pleasure.

No. 10,119.—A. B. Latta, of Cincinnati, Ohio.—*Improvement in Valve-motion of Oscillating Engines.*—Patented October 11th, 1853.

By reference to the annexed figures, the claim will explain this invention.

Claim.—The mode of arranging the valve-chambers outside the barring or trunnion on which the cylinder oscillates, in such manner as to allow the wrist-pin of the eccentric rod to move equally across the centre of the trunnion, and moving equally above and below; and thereby giving motion to the valve or valves by said

eccentric, independently of the oscillating of the cylinder.

Also, the sliding bar or bars to which the eccentric is attached, and passing up the whole length of the valve-chambers to the end or ends, as the case may be, and attached to the valve-rods, thereby giving motion to the valves.

Also, this arrangement, as set forth by drawings or their mechanical equivalents.

No. 10,120.—YELLAND FOREMAN, of New York, N. Y.—*Improvement in Metallic Boats.*—Patented October 11th, 1853.

The object of this invention is to obtain the greatest amount of interior space, strength, and stiffness, and at the same time a large amount of insulated buoyant power, safely distributed.

Claim.—Constructing the body of life-boats wholly of metallic tubes, brazed or similarly united throughout, thus affording a water-tight and solid metallic connection and mutual bracing of every part, whereby the objects referred to are attained in an advantageous manner.

Also, in combination with such boat, the detachable tubular seat.

No. 10,121.—WILLIAM STEPHENS, of Pittston, Pa.—*Improvement in the Slide-Valve Motion of Oscillating Engines.*—Patented October 11th, 1853.

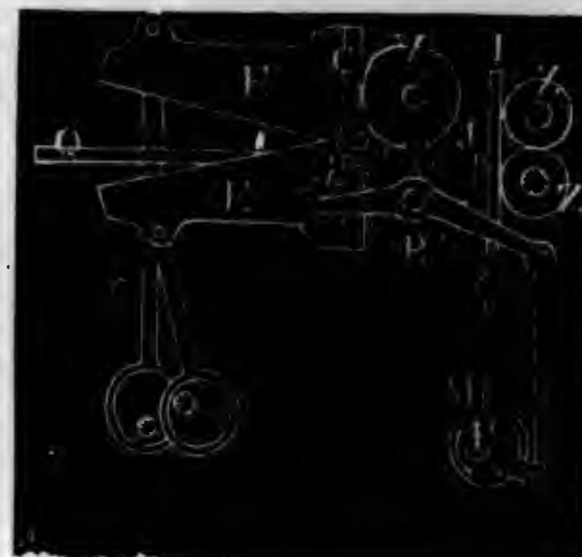
The valve-motion which forms the subject of this improvement produces the necessary movement of the slide-valve by means of a fixed groove or guide attached to some part of the engine-frame, in a convenient position to receive a stud attached to the valve-rod, the stud receiving a proper motion by being carried along the groove or guide by the oscillation of the cylinder. (See figs.) A, cylinder, oscillating in bearings *a*; D, valve-box; G, slide-valve; H, frame, which has a hole on its top to receive a hollow journal *e* at the top of way-frame I, which is adjustable, containing the groove or guide; screw-stud *f* forms a pivot for the lower part of the way-frame—the journal *e* and pivot *f* thus forming an axis which is radial to the axis of oscillation of the cylinder. The arc J has a groove or guide formed by strips *g g'*, projecting on its under side for the reception of friction-roller *h*, which turns on a pivot on the cross-head K, secured to the valve-rod;

the two eyes *k k* of this rod fit to two guide-rods *l l*, which are so secured to the valve-box as to preserve the rectilinear motion of the rod. Frame I is under the control of lever L, having its fulcrum in the engine frame; and can be adjusted on its axis *e f*, so as to bring arc J at an inclination to the axis of the cylinder's motion, as shown in fig. 2, or at right angles to the axis, as in fig. 3. The arc being in this latter position, the engine is stopped; but when in the position shown in fig. 2, the groove is similar to the recess in the thread of a screw, and, as the cylinder oscillates, gives motion to the valve.

Claim.—The combined arrangement of the slide-valve and the guide J, which assists the oscillation of the engine in producing, and directs the motion of the valve, substantially as described, to wit: the valve being arranged to work transversely to the cylinder, and the guide being in the form of part of a helix or screw, concentric to the axis of the cylinder's oscillation, and receiving an arm or cross-head attached directly to the rod or stem of the valve, whereby the intermediate mechanism usually employed is dispensed with.

Also, giving the necessary or desired "lead," by means of the adjustable sliding lining pieces M M', which line the sides of the guide, and are furnished with projecting or rising parts *n n*, which will give the necessary "lead," in working the engine in either direction.

No. 10,122.—John A. Elder, of Westbrook, Me.—*Machine for Cutting Pasteboard.*—Patented October 11th, 1853.



To operate this machine, power is communicated to shaft P, and the pasteboard laid on the table or arm Q, and then moved into the series of shears E E, which close and cut into the pasteboard; then the board is moved to the rolls V V, which take the board and move it to the shears I J; the shear-blade I, which moves in a vertical slot, is drawn down by the eccentric M, and at the same time the series of shears E E cut into the pasteboard, and when they are opening, V turns the ratchet-wheel R, and this wheel turns the rollers V and Z, carrying along the pasteboard; then the shears E E and I close and cut the pasteboard, and so on until the whole sheet of pasteboard is cut up.

Claim.—The arrangement of machinery for cutting pasteboard into strips, and those strips a given length at the same time. Also, the arrangement of the rocker-shaft C, rolls V V, Z Z, and shears I J, for the purpose specified. Also, the series of shears E E, or its equivalent, for the purpose described

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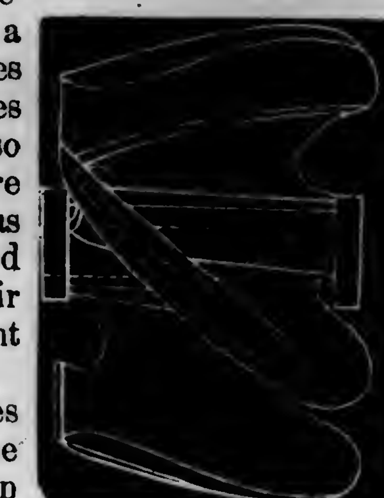
No. 10,123.—L. M. Whitman, of Weedsport, N. Y.—*Improvement in Cultivators.*—Patented October 11th, 1853.

By reference to the annexed figures, the claim explains the nature of this improvement.

Claim.—The employment of the long inclined spring-wings C C, secured at their front ends to the share and main standard, and turning upon the pin E′, in combination with the mechanical contrivances herein shown, for expanding and contracting the wings, or setting them more perpendicular and nearer together, for the purpose of throwing more pulverized soil against or up to the hills, or setting them less inclined to the horizontal plane, and further apart, for the purpose of allowing the pulverized soil, weeds, &c., to pass over them into the broad open spaces in the centre, the wings, in either case, cutting up the weeds and pulverizing the soil, as fully set forth in specification.

No. 10,124.—Ebenezer Beard, of New Sharon, Me.—*Improvement in Screw-Propellers for Propelling Vessels.*—Patented Oct. 18th, 1853.



This invention relates to certain improvements in the form given to the blades of a screw-propeller, and consists in placing flanges circumferentially upon the propelling surfaces of the blades at their outer margins, and also at their inner margins, when the blades are made much broader than their arms, as shown in the figure. They are also placed upon the back sides of the blades at their circumference to render them more efficient in working backwards.

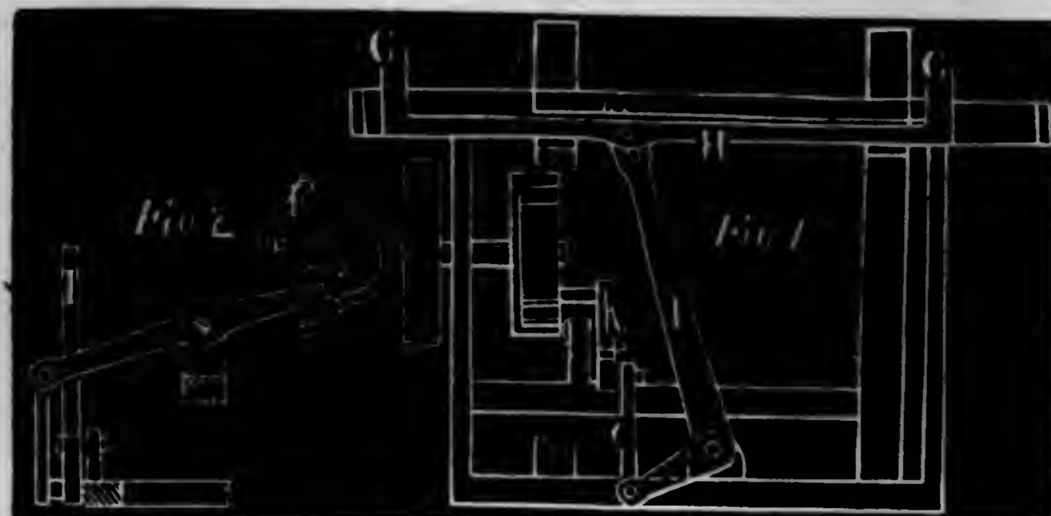
Claim.—The use of one or more flanges or rims, placed circumferentially upon the blades of a screw-propeller, substantially in the manner and for the purposes described.

No. 10,125.—Edwin B. Bowditch, of New Haven, Conn.—*Improved Sofa-Bed.*—Patented Oct. 18th, 1853.

By reference to the annexed figure, the claim will explain this improvement. A is the under seat hinged to the front of the sofa in such a way that it can be turned out, when the seat B is turned back. C is the back of the seat, and may be moved back, as indicated in the dotted lines.

Claim.—The arrangement of hinging the ordinary sofa-seat to the back-rail of the sofa-frame, in combination with the arrangement of hinging an under seat with the upholstered side down to the front-rail of the sofa, so that said under seat, by lifting the ordinary seat back, can be turned out to the front of, and on a level with the ordinary seat, thus forming a bed. Also, the arrangement of hinging the stuffed back to the top rail of the sofa, and attaching the back, at the bottom, to the top seat by strips of iron, in combination with the arrangement of hinging the top seat at the back lower corner.

No. 10,126.—William Crighton, of Fall River, Mass.—*Improvement in Shuttle-motion of Looms.*—Patented Oct. 18th, 1853.



This invention consists in connecting the two pickers G G (see fig.) by means of a rigid rod H passing through the lay, and giving motion to the same, by a picker-lever I, which is operated upon to throw the shuttle in both directions by a single cam on a short shaft at one side of the loom. The object of this improvement is the giving of the pickers a perfectly parallel motion, by simpler mechanism than that commonly employed for the purpose. Figure 1 is a front view of the apparatus, and figure 2 shows parts of it in a side view.

Claim.—Connecting the two pickers with a rod or rigid connection H, which receives motion from a single lever I, and one cam F, whereby both pickers are operated, as herein set forth.

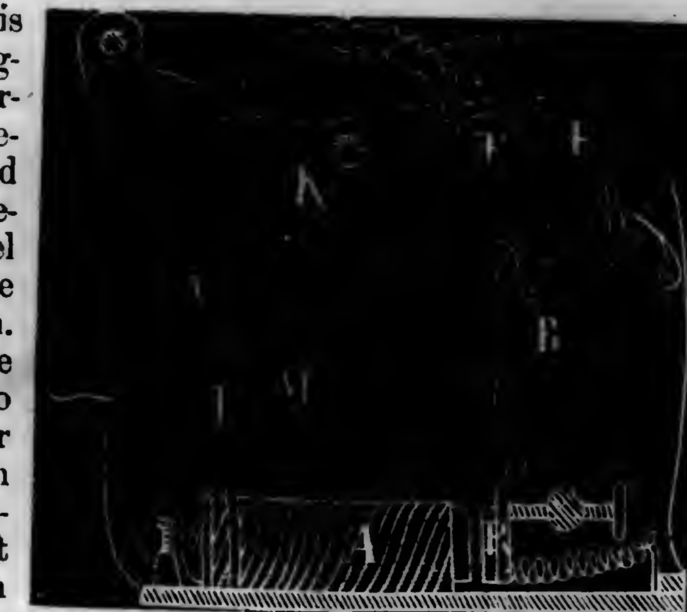
No. 10,127.—Henry S. Crider and David Williams, of Lancaster, Ohio.—*Improvement in Mechanical Dentistry.*—Patented Oct. 18th, 1853.

Claim.—Securing the artificial teeth to a plate by the usual method, and afterwards fastening said plate on the alveolar ridge of the plate having the impression of the mouth, either by riveting or the employment of soft solder, so as to prevent the application to the plate (having the impression) of the intense heat required to secure the teeth, as and for the purpose herein set forth.

No. 10,128.—James J. Clark, of Philadelphia, Pa.—*Improvement in the Construction of Self-winding Telegraph-Registers.*—Patented Oct. 18th, 1853.

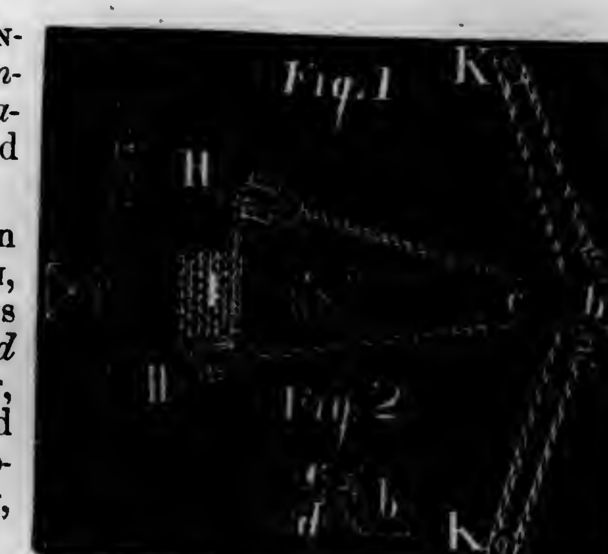
The operation of the several parts of this improvement is as follows: When the spring unwinds and propels the train of register-wheels, it also rotates the break-circuit wheel M; as the wheel M revolves, the spring J alternately strikes the face of the teeth X X, and falls into the cavities between them. Each time J (the spring) presses on the teeth X X, it, by so doing, closes a galvanic circuit extending from the battery around the winding magnet. When the spring falls between

the teeth, this circuit is broken. The winding-magnet A, thus caused alternately to attract and release the armature R and the lever B attached thereto, moves the ratchet-wheel E through the space of one tooth at each vibration. The number of teeth on the break-circuit wheel M is so proportioned that the lever B is caused to vibrate with sufficient rapidity to revolve the spring-shaft (through its gearing with the shaft T) with the same velocity that the spring unwinds itself to revolve the train of register-wheels. To start the train of register-wheels the wheel K is turned, which winds up the spring, which is fastened to the same shaft.



Claim.—The combination of the winding-magnet, the break-circuit wheel, and spring, with the train of wheels of an ordinary telegraph-register, as set forth.

No. 10,129.—Charles Flanders, of Boston, Mass.—*Improvement in Steering Apparatus for Vessels.*—Patented Oct. 18th, 1853.

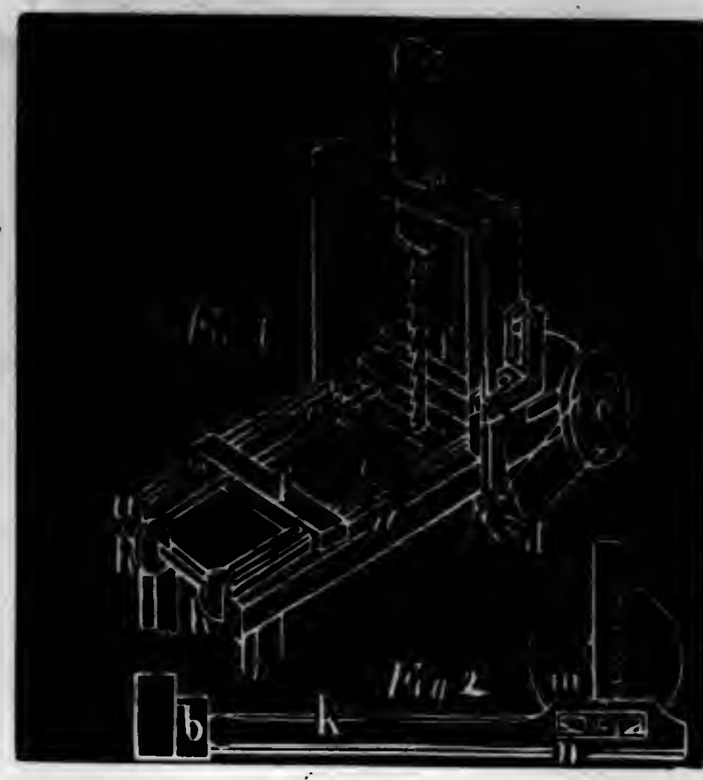


Claim.—The combination and arrangement of the rope I, the two sets of leading-blocks H H′, K K′, and the sheaves *c d* in the after end of the tiller, with one another; the tiller and windlass so as to operate together and move the rudder, substantially as described.

No. 10,130.—Benjamin Frazee, of Durhamville, N. Y.—*Improved Portable "Mully" Saw-Mills.*—Patented Oct. 18th, 1853.

The nature of this invention consists in the method of attaching the saw-blade to the main shaft, by which a reciprocating movement is imparted to the saw in such a manner that the saw will draw into the log in its downward movement, and draw out from the log and clear itself on its upward movement; the whole being constructed without the usual incumbrances of sash, pitman, carriage, or geared or cogged pinions. (See figs.) *a a* horizontal sills of

the main frame; d, main shaft; $f\,f$, the two head-blocks connected by the endless chains $g\,g$. These chains pass over pulleys on the feeding-shaft which is operated by the ratchet-wheel and pawl.



Claim.—Attaching a reciprocating saw-blade to the main shaft by means of a slotted lever and crank-pin operating in the manner set forth.

No. 10,131.—Robert Griffiths, of Newport, Ky., and George Shield, of Cincinnati, Ohio.—*Improvement in Machinery for making Wrought-iron Railroad-Chairs.*—Patented Oct. 18th, 1853.

This invention has reference to that class of machines for making railroad-chairs in which the blank or plate is first clipped, and the clip afterwards bent to form the lip for lapping over the lower flange

of the rail on the sleepers or bearers, and consists in a novel construction and mode of hanging the clipping and bending levers, whereby they are made "adjustable to the greatest nicety," to suit different thicknesses of blanks or plates, various lengths of lips and distances apart between the clips, and various degrees or configurations of bend to the clip, as the form of the rail may require. (See figure.) b is the mandrel upon which the plate or blank is placed after being heated; B the clipping-levers (and in the same manner the bending-levers) having their fulcra c in eccentrics d inserted in the head-stocks, and being made to operate upon the plate by the action of the revolving cams C against their tail-end, their own weight serving to throw them back or open, after the operation has been performed. The tail-end of each of the levers is pivoted by a joint-pin e to the box-lever E, and affixed therein at any required set by adjusting screws f and g.

Claim.—Hanging the fulcra of the clipping and bending levers eccentrically in boxes made capable of circular movement, for the purpose of adjusting the said levers to their work with facility and accuracy. Also, the method of adjusting the angular set of the clipping and bending levers by pivoting and adjustably connecting them to outer operating levers, whereby a varied inclination may be given to the cutting and bending of the clip, to suit different thicknesses of blanks or forms of chair required.

No. 10,132. George W. Griswold, of Carbondale, Pa.—*Improvement in Cutting Apparatus for Tailors, &c.*—Patented Oct. 18th, 1853.

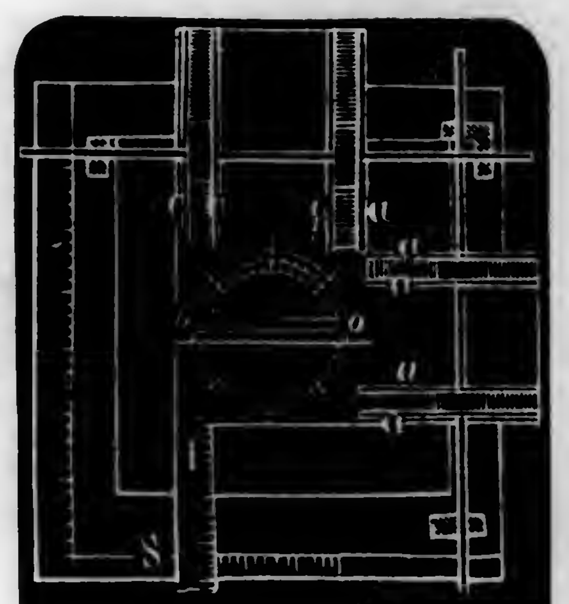
(See fig.) The cloth is passed between the jaws A and C. The jaw A has, through nearly its whole length, a slot I to make room for the knife j, as it passes along. The knife is hinged to the piece B, which slides on dove-tail nuts $a\,a$, outside the jaw A. The foot F of the knife passes along the waved bottom line, and the knife j moves up and down during the cutting operation.

Claim.—Stretching the material to be cut over the two jaws of the stock, and holding it firmly in place by the clamp, whilst the knife divides it with a draw-cut, substantially as set forth.

No. 10,133. Thomas Hinkley, of Hallowell, Me.—*Improved Machine for finding Distance, Departure, Difference of Latitude, and for Drafting.*—Patented Oct. 18th, 1853.

The axes of the wheels B B and B′ B′ are made to turn and slide longitudinally in boxes A A A, and gear into racks R R and R′ R′. By means of the sunken racks (or the racks provided with parallel edges or bars $a\,a$), the pinions, and the shafts made to rotate and slide in

these supports, a compound or resultant parallel motion of the compass-plate can readily be obtained.



(The accompanying figure represents a top view of the machine.)

Claim.—The method or means of obtaining, in the above-described machine, a compound or resultant parallel motion, the same consisting in a combination of pinions or gears and sunken racks (racks provided with parallel bars), two sliding and rotary shafts, as arranged, connected, and supported so as to be operated together.

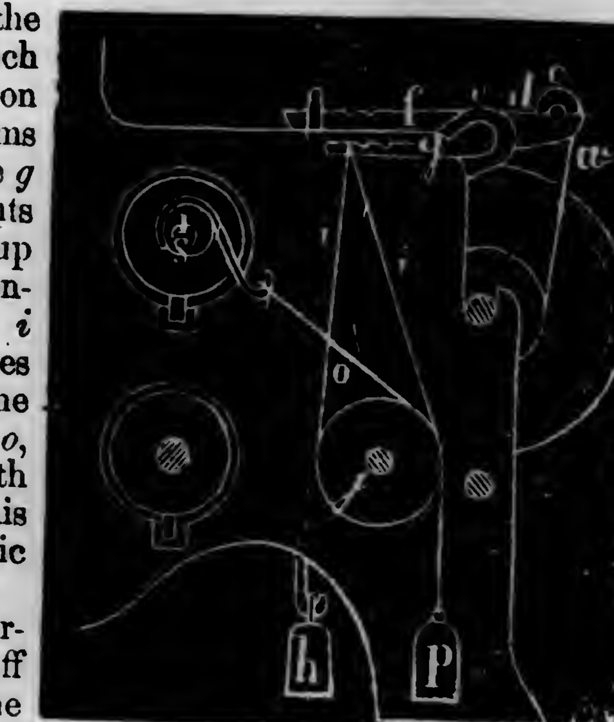
No. 10,134. DANIEL LYNAHON, of Buffalo, N. Y.—*Improvement in making uncrimped Boots.*—Patented Oct. 18th, 1853.

First, cut the vamp according to figure 1, and fold it together as usual. Secondly, cut the piece, fig. 2, and sew it on the side *c* of the vamp *k j*; the opposite half of the same size being a substantial part of the vamp. Then sew up the centre of the front, which forms the seams *l m* and *m n*. Then the top *o* is added. The front seam is covered with the tongue *i*, which is also a part of the vamp.

Claim.—The tongue *i*, which gives to the vamp a more exact crimped turn; secondly, covers the seam *n n* from being seen, and prevents it from ripping; and thirdly, keeps the other seams *l m* and *p n* permanent, by receiving the strain that comes on them when drawing on the boot.

No. 10,135. WILLIAM MASON, of Taunton, Mass.—*Improvement in Power-Looms.*—Patented Oct. 18th, 1853.

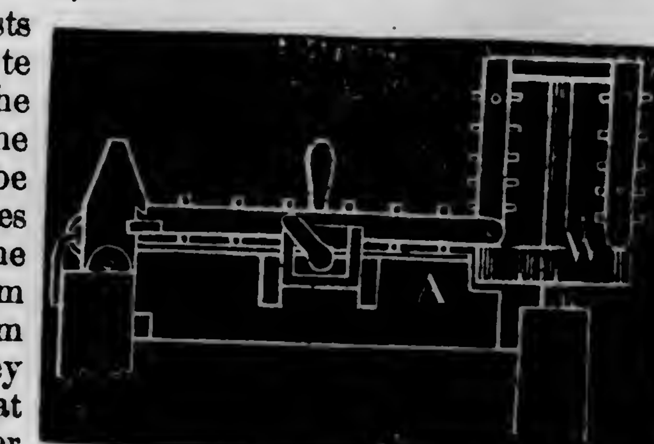
This invention consists in the employment of a whip-roll, over which the warps pass from the warp-beam to the breast-beam, which roll is forced up by adjustable weights, when the roll is combined by means of a friction strap or band with the periphery of a wheel, which, by gearing, communicates the let-off motion to the warp-beam, and which receives motion from a crank or eccentric from the lay or crank-shaft by a weighted cord wrapped around it, so that when the whip-roll is up and the friction-strap or band is loose, the weighted cord, actuated by the crank or eccentric, will turn the friction-wheel in both directions, and therefore will not let off the warps; but when the whip-roll is drawn down by progress of weaving until the friction-strap or band is drawn tight, the weighted cord slips in one direction on the wheel, and on the return-motion turns it to give out the warps.



(See fig.) *a*, the warps; *c*, the whip-roll on two arms *d d*, which sit on a rock-shaft *e*, provided on the other side with two other arms *f f* within the frame, and one *g* outside of the frame; *h h*, weights which force the whip-roll up against the warps; *i*, friction-strap suspended to arm *g*; *i* presses around one of the grooves in the periphery of wheel *j*; the other groove receives cord *o*, which is wrapped around it with a weight *p*; the other end of this cord is connected to an eccentric *r* on the end of the lay-shaft *s*.

Claim.—The method of operating the warp-beam to let off the warps, and ease them in the opening of the shed by means of the weighted cord acting on the periphery of a wheel geared to the warp-beam, and receiving motion from an eccentric or its equivalent; in combination with the mode of regulating the delivery-motion by the action of the warps on a weighted whip-roller acting by a friction-strap on the friction-wheel of the let-off apparatus, substantially as and for the purpose specified.

No. 10,136.—NORMAN MILLINGTON and DENNIS J. GEORGE, of Shaftsbury, Vt.—*Improvement in the Mode of Figuring Carpenters' Squares.*—Patented Oct. 18th, 1853.



This improvement consists in providing the requisite number of chases set with the proper dies or figures, for the several lines of figures to be stamped on the different sides of the bar and tongue of the squares, and placing them perpendicularly on the rim of the wheel to which they are connected by a joint at the bottom in the proper order for stamping. And then placing the squares on an anvil, arranged to move laterally on ways, so as to bring the end of the line to be figured directly opposite to the end of the chase, which is turned down upon the end of the line or space for which the line of figures was arranged.

Claim.—The combination of the revolving chase-wheel W with the lateral moving-anvil A, by which the relative position of the square to be stamped and the required chase is so regulated, that the line of the square to receive the impression is brought under the chase containing the desired figures, as set forth.

No. 10,137.—John Pender, of Worcester, Mass.—*Improvement in the Mode of operating Heddles of Power-Looms.*—Patented Oct. 18th, 1853.

The nature of this invention consists in so arranging the harness, or heddles of the loom, that they will, play up and down in a guide, and rest on a positive foundation, and be moved up and down as indicated by a pattern, by means of jacks with hooks. (See fig.) A is the frame of the loom; B B are the standard-guides in which the harness-frames slide; R R and C C are the rest supported on the pillar E. The harness-shafts fall upon this rest whenever they are let down. The pillar E is supported on lever F, which lever is moved up and down by means of eccentric *o* and pitman *v*. The jacks are attached to the harness-frames, and hang downward to the lever K through the rack H, on the part *y* of the frame A.

Claim.—The rest C C, in combination with the guides B B, when constructed as described.

No. 10,138.—Benjamin F. Rice, of Clinton, Mass.—*Improvement in Harness for Power-Looms.*—Patented October 18th, 1853.

The nature of this invention consists in employing levers formed of two or more parts, one of these parts being so constructed as to oscillate within the other part by the action of hooks and pins set in the grooves of a figuring chain, said hooks and pins acting upon the upper portion of the oscillating part of the levers, thereby causing the lower portion of the oscillating part to move to and fro within the outer and larger part of the levers, thus forming a groove in which a vibrating roller is made to act upon the outer and larger part of the levers; which operation raises and depresses the harnesses, by which means a more positive action is given to the levers which act upon the harnesses when run at an unusual speed, and a uniform shed is produced. Also, in giving motion to the figuring chain by the use of a crown-wheel, turned by the action of a finger projecting from a vibrating lever, and working in the openings of the crown-wheel. Also, in constructing the bars which connect the links of the figuring chain in such a manner as to admit of the insertion of hooks or pins, the lower part of which are made in the form of an inverted wedge, so that the hooks or pins are more easily adjusted, and also held more firmly in their position.

Claim.—The application of compound levers, constructed substantially as herein described, to the raising and depressing of harnesses or heddles. Also, employing a finger attached to the vibrating lever, operating as described, in combination with the crown-wheel, to move the figuring chain. Also, forming a groove in the bars of the figuring chain for the insertion of hooks or pins, or their equivalents, in the manner substantially as specified.

No. 10,139.—John Scott, of Philadelphia, Pa.—*Improvement in Air-Beds.*—Patented October 18th, 1853.

(The inventor's claim fully explains the nature of this improvement.)

Claim.—Forming a bed of an air-tight india-rubber cloth sack, inclosed or enveloped in a pouch-formed mattress, composed of two thicknesses of ticking or other suitable material, between which is interposed feathers, hair, cotton, or other soft substance, retained by proper quilting; the mattress conforming in shape and size to the air-sack when extended with air by flexible pipes.

No. 10,140.—Nathan Thompson, Jr., of Williamsburgh, N. Y.—*Life-Bucket.*—Patented October 18th, 1853.

The nature of this invention consists in confining between an inner and outer vessel a tight stuffing of cork or its equivalent, said vessel completely inclosing the cork or stuffing, and the whole being so shaped that it answers as a pail or bucket. Also, in securing the handle or bail thereto by means of metallic tubes and grooves in the handle.

Claim.—A double vessel, the space between the outer and inner side thereof being filled with cork, or its equivalent, by which it is in a great measure secured against leakage, and retains sufficient buoyancy when punctured, and serves as a reliable bucket and life-preserver. Also, attaching the handles thereto by means of the tubes, the nicks in the handles, and the bending of the ends of the tubes therein.

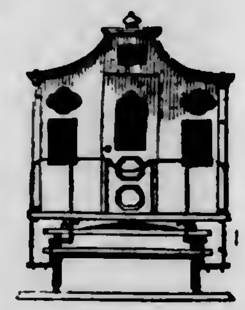
No. 10,141.—Nathan Thompson, Jr., of Williamsburgh, N. Y.—*Life-preserving Seat or Bucket.*—Patented October 18th, 1853.

Claim.—The folding life-preserving seat, with a buoyant divided top. Also, the clasp, in combination with the surfaces on which it slides, operating to hold the stool either shut or open.

No. 10,142.—Thomas E. Warren, of Troy, N. Y.—*Iron Carriage-Bodies for Railroads and other purposes.*—Patented October 18th, 1853.

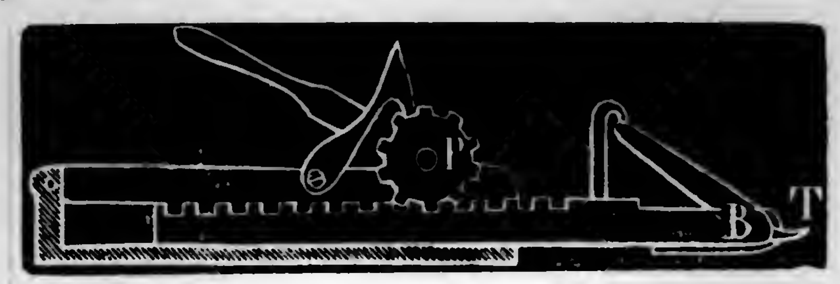
The specification describes this car or carriage as being constructed of, or consisting of, three elements, which, united, go to form a strong, light, and durable structure. These elements form the sides, and unite all the parts, and are a series of straight panels of thin sheet-

metal, which serves as diagonal braces, and columns of the same material, for strengthening the plates to which they are firmly riveted, together with bolts extending through the colums to hold the top and bottom to the sides, a service which there is not strength enough in the thin metal sides to perform, if riveted to the top and bottom.



Claim.—The combination of hollow sheet-metal columns and panels, as described, with the through bolts holding the top, bottom, and sides all firmly together, in the manner and for the purposes set forth.

No. 10,143.—J. W. Weatherby, of Kingsville, Ohio.—*Machine for Laying Carpets.*—Patented October 18th, 1853.



To make use of this machine (represented in the figure), one corner of the carpet is first fastened in its place, and then the teeth T, at the point B, are inserted in the opposite end of the carpet, and the end of the stock A is placed against a board reaching the opposite side of the room. By turning the pinion P, the rack is pushed out, and thereby the carpet may be held to any desired tension, until one whole side or end is secured.

Claim.—The general construction and arrangement of the carpet-stretcher, made and operated as described.

No. 10,144.—Linus Yale, of Newport, N. Y.—*Improvement in Locks.*—Patented October 18th, 1853.

The distinguishing feature of this lock is the manner of applying the key to very simple and efficient stops, so situated that they cannot be approached by any means with an instrument subject to the control of the burglar or other operator.

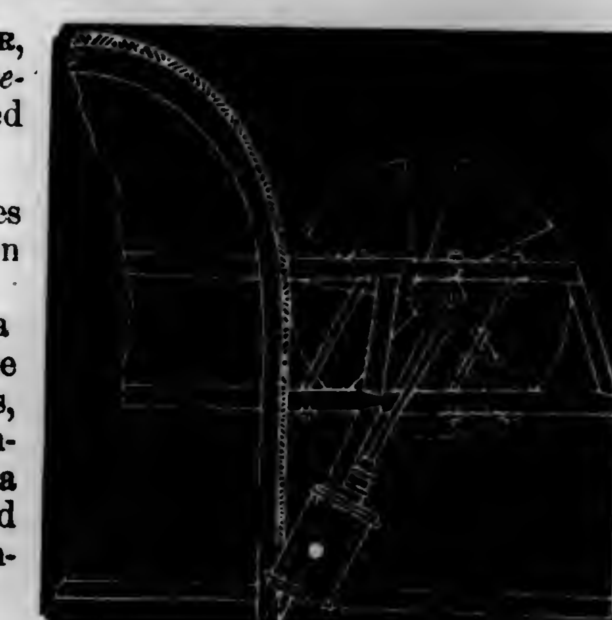
On the front plate A is a projection *a a*, astride of which is fitted to slide a crotched bolt B running close at the sides, making an easy

movement to stop or lock by divided pins C C driven across the joint by spiral-springs D D, and projected into the key-hole E, there to be adjusted by the planes *f f* on the key F (fig. 3).

Behind the wheel G is a revolving key-chamber I, through which the wrench H also passes. The wrench, in revolving, moves first the key-chamber, and then the wheel G (having a notch to catch pin *b* on bolt B—*h* being a cog-arm), and in its end movement carries the key into the chamber, and then draws it from the chamber into the key-hole, and arranges the stops for the passage of the bolt.

Claim.—Introducing and applying the key from behind, instead of in front as is usual, by means of a permanent wrench, revolving key-chamber, and the passage J.

No. 10,145.—Harry Whitaker, of Buffalo, N. Y.—*Improvement in Propellers.*—Patented October 18th, 1853.



The annexed figure illustrates the arrangement and application of this improvement.

Claim.—The direct application of the crank outside of the hull to side-screw propellers, when such application is combined with, or effected by, a high-pressure engine, arranged also outside of the hull, substantially as set forth.

No. 10,146.—Calvin Adams, of Pittsburgh, Pa.—*Improvement in Window-shutter Fastener and Holder.*—Patented October 25th, 1853.

This invention consists in combining with a latch or bolt of a shutter fastener a device for securing the shutters in a partially opened position. *g* is an arm firmly attached to arm *d*; A and B, the two shutters in a half-opened position: when to be entirely shut, *f*

is drawn back a little, so as to lift h above c; shutter A is opened a little further, so as to let arm g pass below n, by drawing f forward; then the shutters are shut and latched by turning f entirely down, until the back part of d comes to rest on plate v, and m on the back part n of pin c.

Claim.—The combining with the latch or bolt of an inside shutter-fastener a contrivance for securing the shutters in a partially opened position, by means of the rings f h h' and the arm g, in combination with the latch d and pin c, substantially in the manner and for the purpose herein before set forth.

No. 10,147.—G. T. Beauregard, of New Orleans, La.—*Improved Self-acting Bar-Excavators.*—Patented October 25th, 1853.

The excavator is anchored at the inner edge of the bar in the thread of the strongest current of the stream. The top of the frame N M C D is then weighted down; the current near the upper surface enters at A D, and forces itself out of the smaller aperture B C with an increased velocity, and thereby excavates the bottom in front of the excavator.

Claim.—The bar excavator, in which the surface current, by means of the inclined plane, is deflected downward, and made to act upon the bar.

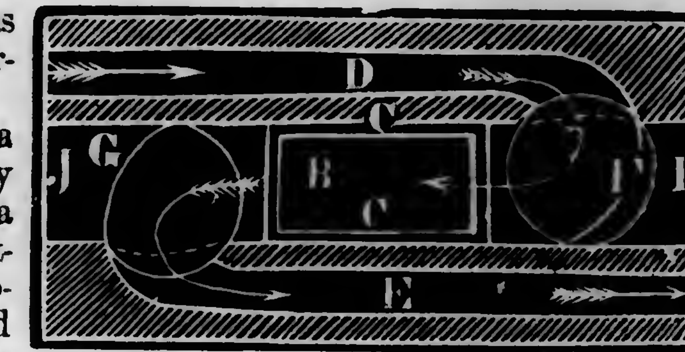
No. 10,148.—Ezra H. Dawes, of Litchfield Corners, Maine.—*Improvement in Dung-Forks.*—Patented Oct. 25th, 1853.

The construction of this fork is such that it may be readily converted into a garden cultivator or hoe. (See fig.)

Claim.—Making the tines of ordinary dung or hay forks to revolve upon the handle, in the manner and for the purpose set forth.

No. 10,149.—Frederic P. Dimpfel, of Philadelphia, Pa.—*Improvement in Propelling Vessels.*—Patented October 25th, 1853.

The propeller represented in the figure is arranged to work below the keel or bottom of the ship; it may also be arranged to work at



the sides or other portions of the vessel below the surface of the water.

The piston B is set in a reciprocating motion by being connected with a steam-engine, which is situated above it. This propelling-piston B is placed within an oblong chamber C that communicates on its opposite sides, and at or near its opposite ends, with water passages D and E, which also run parallel to the keel; and one pipe or passage D is open at its end next to the bow of the ship, while the open end of the other pipe E faces the stern of the vessel. Valves F and G are situated near either end of the reciprocating piston-chamber at the points of connection of the water passages D and E with the said chamber.

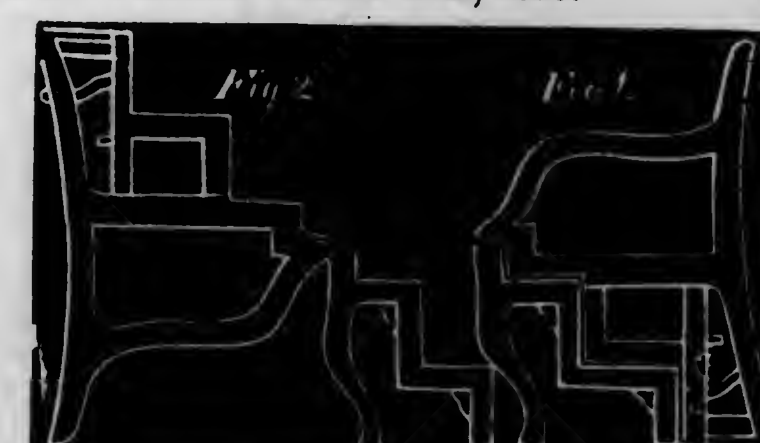
Claim.—The arrangement of the water passages, apertures, and valves, in combination with the reciprocating-piston and its chamber, substantially in the manner and for the purposes set forth in the specification.

No. 10,150.—Augustus Eliaers, of Boston, Mass.—*Improvement in Lounges.*—Patented October 25th, 1853.

The figure and claim show the construction and nature of this improvement.

Claim.—Resting the part which forms the support to the upper part of the body in lounges, or other similar articles of furniture, upon springs and hinges, so as to vary its inclination at the pleasure of the occupant, the said support being fastened and held in any desired position by a set-screw and curved arm, as above set forth.

No. 10,151.—Augustus Eliaers, of Boston, Mass.—*Improved Library Step-Chair.*—Patented October 25th, 1853.



Claim.—A library step-chair, or a chair which may be changed at pleasure into a flight of steps, in which the fold or hinge of the two parts is formed in the top or an extension of the front legs of the chair, thereby permitting the seat to be so stuffed as to form an ornamental and comfortable chair, and, when opened, to form a flight of five steps.

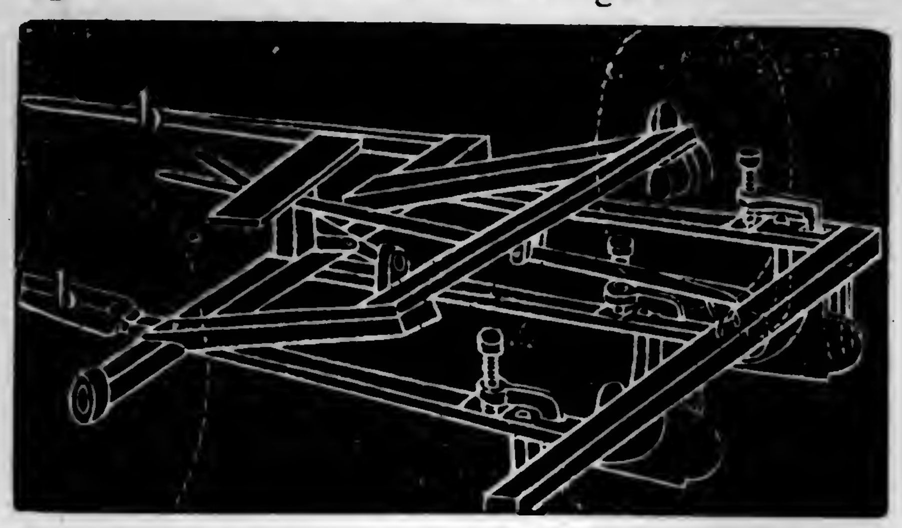
No. 10,152.—Wooster A. Flanders, of Sharon, Vt.—*Improvement in Bee-Hives.*—Patented October 25th, 1853.

b is an extra passage adapted to the hive, and capable of being gauged, so that, while the working bees are permitted to pass and repass without hinderance, the passage is not sufficiently large to permit the queen to leave the hive. A is the interior of the hive; *d* is an adjustable screw. Plate B is hinged to the hive at *f*; D, glass; C, aperture.

Claim.—The adjustable passage *b*, by which the entrance to the hive may be enlarged or diminished.

No. 10,153.—J. D. Filkins and William H. De Puy, of Lima, Ind.—*Improvement in Hitching Horses to Ploughs.*—Patented Oct. 25th, 1853.

This apparatus is shown in the annexed figure.

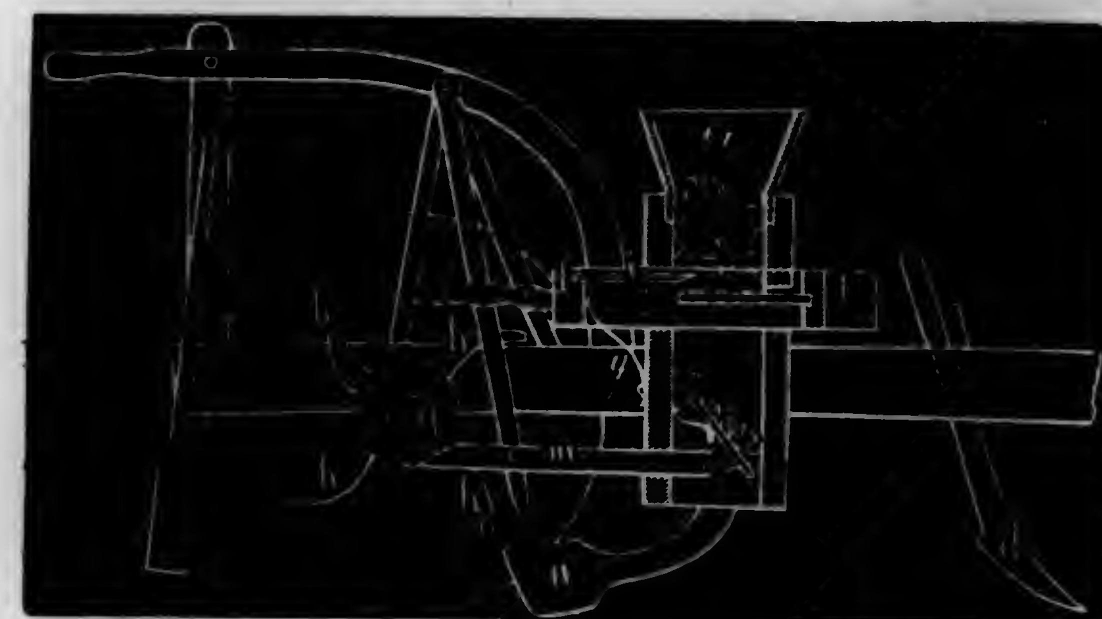


Claim.—The combination of the limber tongue *b'* and stiff tongue *b* with the running gear, to adapt the gang plough to being drawn by two teams abreast.

No. 10,154.—Samuel Hutchinson, of Rockport, Ind.—*Improvement in Cutting and Planting Potatoes.*—Patented October 25th, 1853.

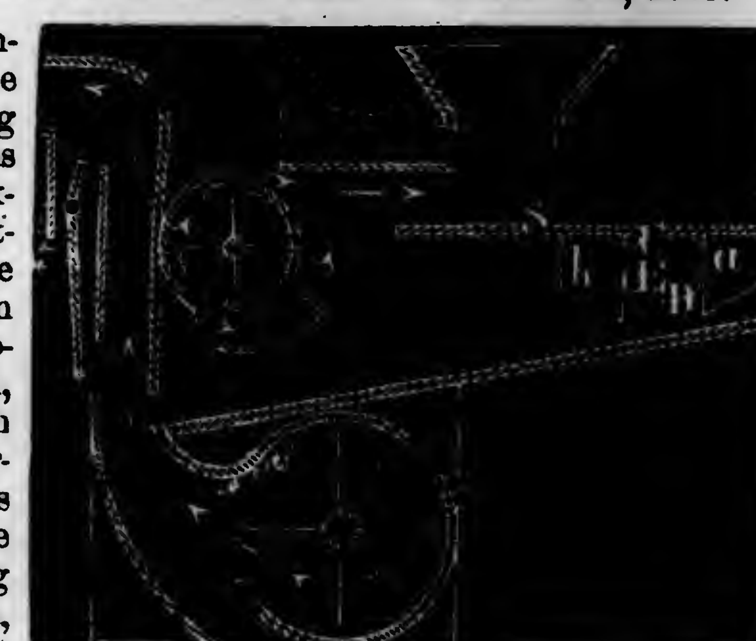
In the figure, *d* represents the share; *f f*, a sliding floor, which carries the knife *i*; *g*, a spring, which presses the sliding floor back; cams *h h*, on the axle of the wheels, press the sliding floor forward. K, trap-door, which is set in a reciprocating motion by the pin *l*, striking against the rod *m*; blades *n'* scrape the earth back over the pota-

toes after they have been dropped. There is also a pin to hold the trap-door permanently back; if desired, a ratchet and pawl prevents the return movement of the wheels.



Claim.—The construction and combination, as described, of cam, sliding-platform, cutting-blade, and trap-doors, with the furrowing-share and covering-blade, for the purpose of cutting, dropping, distancing, and covering potatoes.

No. 10,155.—David S. Mackey and Jarvis R. Smith, of Batavia, N. Y.—*Improvement in Winnowers.*—Patented October 25th, 1853.

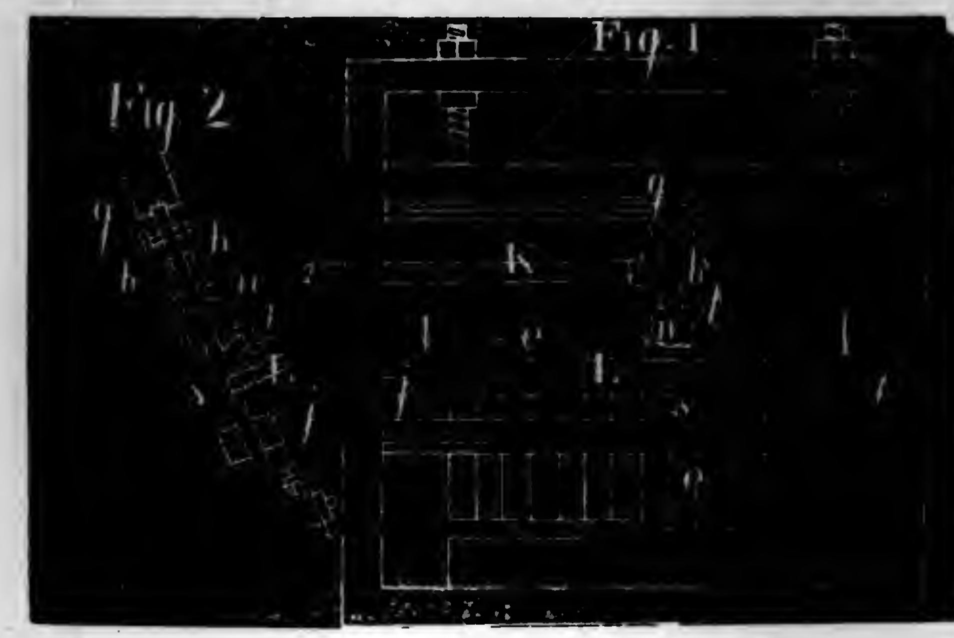


The nature of this invention consists in the manner of operating the screens, by means of two eccentrics working between blocks attached to the under side of the screens, and in having two blasts proceed from a single fan, the blasts crossing each other, and being so arranged that the grain is subjected to one of the blasts before passing through the screen, while the other blast prevents the screen from being clogged with chaff and other matter. (See fig.) The eccentrics C and D are set on the same shaft; C works against block *b*, and D against block *a*, which blocks support the screens.

Claim.—The peculiar manner of operating the screen; viz., by means of the eccentrics C D placed in a reversed manner upon the shaft E, and working between the blocks *a b* attached to the under side of the screen, as shown and described.

Also, producing two blasts from a single fan, and having the two blasts cross or intersect each other, by which a blast passes horizontally over the top of the screen, and a blast also passes upward through the screen, preventing the screen from being clogged or choked.

No. 10,156.—E. G. Matthews, of Troy, N. Y.—*Improvement in Machines for Dressing Stone.*—Patented October 25th, 1853.



The rocking-bar L is hung in journals *j*; and when the roller *n* strikes the inclined plane *l* on its end, the front edge of bar L will be depressed, and consequently the rear edge will be raised; and as this rear edge fits into the shoulders *s* of the cutter stocks *e e*, these will be raised.

Claim.—The driving-apparatus for driving the cutters: said apparatus being constructed of the driving-wheel *f* and friction-wheel *g* in the frame *h h* attached to the driving-rod K, by means of which rod a reciprocating motion is given to the frame, which causes the driving-wheel to roll back and forth on and over the heads of the cutter stocks, thereby causing the cutters to make the desired cut in the stone, the friction-wheel meanwhile rolling on the periphery of the driving-wheel, and also in a groove in the cross-bar. Also, the rocking bar L, with inclined planes at each end, in combination with the cutter stocks *e* and roller *n*, or its equivalent, attached to the frame *h* of the driving-apparatus, for the purpose of rolling or striking on the inclined planes of the bar as the driving-apparatus reaches the end of its stroke, so as to rock or tip the bar, thereby causing the inner edge of the bar to catch or strike under the shoulders in the cutter-stocks, and raise them up in position for the driving-wheel to act upon them in its return stroke.

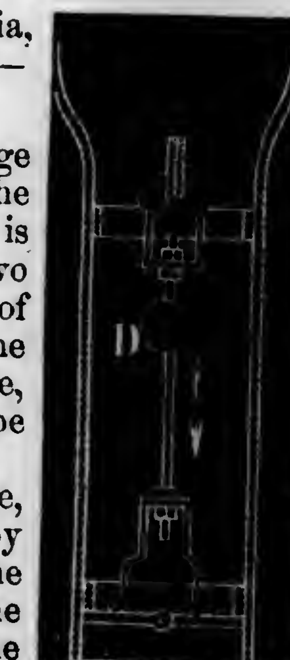
No. 10,157.—Charles Perley, of New York, N. Y.—*Improvement in Ships' Side-Lights.*—Patented Oct. 25th, 1853.

The nature of this invention consists in the use of a circular glass or light *g*, inclosed by a circular frame, on which are teeth gearing

into a fixed rack on the inside of a metal box that is let into the side of the vessel. To open the light, it is rolled to one side within the box; and when it is to be closed, the light is rolled back again, and a screw-ring forced into an elastic packing *j*, in the frame of the glass. Any water that may by accident run into the box can escape by a small hole *f*.

Claim.—The means herein described and shown for preventing any leakage from a side-light passing into a vessel, by inclosing the side-light in a metallic box let into the side of the vessel and provided with a small hole or holes to pass out the leakage, as specified.

No. 10,158.—Alphonse Quantin, of Philadelphia, Pa.—*Improvement in Valve-Gauge for Bottles.*—Patented Oct. 25th, 1853.



The figure shows the mode in which this gauge is arranged and operates. D is a weight upon the rod which connects the two valves; as the bottle is inclined the liquid fills the space between the two valves, and the weight, sliding by the inclination of the bottle, closes the lower valve, and at the same time opens the valve at the mouth of the bottle, thus permitting no more of its contents to escape than what is contained between the two valves.

Claim.—The above-described machine or gauge, with the arrangement of the valves, one opening by the act of closing the other, so as to pour out of the vessel to which the gauge is attached only the quantity of liquid contained in the space between the two valves.

No. 10,159.—Henry L. Russell, of Hudson, Mich.—*Improvement in Metallic Piston-Packing.*—Patented Oct 25th, 1853.

See figure.

Claim.—Expanding the metallic bands H I J, which encompass the drum A, by means of the levers B, placed in the periphery of the drum A, and operated by means of the ring C within the drum; the ring C being prevented from moving casually by means of the coil-spring D, and ratchet F, and pawl *g*, or their equivalent.

No. 10,160.—William W. Richards, of Philadelphia, Pa.—*Improvement in Shovels, Spades, &c.*—Patented Oct. 25th, 1853.

The object of this invention is to obtain a greater degree of toughness, strength, and sharpness in these utensils than heretofore.

The manner of construction is as follows: on one or both sides of a slab of steel is placed a slab of iron; these slabs, called a "pile," are first heated to a welding heat, and then hammered or rolled into sheets.

Claim.—As a new manufacture, shovels, spades, and other implements made of a composite sheet of metal, whose constituents are parallel laminæ of unequal hardness, as herein set forth.

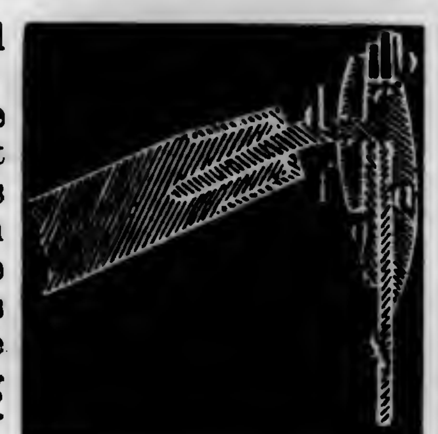
No. 10,161.—Benjamin P. Sargent, of Sutton, N. H.—*Expanding Horseshoe.*—Patented Oct. 25th, 1853.

This invention is intended to prevent the contraction of the frog, or heel part of the hoof of a horse.

The shoe is formed in separate parts, and connected by joints D E, and may be contracted or expanded by the screw H.

Claim.—The combination of the bearers or ears *e f* with the jointed quarters or bars A B, jointed together or to a common toe piece or cork C, and operated by an expansion screw, as specified.

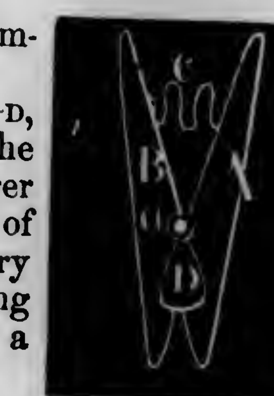
No. 10,162.—Jacob T. Sargent, of Sutton, N. H.—*Improvement in Garden and other Hoes.*—Patented Oct. 25th, 1853.



By reference to the figure, the claim will explain this improvement.

Claim.—The improved attachment of the blade and shank, whereby the blade not only can be readily removed from or as readily confined to the shank, but when affixed to it is prevented from breakage where the greatest leverage or strain is brought upon it; meaning to claim the bearing-head A, fixed firmly to and making part of the shank; the movable plate or stiffener *g*, or its eqivalents (applied to the back of the blade and made separate from the shank); the screw *d*, on the shank; the screw-nut *f*, and the recess *b*, in the hoe-blade, as combined together, and with the shank of the handle, and made to operate substantially as specified.

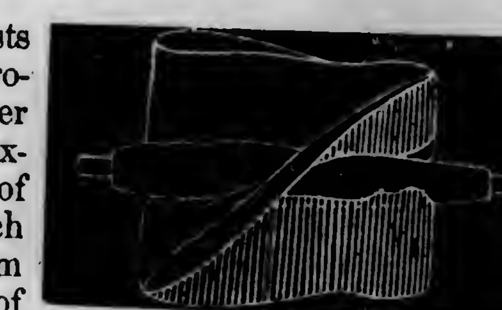
No. 10,163.—David M. Smith, of Springfield, Vt.—*Improvement in Clothes-Pins.*—Patented Oct. 25th, 1853.



The claim and figure explain the nature of this improvement.

Claim.—The arrangement of the line-opening D, and the spring *c*, on opposite sides of hinge *a*, of the two levers A B; whereby, by pressure of the longer legs of the levers between the thumb and fingers of the hand of a person, the instrument is rendered very convenient of application, without danger during the same of tearing the clothes secured by it on a line.

No. 10,164.—James Trees, of Salem, Pa.—*Improvement in Submerged Propellers.*—Patented Oct. 25th, 1853.



The nature of this invention consists in the application to submerged propellers (whose area where the water enters is greater than the hinder extremity, where the water escapes) of blades or vanes, and a shaft to which they are attached, all tapering from front to rear; assuming as the front of said blades and shaft that part where the blades first impinge upon the water, and where the propulsion commences.

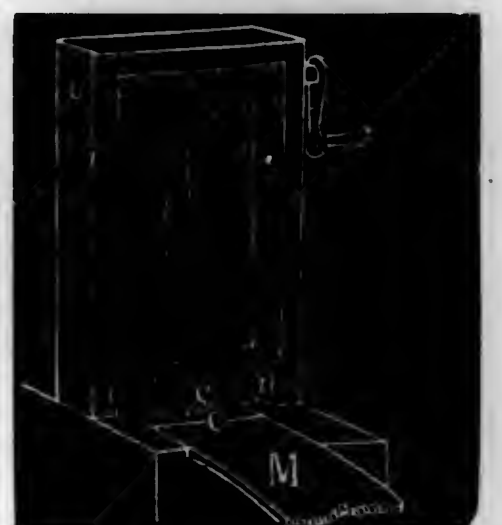
Claim.—The combination with submerged propellers, whose area where the water enters is greater than the hinder extremity where the water escapes, of helical blades or vanes, and a tapering shaft to which they are attached; both the blades and shaft tapering from point to rear, substantially in the manner and for the purposes specified.

No. 10,165.—Albert Vose, of Pittsfield, Vt.—*Improvement in Ox-Yokes.*—Patented Oct. 25th, 1853.

See figures.

Claim.—The construction of the semi-revolving neck-blocks, each having a curved groove and pin fitting into it, for enabling the neck-block to always adjust itself at right angles to the direction of the neck of the animal. Also, in combination with the groove in the neck-block, the use of the pin subserving the double purpose of controlling the movement of the neck-block, and adjusting the length of the yoke.

No. 10,166.—William Wheeler, of West Poultney, Vt.—*Cutting Bars and Teeth of Curry-Combs.*—Patented Oct. 25th, 1853.



In the figure, M represents a strip of metal of the width of the dies *e e*, inserted between the dies for the purpose of cutting a row of teeth in the same, both on the end of the plate and on the piece or bar cut off by the descent of the jaw.

Claim.—The method of forming the bars of curry-combs by punching them out of plates; so that at a single operation a strip of the proper width for the bar is severed from the plate, and one row of teeth cut thereon, and another row upon the end of the plate for the next bar.

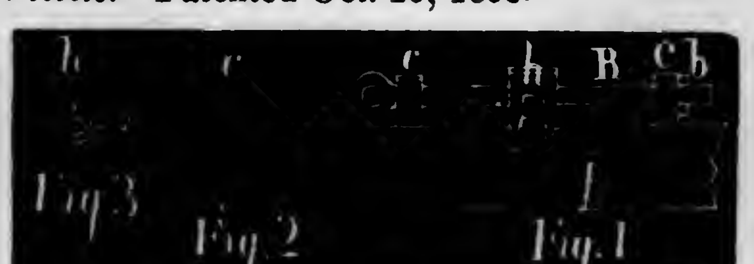
No. 10,167.—William Coughlan, of Baltimore, Md.—*Mineral-water Fount and Refrigerator.*—Patented Oct. 25th, 1853.

The nature of this invention consists in adding an auxiliary faucet or valve *b*, to the fount A, for the purpose of rapidly filling the fount with mineral-water already prepared in a stationary apparatus.

The spigot *d* is provided on its outer end with a female screw, to receive the end of the pipe whereby it is filled or emptied. The spigot *c* serves to pass off the superabundant gas, and thus avoids the necessity of repeatedly unscrewing the filling tube for the same purpose, and permits the fount to receive a due quantity of water.

Claim.—The auxiliary faucet or valve *b*, for the purpose of enabling the fount to be filled with prepared mineral-water.

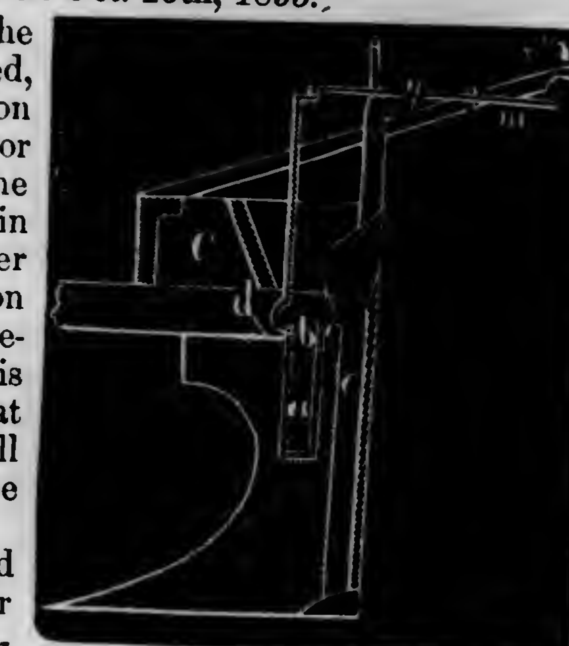
No. 10,168.—Nelson Crocker, of Sandwich, Mass.—*Improvement in Rigging Vessels.*—Patented Oct. 25, 1853.



In fig. 1, *j* represents a yard, on the end of which a bolt B is secured by the two eye-bolts *c c* (which are driven into the yard), and a pin *b*; and on this bolt are one or more hooks *h*, to receive the head cringles, which are made in the usual way, but have an iron thimble worked into them. This thimble comes in contact with the hook, and prevents the chafing of the rope. To prevent the cringle from slipping off, a mousing of spun-yarn is passed around the hook. (See fig. 3.)

Claim.—The head-cringle hooks and their fixtures, constructed and combined with rigging of a vessel, in the manner and for the purpose specified.

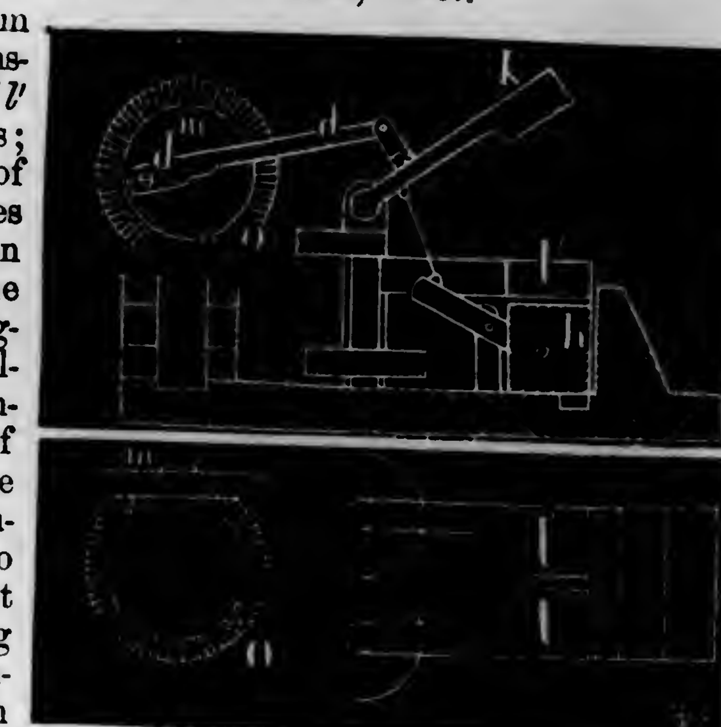
No. 10,169.—Nathan C. Davis, of West Jefferson, Ohio.—*Improvement in Seed-Planters.*—Patented Oct. 25th, 1853.



In the figure, C represents the drill-box in which the corn is placed, from where it falls into depression *d*, which is kept full. The operator presses down the end *m* of the lever *g* with his thumb, at certain intervals. For convenience the lever *m* is bent towards the handle *n*, on which the hand rests. By the depression of this lever the piston *a* is lifted up through the grain, so that the kernels in the hollow *b* will fall out over the partition *c* into the aperture *e*, and to the furrow.

Claim.—The piston *a*, provided with a notch or hollow *b* in its upper end, and so arranged in combination with partition *c* and the depression *d*, that it will bring up and discharge through the aperture *e* the desired number of grains of corn every time it is raised by the operator.

No. 10,170.—Daniel Noyes, of Abington, Mass.—*Improved Machine for Hammering Iron.*—Patented Oct. 25th, 1853.



m is the wheel from which the motion is transfered to the machine; *k l l'* are the three hammers; and *h* the anvil. One of the most essential features of this machine consists in the relative position of the ends of the connecting-rods *d d*, *o o*, and the fulcra or journals of the hammer-beams at the time of giving the blow; as the journals of all the hammers are so placed as to be in nearly a straight line, at the time of giving the blow, with the connecting-rods from which they derive their motion.

Claim.—A machine for hammering iron: viz., a hammer for giving the blow upon the upper surface of the iron, acting in conjunction with two hammers which simultaneously strike the sides of the iron. Also, the use of the two side hammers, whether used in connection with the upper hammer or without it. Also, so arranging the relative position of the fulcra of the hammer-beams, and the ends of the connecting-rods attached to the beams and to the crank-shaft and gears from which they derive their motion, as to bring the fulcra and connecting-rods in nearly a straight line at the time of giving the blow, the opposite ends of the connecting-rods, just before giving the blow, moving in opposite directions, so as to give a rapid and powerful blow. Also, causing the anvil to descend from the iron just before the blow of the side-hammers and to ascend just before the blow of the upper hammer, by means of a rod attached at one end to the under side of the upper hammer-beam, and at the other end to a tilting arm which embraces the anvil.

No. 10,171.—Samuel Pratt, of Boston, Mass.—*Improvement in Screw-Nails.*—Patented Oct. 25th, 1853.

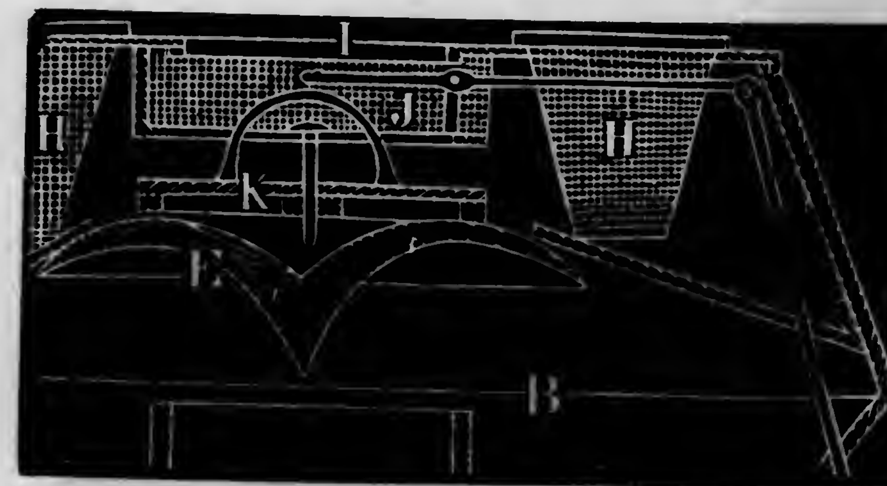
The object of this invention is to construct a spike or nail, so that it may be turned into the wood by driving, without having its head bruised (that it may be turned out by a turn-screw) by driving, and without breaking the wood by driving, so as to prevent it from forming a good and compact counter-screw for the threads of the nail to turn in. The elevations at *c c* are to prevent bruising by driving. The inclination of the thread is very oblique. Fig. 3 is a section through *a b*.

Claim. A screw-nail, constructed with a thread, substantially as herein described. Also, shaping the head so that the battering caused by the driving will not obstruct the application of the turn-screw.

No. 10,172.—Samuel Sweet, of New York, N. Y.—*Improvement in Spark-Arresters for Locomotives.*—Patented Oct. 25th, 1853.

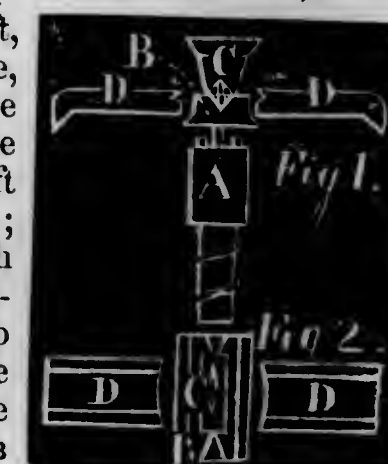
This invention consists in placing a deflector of novel construction within and near the top of the outer case, and directly over the top of the smoke-pipe, so as to deflect the sparks as they rise and give them a direction downwards into the chamber formed between the outer sloping case and the smoke-pipe, and in combination with the deflector; employing a metallic top-plate or cover, which has a series of inverted hollow wire-cloth sieves set in and around it, with their lower tapering end extending down some distance into the hood or outer chamber; the funnel-shaped sieves rendering the escape surface for draft very large, and admitting the deflector to be employed without increasing the size of the hood.

Claim.—The combination of the reticulated inverted frustums of cones H, constructed and situated as described, with the trumpet-



shaped deflector and guard E, the reticulated cylinder J, under the opening I, provided with the reticulated valve K, when these parts are arranged in the upper portion of an enlarged or expanded external pipe, such as that represented at B; the whole operating in the manner and for the purpose set forth in the specification.

No. 10,173.—Kasimir Vogel, of Chelsea, Mass.—*Machine for the Manufacture of Weavers' Harness.*—Patented October 25th, 1853.



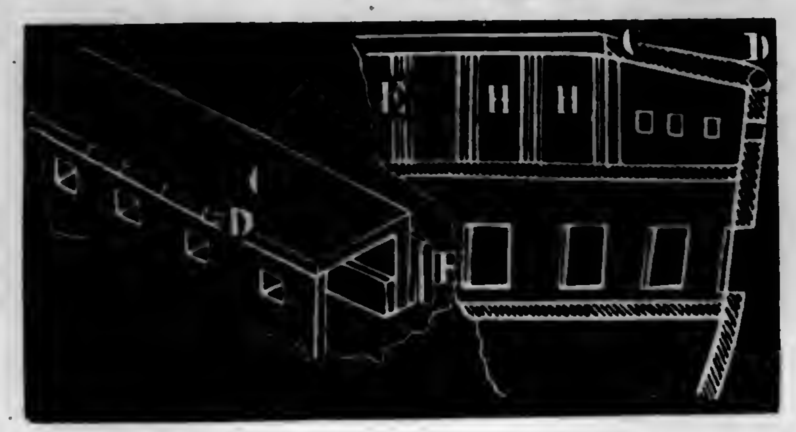
In the figure, A represents a vertical shaft, having on its top a tongue to receive the eye, and around its lower part a spiral spring. The tongue passes through the die B, and into the die C; die B is fitted to the tongue of the shaft A, so as to slide up and down freely upon it; die C is inserted in the end of a piston which moves up and down, and the die C has an orifice to receive the point of the tongue in the top of A. The dies D D are fitted with lips at the ends, which press on plate-springs, and are grooved at the opposite end next the dies B and C. Dies D D are made to slide horizontally. The heddle yarn is placed in the grooves of the metallic eye, which has dropped on the tongue of the shaft A; by the action of the spiral spring the tongue is thrust to the point, and the dies D D and B C, by the action of levers, compress the lids of the eye around each yarn of the heddle, and connect two yarns to each eyelet, without making a knot, braid, or loop in the heddle.

Claim.—The combination of the loom for weaving the borders of the harness, with the press for securing the metallic eye upon the threads of the harness, without a knot, braid, or loop.

No. 10,174.—William Ballard, of New York, N. Y.—*Improvement in Protecting Rifle Batteries (in Vessels of War).*—Patented November 1st, 1853.

The nature of this invention consists in attaching, by means of hinges, a series of shield-boards to the inside of the rail of the bul-

warks, so as to be raised up in time of naval engagements, as a protection to the riflemen; and also in arranging a series of stanchions and rails along the line of the deck, parallel with the bulwarks, and from four to six feet from them, for the support of the inner ends of the



shield-boards when raised up, the space between the stanchions being panelled up by sliding panels, which may be taken down when not required.

Claim.—The use of the shield-boards C in combination with the bulwarks of a ship. Also, the use of the stanchions E, rail G, and panels H, in combination with the deck of the vessel and the shield-boards C, for the purposes and principle of construction and operation, substantially as set forth.

No. 10,175.—CALVIN CARPENTER, Jr., of Pawtucket, Mass.—*Improvement in Magnetic Electric Machines.*—Patented November 1st, 1853.

The object of this invention is to develop a perfectly continuous electric current through the agency of permanent magnets. The invention consists in the arrangement and combination of permanent magnets and disks of helices.

Claim.—The combination of one or more series of permanent magnets, radically arranged, the poles of each series being in one plane, and in two concentric circles, with a disk or disks of helices arranged in three sets, in such manner that the three sets may be acted upon successively at nearly equal intervals of time; one set by the inner circle of poles, and the other two sets of helices being thrown into one constant or uninterrupted current, by means of the current dischargers and springs, or their equivalents, as described.

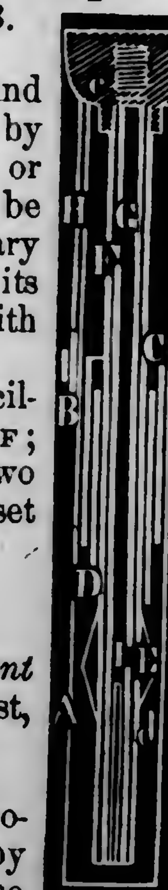
No. 10,176.—A. P. CHATHAM, of Canoga, N. Y.—*Improvement in Car-Couplings.*—Patented November 1st, 1853.

By reference to the figure, the claim explains this improvement.

Claim.—Constructing the buffer A with a recess *a*, to hold the link C in the proper position for entering the buffer B, and the buffer B with a

cavity and inclined draught-catch F extending to nearly the top of the cavity, so that when a link C is connected to the buffer A, and passed over the catch F of the buffer B, it cannot jump up and become detached from the catch while the cars are in motion, whereby the danger of the cars being separated while running is greatly lessened, while the coupling is simple, cheap, and not liable to get out of order.

No. 10,177.—GILBERT S. CLARK, of New York, N. Y.—*Improved Pen and Pencil-case.*—Patented November 1st, 1853.



In the figure, A represents the body of the case, around which there is a band B; C, tube fitting in A, and attached by pivots to band B, by means of which it can be shoved in or out; E, pen, inserted in the lower end of tube D; D can be shoved in or out; tubes C D form the pen-slide; F, stationary tube, secured to A; G, pencil-slide, which has a disk O at its upper end, to which disk tube H is soldered; I, pencil, with a pivot *d* working in a slot.

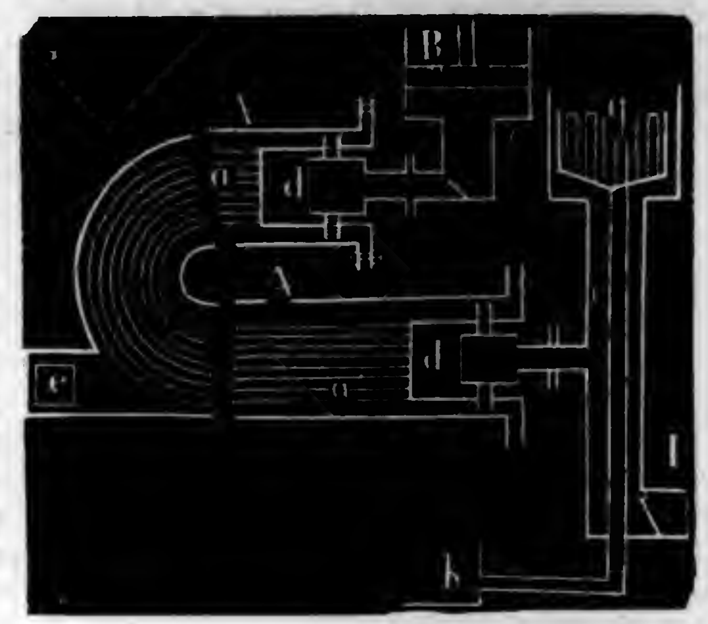
Claim.—The peculiar arrangement of the pen and pencil-slides: viz., the pencil-slide G with its covering tube F; within the pen-slide, or tubes C and D, and operating the two slides, independently of each other, in the manner as set forth.

No. 10,178.—J. W. CORMACK, of Quincy, Ill.—*Improvement in Corn and Sugar-cane Cutters.*—Patented November 1st, 1853.

The knife B is on a level with the body of the sled, and projecting some two or three feet over its side. The arm A, by means of the framing, is placed some three feet over the knife, and slightly in advance of it; so that when the sled is drawn forward, the arm comes first in contact with the corn, and bends it forward, and then the knife comes in contact with it, and in addition to its being drawn forward, it has a slight side motion by means of a spring, which facilitates the cutting operation. The arm throws the corn forward, and lays it all in one direction. The knife and arm may be revolved from one side of the sled to the other.

Claim.—The framing and manner of attaching the knife and arm to the sled.

No. 10,179.—Benjamin Crawford, of Pittsburgh, Pa.—*Improvement in Condensers for Steam-Engines.*—Patented November 1st, 1853.



In the figure, B represents the air-pump, with which the upper series of tubes communicate; the lower limbs of the same communicate with the escape pipe, leading from the exhaust valve of the engine. The openings *d*, in the front ends of the two limbs of the water-jacket A, and a similar opening *e*, in the opposite end of A, form inlet and outlet passages for the water through the condenser, and are connected with the water outside, so that a constant current of water will be forced through the jacket and among the tubes, for the purpose of condensing the steam or vapor entering the tubes from the engine. The escape pipe C, which conveys the steam to the condenser, connects with an intervening chamber that contains an evaporator *g* within it.

The steam in entering from the engine passes through the tubes in the evaporator, and round the sides thereof, communicating heat to the water, in order to distil it from the salt or other extraneous matter.

Claim.—The arrangement of the tubes or passages in the condenser with the inlet and outlet openings in the case, so that a current of cold water is caused to flow round the ends of the tubes; whereby the condenser is prevented from undue heating, and the tubes kept coolest at both ends, and warmed at the middle, whereby the great bulk of the heat is transferred to the condensing water, near the point at which it is discharged from the case.

No. 10,180.—Chancey O. Crosby, of New Haven, Conn.—*Machine for Sticking Pins.*—Patented November 1st, 1853.

Claim.—The method of crimping the paper by means of movable folding blades, in combination with the bed-plate, while the back and front sides of the paper are sustained by the clamping-bars. Also, the method of crimping the paper by means of moving folding-blades, descending and ascending between the stationary and moving clamping-bars, when these clamping-bars serve as a part of the crimping apparatus, whether the paper be sustained by the bed-plate or otherwise. Also, the method of lifting the pins from the distributor, and carrying them away, and sticking them into the crimped paper, while the distributor is bringing another supply of pins in front of the clamping-bars, thereby keeping the lifting-pliers, or other lifting apparatus, continually in operation. Also, the lifting apparatus, or any substantial part thereof, when constructed, combined, and made to operate substatially as described in the specification. Also, the combination of the lifting apparatus with the inclined transverse notches in the stationary clamping-bar, by which means the pin will always be stuck in an exact line, even though the pins are not straight. Also, the combination of the conical rollers with the side-planes, to form a straight inclined conducting channel. Also, the lifting-pliers, either with or without the creeper, sliding-guide, or director N.

No. 10,181.—Chancey O. Crosby, of New Haven, Conn.—*Improvement in Machinery for Sticking Pins.*—Patented November 1st, 1853.

Claim.—The combination of the punches I (working in horizontal grooves *c*) with the slide *g* and the straight inclined channels D D. Also, the combination of the punches with the double folding-blades, when these are combined with the movable and stationary clamping-bars, and the whole is constructed and combined substantially as described. Also, the method of crimping the paper by means of folding-blades working between stationary and moving clamping-bars, when those clamping-bars serve as a part of the crimping apparatus. Also, the bars forming the side-guides to the spaces, to guide the pins while falling down from the separator to the horizontal grooves, in combination with the grooves and punches.

No. 10,182.—Chancey O. Crosby, of New Haven, Conn.—*Machine for Sticking Pins.*—Patented November 1st, 1853.

Claim.—This claim embraces the various parts of the machinery as constructed, arranged, and operating, for the purpose of crimping the paper, and sticking the pins therein.

No. 10,183.—David Demarest, of New York, N. Y.—*Improved Mode of Protecting Engine Hose.*—Patented November 1st, 1853.

This invention consists in the employment of a portable section of a rail-track, which has an arch or opening cut in its bottom, into which the hose fits. (See figure.) C is the opening; B, the hose; D, brace for strengthening A where the opening C is cut through.

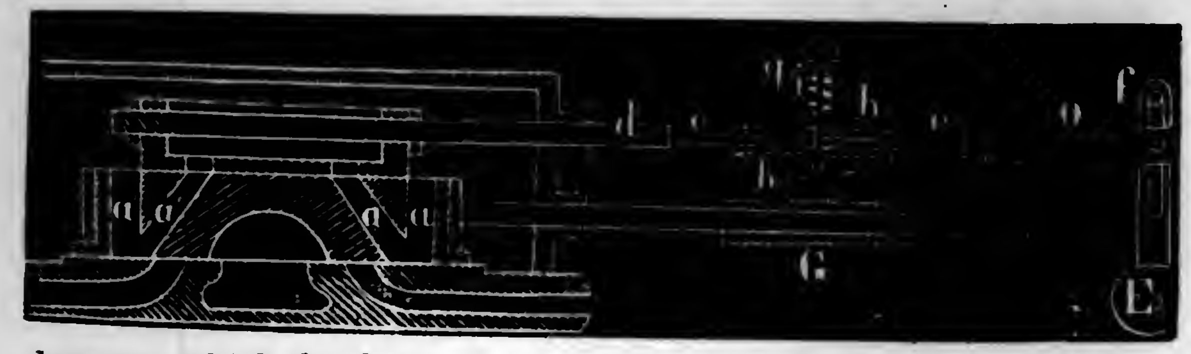
Claim.—The employment of a portable section of a rail-track, with an opening C in its centre for the hose B to fit in when the section is placed over the hose; for the purpose of covering the hose at certain points, and saving them from the great injury they sustain from carriages and cars passing over them during the time of fires.

No. 10,184.—JOSEPH FARNSWORTH, of Madison, Ind.—*Improvement in Car-wheels.*—Patented November 1st, 1853.

Claim.—A cast-iron car-wheel constructed as herein described (viz., having the hub and flanged rim connected by a curved annular disk extending from the outer edge of the hub to the outer edge of the rim).

No. 10,185.—L. R. FAUGHT, of Macon, Ga.—*Improved Regulators for Steam-Engines.*—Patented November 1st, 1853.

In the figure, *d* represents a rod flattened at *e e*, to be received in the friction-box, which consists of a boss G secured to the valve-rod, and has two horns *g g*, forming guides for two metal friction-plates *h h*,



between which the flattened part *e e* is received; the upper plate *h* is pressed down by means of spring *i*. Rod *d* is connected by a link *o*, with a short arm *l* on a rock-shaft *f*, from which pendulum E is suspended.

Claim.—Connecting the cut-off with the slide-valve, so that the latter drives the former by friction, when the cut-off is at the same time connected with a pendulum, air-spring, or some other device, offering such a resistance to its movement as will prevent its moving the same distance as the valve, and arrest it at such a point in the motion of the valve as to cut off the steam at the desired point in the stroke, and will increase or diminish with any increase or diminution of the speed of the engine, and thereby retard the motion of the cut-off more or less, in order to cut off the steam earlier or later in the stroke, and thus to regulate the speed.

No. 10,186.—C. P. KELSEY, of Livingstonville, N. Y.—*Improvement in Grain-Cradles.*—Patented November 1st, 1853.

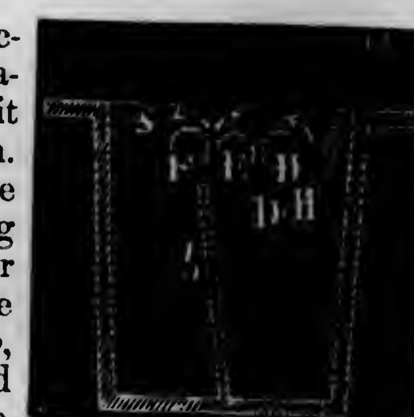
The object of this improvement is to enable the workman to lay the grain more regularly, to cut the entire length of the scythe, and to readily adjust the fingers; also, so that the cradle shall balance better on the handles, and be capable of being folded up when not in use.

a, fingers; *b*, post; *c*, a bar of iron which forms the connection between the post and lower end of the snath; a thumb-screw passes through this bar at *c'* to fasten it to the snath. The fingers are attached

by braces, which have joints or links as at *d, e, f, g*, for the purpose of making their position adjustable.

Claim.—The bar *c*, or its equivalent, for attaching the frame of fingers to the snath. Also, so connecting the braces *d, e, f, g*, with the fingers, by means of links or other universal joints, that the snath may be folded close against the fingers, without requiring that the braces shall be loosened in the snath.

No. 10,187.—EDMOND MOREWOOD and GEORGE ROGERS, of London, England.—*Improved Apparatus for Coating Sheets of Metal.*—Patented November 1st, 1853.



The three rollers D E F revolve in the direction of the arrows, and D and F are adjustable in their distance from E, so as to admit sheets of various thicknesses between them. D' is the sheet fed in, submerged under the surface *s* of the bath, the operator supporting its lower edge by means of a hooked-bar H. After the sheet has passed through the rollers D and E, it is thrown against the bar *b*, in the position shown in the figure in dotted lines; and the operator feeds it between the rollers E F, which draw it out of the bath, press the coat of metal on it, and flatten out all irregularities on the sheet.

Claim.—The method described of coating sheets of metal, by im-

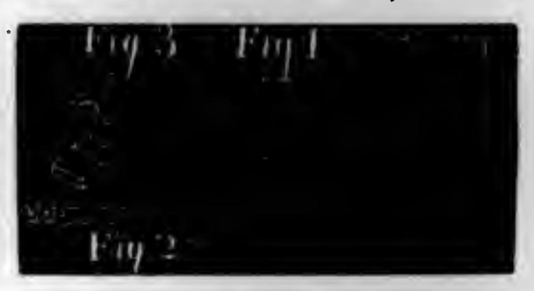
mersing them in other molten metals which are more fusible, by means of rollers, as described; so that with the same machine, sheets of metal varying in thickness may be coated, free from puckers, bends, or indentations on their surfaces.

No. 10,188.—RUSSELL S. MORSE, of East Dixfield, Me.—*Improvement in Carriage-Springs.*—Patented November 1st, 1853.

By raising or lowering the screw C, the pressure of springs D E on the bed-spring B, will be increased or diminished.

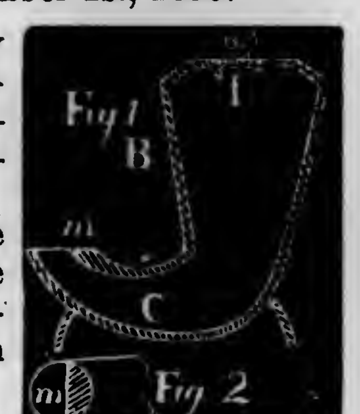
Claim.—The adjustable auxiliary springs D E, in combination with the bed-spring B, substantially as represented.

No. 10,189.—HOWARD PERKINS, of North Bridgewater, Mass.—*Improvement in Bits and Bit-stocks.*—Patented November 1st, 1853.



Claim.—The manner of constructing and fastening the bit into the socket by the slide-lock, having the end of the bit so formed as to fit into the groove in the key, and having the end of the bit press down upon the key, so that, when the key is slipped back, the bit may be easily removed.

No. 10,190.—HENRY M. RITTERBAND, of New York, N. Y.—*Improved Gold-washer and Separator.*—Patented November 1st, 1853.

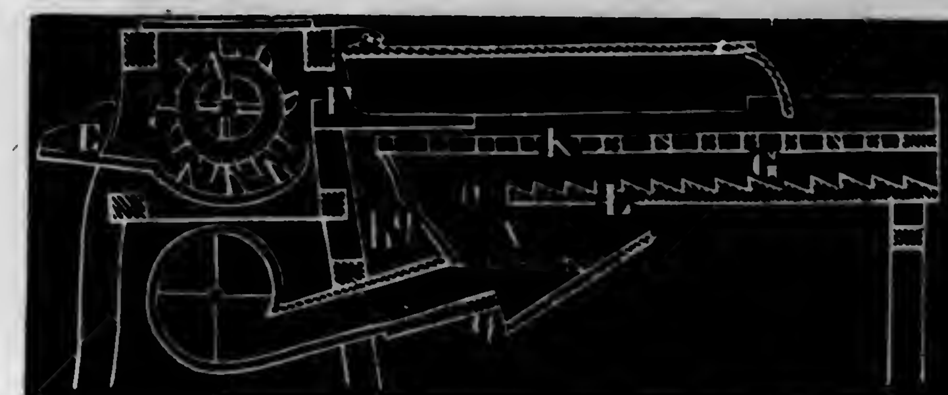


The object of this invention is, by the agency of water, to obtain a force, which, being just sufficient to overcome the gravity of the earthy matters mixed with the gold, is ineffectual to overcome the superior gravity of the gold.

Claim.—The combination of the tube B, valve *f*, and lip *m*, constructed and having the relative proportions substantially as described in the specification, forming an apparatus for removing earth and stones from auriferous earth.

No. 10,191.—JOHN A. TAPLIN, of Fishkill, N. Y.—*Improvement in Machines for Threshing and Cleaning Grain.*—Patented November 1st, 1853.

The axis of the threshing cylinder A (see figure) is connected with crank-shaft *h*, by means of belting; and the revolutions of A will give to the grain-separator G a reciprocating motion, by means of connecting-rods G. The grain is fed in upon apron E, passes along spout F, and comes on the reciprocating-screen K, falling through upon the fluted bottom L, while the straw is delivered at the end of the machine. The grain is finally moved towards *n*, where it is delivered upon the riddle N, and meets the blast of the fan; *q* is the place of delivery.



Claim.—The vibrating straw-carrier and grain-separator, with a screen K and fluted bottom-board L, for the purpose of separating the grain from the straw, returning the former to the winnowing apparatus, and conveying the straw to the hinder extremity of the machine.

No. 10,192.—WILLIAM H. TOWERS, of Philadelphia, Pa.—*Improvement in Metallic Pens.*—Patented November 1st, 1853.

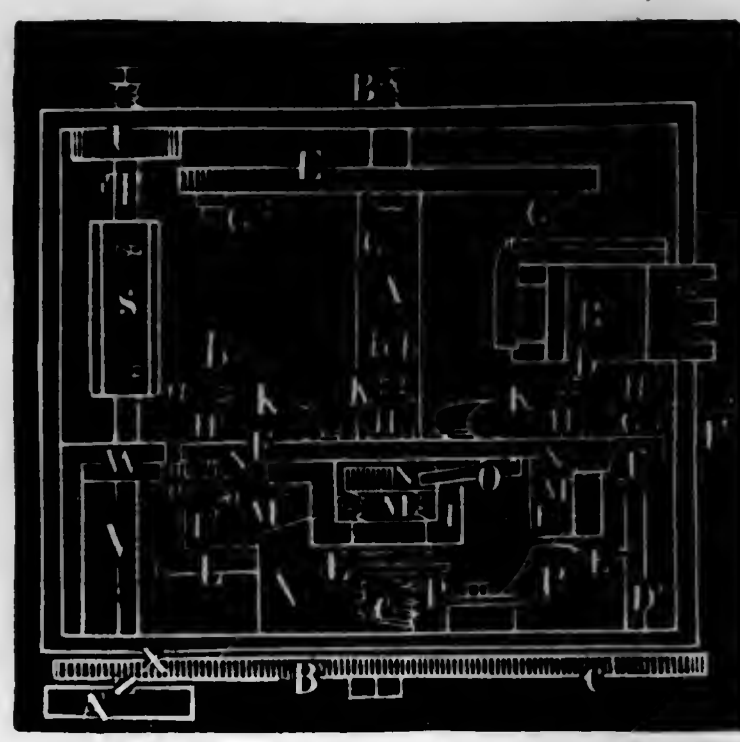
The nature of this improvement consists in making metallic pens flat, with cavities or depressions in both surfaces, for retaining the ink, in such a manner as to enable the pens to be more easily formed, and of a less bulk of metal, and more convenient for use, as they can be used for writing on either side.

Claim.—Making metallic pens with depressions or cavities for retaining the requisite quantity of ink, and making them flat on both surfaces, and tapering the shank or main body of the same, and inserting it in a corresponding socket, in the centre of the lower end of the pen-holder.

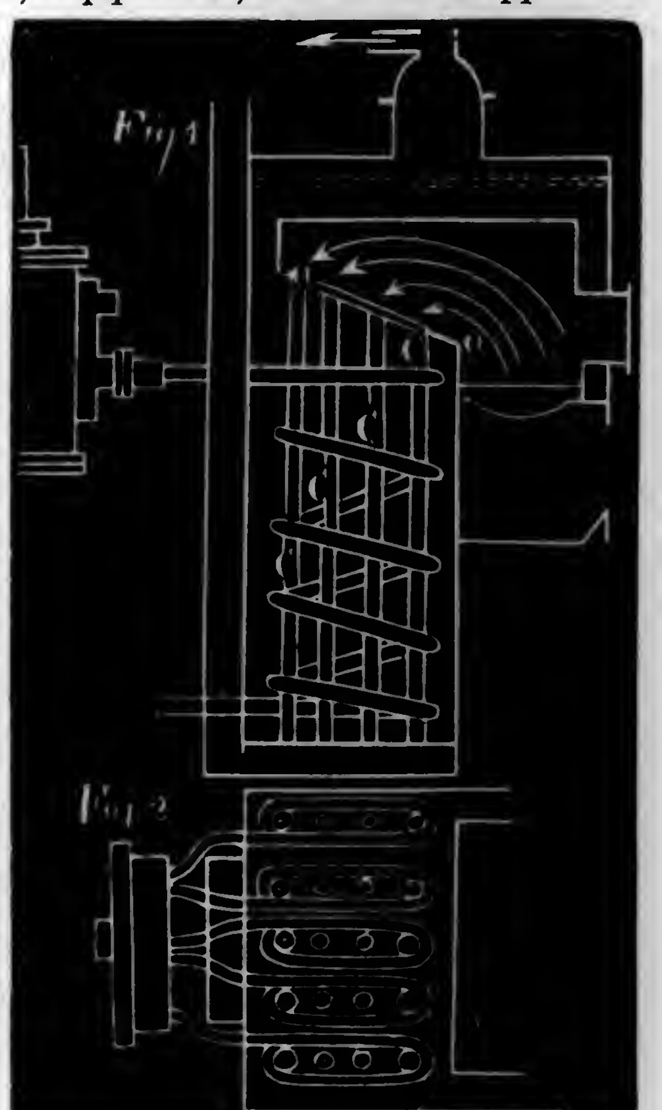
No. 10,193.—INCREASE S. WAITE, of Hubbardston, Mass.—*Improved Machine for Turning Cylinders, &c.*—Patented November 1st, 1853.

To fully describe the construction and operation of this machine, would require too much space for this Report.

Claim.—The combination composed of the feeding hopper, the series of rotary mandrels and centres applied to the shaft A, the revolving cutter or cutter-cylinder S, the mechanism for giving each mandrel an endwise movement backwards and forwards; mechanism for arresting the rotary movement of the shaft A, or the heads E F, during the time necessary for the operation of the cutter or cutter-wheel S, on each piece of wood; and finally, a mechanism for rotating the shaft A and its two heads; the mechanism for moving each mandrel endwise being the spring K, the wheel L, and cam-plate P; that for rotating the mandrel being the gear N and the gear W, on the shaft Y,



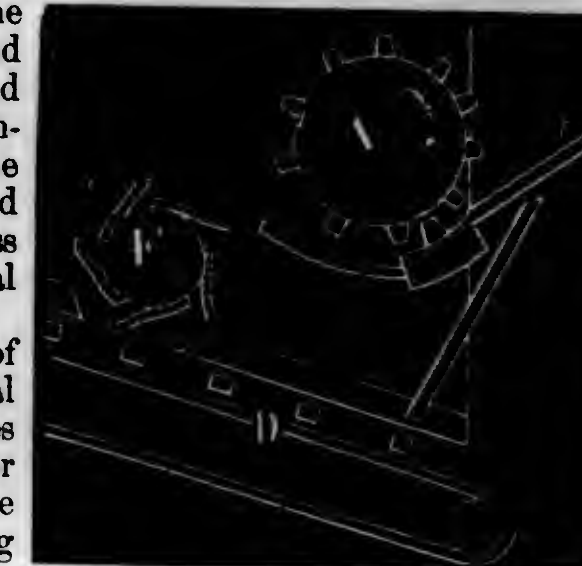
put in revolution as described; that for arresting the rotation of the shaft A being the stud I′ K′ or L′, stop-plate M′, and the screw applied to each mandrel; and finally, that for rotating the shaft A, being the friction-roller F, made to operate against the periphery of the circular head F, and to be rotated and borne against said head.



No. 10,194.—PETER H. WATSON, of Washington, D. C.—*Improvement in Steam-Boilers and Engines.*—Patented November 1st, 1853.

Claim.—The method of recovering the heat of the exhaust-steam, by passing it through the comparatively cool water in the lower portion of the boiler. Also, the arrangement of the upper end of the drop-flues C in an inclined plate *a*, to facilitate the entrance of the smoke into the flues, and the passage of the steam from beneath the inclined plate into the upper part of the boiler.

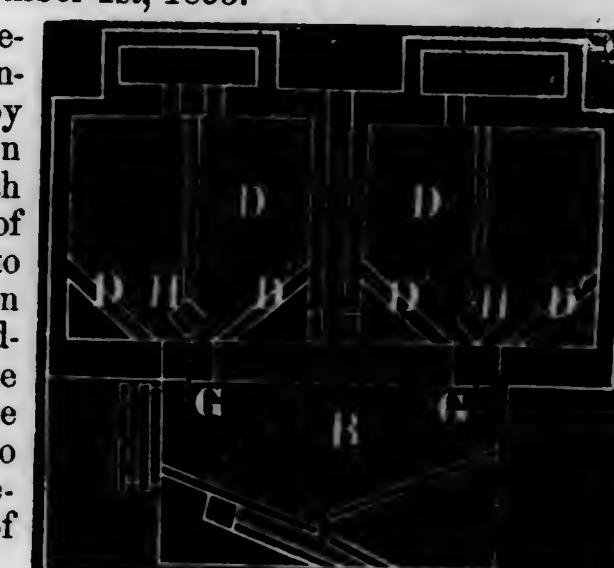
No. 10,195.—JACOB V. A. WEMPLE, of Chicago, Ill.—*Machine for Separating and Cleaning Grain.*—Patented November 1st, 1853.



This invention consists in the employment of a separating and break cylinder F, so situated and operating, as regards the threshing-cylinder A, as to break the force with which the straw and grain is thrown on the endless apron D; also serving as a partial separator.

Claim.—The employment of a cylinder F, having tangential or other suitably projecting plates across or along its periphery, for the purpose of separating the grain, and breaking the impinging effect produced by the threshing-cylinder on the endless apron D; the cylinder F being so situated, and operating in rear of the threshing-cylinder, as gently to feed over it the straw and headings, as they are delivered from the threshing-cylinder.

No. 10,196.—GEORGE CALVERT, of Upperville, Va.—*Improvement in Bee-Hives.*—Patented November 1st, 1853.



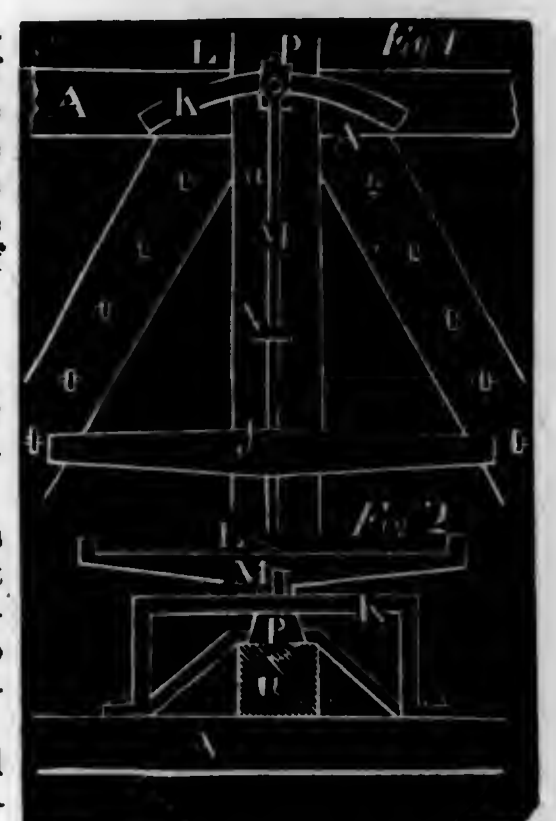
The object of this improvement is to effect a perfect cleaning of the hives of litter, by means of inclined planes D′, in the store-hives D, connected with the double flue G, at the top of the brood-hives B; the litter to pass down the sides, rather than through the centre of the brood-hives B, so as not to disturb the brood colony at work. The cross-piece H, brought down to the mouth of the planes D′, becomes a base for the support of the combs.

Claim.—The combination of the honey-boxes D D with the box B and cross-pieces H H, arranged and operated in the manner and for the purposes set forth.

No. 10,197.—SENECA LAPHAM, of Salem, Ohio.—*Improvement in Cultivators.*—Patented November 1st, 1853.

A represents the frame of the machine, and tongue *a* is secured to it by means of king-bolt J, round which it can turn; pin L, projecting from brace K, forms the fulcrum for lever M; staple N is secured to tongue *a*, and through this staple passes lever M. By this means lateral movement can readily be given to the tongue.

Claim.—The combination and arrangement of the parts, consisting of the lever M and its attachment to the brace K, and the connection of the tongue *a* to the lever by the staple N; and this in its application to the purpose of changing the direction of this and other machines.



No. 10,198.—WILLIAM B. LEONARD, of New York, N. Y.—*Recording Fluid Metres.*—Patented November 1st, 1853.

The object of this improvement is measuring the quantity of fluid that may pass through a pipe, or is discharged therefrom, without regard to the regularity or velocity of the current.

Claim.—The combination, in fluid metres, of mechanism for measuring the volume of a flowing fluid, however variable; mechanism for measuring the velocity of the flowing fluid, however that may vary; mechanism for multiplying the two quantities together; and mechanism for recording the product, in such manner as to show on a register the quantity of fluid that has passed. Also, the combination of a self-acting guard-valve or valves, however constructed or arranged, with the water-wheel or other motor, in a meter, in such manner that the flow of water through the meter will be arrested whenever its pressure is not sufficient to give motion to the motor the instant it begins to flow, whereby the escape of water through the meter unmeasured is prevented.

No. 10,199.—WILLIAM T. MERRITT, of Hart's Village, N. Y.—*Improved Mode of Opening and Closing Gates.*—Patented November 1st, 1853.

By reference to the annexed figure, the claim explains this improvement.

Claim.—The method of elevating and depressing, or opening and closing the gate, as shown and described; viz., by means of the shaft D, having upon it the pulleys *f f*, *g g*, the pulleys *g g* being attached permanently to the shaft, and having ropes H H' attached to them, and the pulleys *f f* being placed loosely on the shaft, and connected to it at a certain period by means of pins *h h*, on the shaft working

in slots *i i* in the bosses or hubs of the pulleys *f f*; these pulleys *f f* having the chains *j j* attached to them and to the upper ends of the gate-stiles *c c*, and also the chains *j j* with the weights G G; the said chains *j j* being attached to the lower ends of the stiles *c c*; the gate being prevented from being casually depressed or opened by means of the pawl J, which is freed from the notch *p*, in the boss or hub, by the dog L, substantially as set forth in the specification.

No. 10,200.—GEORGE WILLISTON, of Brunswick, Me.—*Improvement in Straightening or Curving Rails of Railroads*, &c.—Patented November 1st, 1853.

Claim.—The combination of the screw, strap, beam, and slides, constructed and combined substantially in the manner described; with the beam placed on the top or side of the rail, for the purpose of straightening or curving rails on railroads, without the necessity of removing the same from the sleepers.

No. 10,201.—SAMUEL S. ALLEN, of Salem, N. J.—*Improvement in Harvesting and Mowing Machines.*—Patented November 8th, 1853.

The nature of this invention consists in balancing the frame-work and gear operating the cutters on the driving-wheel, as a centre of oscillation, and thus balancing the weight of the arm and cutters thereon; also, in an arrangement of the tongue between the driving-wheel and the cutter-arm or beam, so as to constitute a centre draft, by the application of the adjustable secondary wheel on the side of the framing opposite to that of the cutter-arm, and thus obviate the tendency to swing around against the shoulder of the horse; also, in other improvements which are explained in the claims of the inventor.

Claim.—The arrangement by which the driving-wheel D is made the centre of oscillation, in counter-balancing the cutter-beam and

cutters thereon, embracing the secondary wheel I and spring L for the purposes set forth. Also, the combination of the tongue N with the driving-wheel D and secondary wheel I. Also, the method of balancing the cutter-blades T on the angular bar *a* by the sliding-bar H, in combination with the blade *e*, or their equivalents. Also, the construction of the cutter-blades, as formed on the under side with a rasp or roughened surface, while the upper side forms a shear-cutting edge, for the purpose of preventing choking of the fingers, and supplying an oil-box to the cutter-bar, as set forth in the specification and drawings.

No. 10,202.—JOHN BLUE, of Covert, N. Y.—*Improvement in Machines for Separating Grain from Straw.*—Patented November 8th, 1853.

This improvement is confined to what the inventor denominates a "shaker." It consists in connecting the cornered roller on either side to another on the other side opposite, with the same number of corners or arms, by fastening both on a shaft, in such a manner that when either side of the belt rests upon one corner or arm of the roller on that side, the other side rests upon the side of the roller, between the corners or on the ends of two arms, for the purpose of agitating the straw and grain while passing over the endless slotted apron.

Claim.—The arrangement of the cam-blocks *f* and *e*, or their equivalents, on the shaft *g*, for agitating the endless apron, as set forth.

No. 10,203.—CORNELIUS S. COOPER, of New York, N. Y.—*Improved Bass-Bar for the Violin.*—Patented November 8th, 1853.

A represents the bass-bar.

Claim.—The application of the *spring bass-beam* or *bar*, in place of the solid beam, which is taken from the violin, for the *violin*, *tenore* or *viola*, *violoncello*, double bass or *violono*, or any other instrument requiring a bass-beam or bar for the production of tone; then the support of the ends of the spring or improved bass-bar, by cutting notches or mortises in the end-blocks, as shown in the figure, and supporting said ends of spring in any manner, by connecting the bearings of the spring to the end-blocks to produce the desired effect. Also, the separation of the bass-bar or beam from the top or sound board, except three inches, which will produce the desired effect.

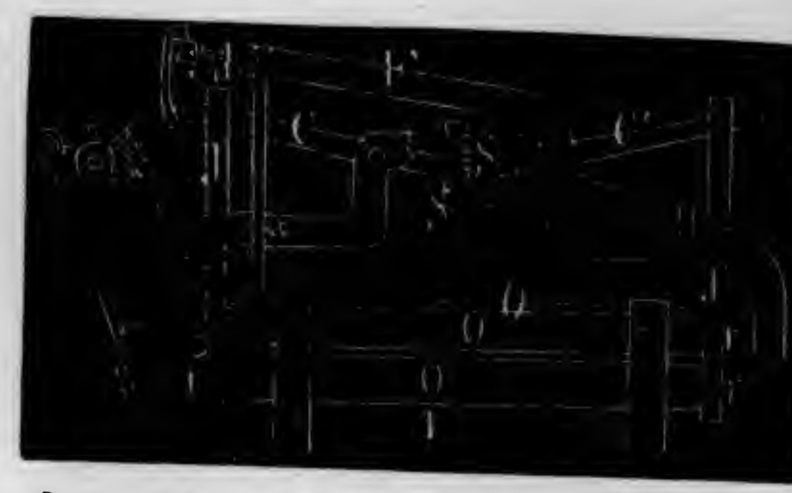
No. 10,204.—NATHANIEL GEAR, of Zanesville, Ohio.—*Improvement in Machines for Cutting Irregular Forms.*—Patented November 8th, 1853.

F, lower cutter-head; G, brace supporting the upper cutter-head H,

which is removable; G also forms a throat to the cutters; the cutters I are set in the inclined grooves in the upper and lower cutter-head, and fastened by screwing down J. To cut a duplicate of the pattern Y, the material is placed on top of it, and held there by some sharp projections in the upper side of Y. The two pieces are fed along by hand in the direction of the running of the cutters, which draws them tight up against the lower cutter-head. The cutters work upon the edge of the piece to be cut, whilst the cutter-head receives the pattern and prevents it and the piece upon it from coming any closer to the cutters than a fixed distance. The knives are gauged by the cutter-head, and the pattern is guided by the cutter-head also, which serves as a guage to the pattern.

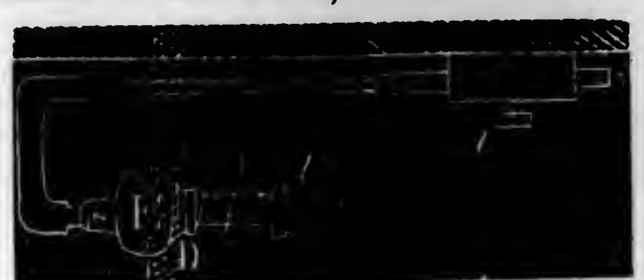
Claim.—The combination of knives in the manner described with a rotary cutter-head, so that said head shall serve as a guide or directrix to the form or pattern carrying the material to be dressed.

No. 10,205.—JAMES GREENHALGH, Jr., of Waterford, Mass.—*Improvement in the Harness Motion of Power-Looms.*—Patented November 8th, 1853.



Claim.—Suspending each leaf of harness from two jacks C C′, which are of similar form and length, and are geared together by toothed sectors S S, for the purpose of preserving a uniformity of motion to both ends of the harness. Also, attaching the knife G to the levers F F, and applying springs *d d* to the same, in such a way that it will move on the levers in its descent, in closing the shed sufficiently to pass the points of those hooks of the ascending portion of the harness which are in a position to be raised to make the succeeding shed, and after passing the points of the hooks will slip under them substantially as described. Also, suspending the heddle-frames I I, or the top rails *o o*, by means of sheet or hoop iron links J J, which are pivoted to the jacks, and are furnished with pins *r r* to enter slots or notches in the ends of the top rails *o o*, by which a simple means of attachment and detachment is obtained.

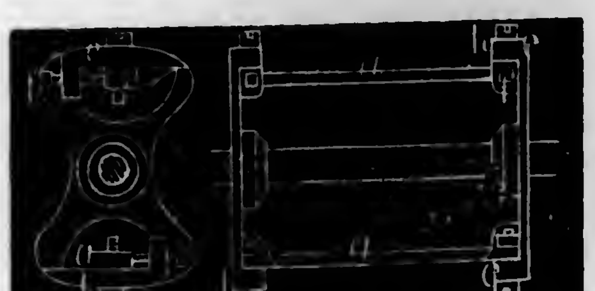
No. 10,206.—Jerome B. Greene, of Worcester, Mass.—*Improvements in Temples for Looms.*—Patented November 8th, 1853.



This temple consists of a roller, which turns freely on an axle placed parallel with the weft; and it is surrounded, or partially surrounded by a guard, which is adjustable on the same axle. The roller and the guard keep the cloth properly stretched, either by holding it between two conical surfaces, or by pins on the roller, upon which the cloth is held by the guard; the roller being kept in position for holding the cloth by a spring, which will allow it to be withdrawn when necessary. The axle upon which the temple turns forms part of an elastic stem, which gives the temple the necessary elasticity.

Claim.—The arrangement of the roller D, adjustable guard E, and springs *g*, upon the axle *a*, which is parallel with the weft, whether the roller and guard hold the cloth between two conical faces, or by teeth on the roller.

No. 10,207.—John Jones and Alexander Lyle, of Rochester, N. Y.—*Improvement in Machines for Cutting Straw.*—Patented November 8th, 1853.



The knives *a* are secured to the inside of the flanges *e*, in order to prevent them from overreaching and cutting into the mouthpiece of the box containing the straw. *f*, set-screws for regulating the knife; *h*, bolts which hold the knife on the inside of the flanges.

Claim.—The combination of the knives and segments of flanges (which are attached to, and form a part of the heads), the knives being placed on the inside of the flanges, instead of the outside, in the manner and for the purpose set forth.

No. 10,208.—Samuel Karns, of Bloody Run, Pa.—*Improvement in Machines for Hulling Clover-Seed.*—Patented November 8th, 1853.

This invention consists in a new method of constructing the teeth of the concave and cylinders, by forming them of wire, and securing them to sheets of leather or other elastic substance, which are made fast to the faces of the cylinder and concave; the teeth thus formed having the quality of elasticity, which allows them to yield, and pass any accidental obstruction that may occur when the machine is in operation, while the wearing away of the leather is retarded by encasing it with wire or thin bands of metal.

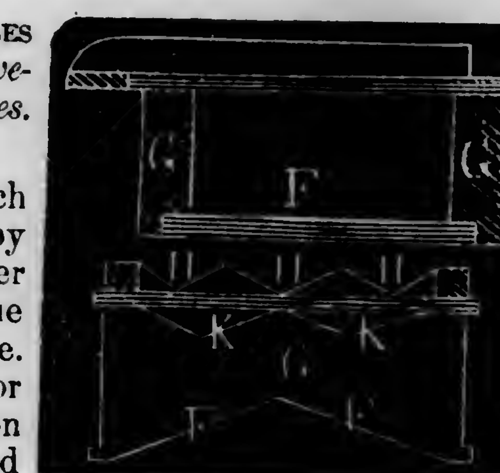
Claim.—The binding of the teeth to the hulling-cylinder by means of the wire band, as set forth.

No. 10,209.—Jonathan Knowles, of Cohoes, N. Y.—*Improvement in Looms.*—Patented November 8th, 1853.

This invention relates to the mechanism for letting off the warp from the warp-beam as the weaving progresses; and consists in arranging what is termed the tension or whip-roll, which is hung in the usual manner upon the arms of a vibrating lever, to roll up and down inclined guides in its vibrations, to accommodate itself to the length of the yarn unwound from the warp-roll.

Claim.—The combination of inclined guides with the whip-roll, for the purpose of graduating the tension of the warps.

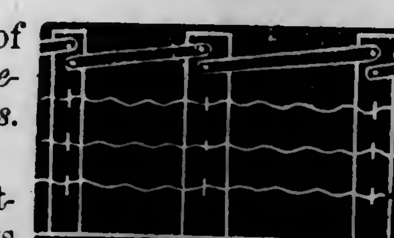
No. 10,210.—Abraham Lash and Miles Moore, of Bellville, Ohio.—*Improvement in Grain-Cleansing Machines.*—Patented November 8th, 1853.



H, flutes in the upper cleanser, which keeps the grain continually rolling by means of a vibratory motion, in order to obviate clogging. The flutes K in the under cleanser serve the same purpose.

Claim.—The two fluted cleansers, or their equivalents, and the combination of said cleansers. (They may be used in any common winnowing machine).

No. 10,211.—William H. Meriwether, of the County of Comal, Texas.—*Improvement in the Construction of Wire Fences.*—Patented November 8th, 1853.

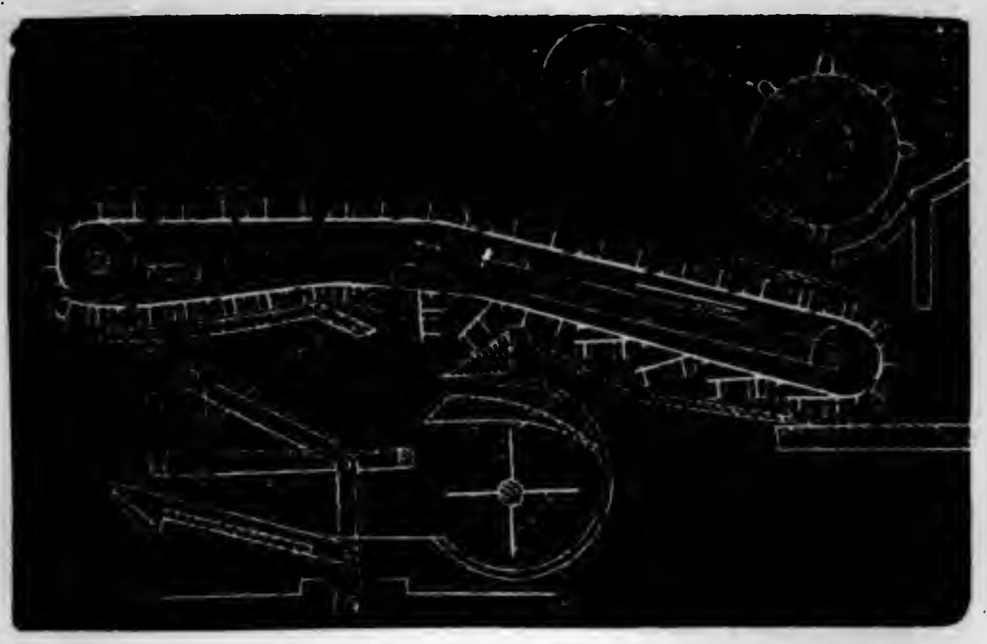


Claim.—The employment of the undulating or zig-zag wire for fencing, which, by its elasticity, increases the durability and effectiveness of the fence.

No. 10,212.—Abram B. Peterson, of Dexter, Mich.—*Improvement in Machines for Separating and Cleaning Grain.*—Patented November 8th, 1853.

By reference to the figure, the claim explains this improvement.

Claim.—The raddle A, with swinging sections, in combination with the interior carrier or elevator B, to separate the grain from the straw, and discharge the grain on the riddles under the head of the carrier or elevator B, with the effect of permitting the cylinder and concave to be set low down; the whole operating substantially as set forth. Also, the running of the raddle A and carrier or elevator B on separate and independent pulleys, in the manner and for the purposes herein described. Also, the introduction of the protecting apron H between the carrier or elevator B and raddle A, to serve the double purpose of



preventing the straw from driving through the raddle A, and protecting the carrier or elevator B from abrasion by the grain. Also, hanging the riddles, or the riddle and wheat-board, to upright standards W, to give the upper riddle the longest stroke.

No. 10,213.—WILLIAM ROBERTSON, of New York, N. Y.—*Improvement in Violins and other Stringed Musical Instruments.*—Patented November 8th, 1853.

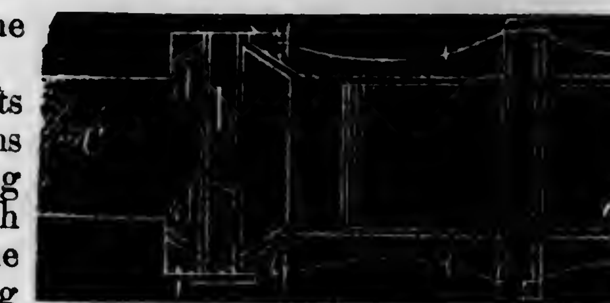
The performer presses his fingers on the projecting keys a; the string, which is just below the *supplemental finger-board*, will be pressed against the lower finger-board.

Claim.—Combining with the finger-board of a violin, or musical instrument of like character, a supplemental keyed finger-board, constructed and operating as described.

No. 10,214.—SAFFORD E. STURTEVANT, of Hartford, Vt.—*Improved Mode of Attaching the Shafts of Vehicles to Axles.*—Patented November 8th, 1853.

This attachment consists of an eye or collar, having taper or conical ends, which fit in adjustable sockets. The eye or collar may be attached to the shaft, and the sockets to the clasps which encompass the axle; or the eye or collar may be attached to the

clasps, and the sockets to the shafts.



Claim.—Securing the shafts of vehicles to axles by means of an eye or collar C, having taper or conical ends $d\ d$, which fit in adjustable sockets $g\ g$; the ends $d\ d$ of the collar C being kept firmly in the sockets by means of the screw-bolt h; the collar and sockets being attached to the shaft and axle in either of the modes herein described.

No. 10,215.—THOMAS SPILLER, and ANTHONY CROWHURST, of No. 5 Red-Lion Square, in the County of Middlesex, England.—*Improvements in Propelling Steam-Vessels.* — Patented November 8th, 1853.

This invention consists in the application of vanes, blades, or fins, mounted upon an axle which has free motion in the bearing of a frame, which frame slides vertically in a groove or guide prepared for it in the dead-wood of the stern or any other part of the vessel below the water-line—an alternating vertical motion being communicated by suitable mechanism. The vanes, blades, or fins are moved up and down through the water, and assume an angle of resistance to it, which is regulated by a suitable arrangement of stops. The angular position which the vanes or blades assume in their motion through the water is similar, somewhat, to that of the tail of a fish.

Claim.—Vanes, blades, or fins of whatever form, or wheresoever applied in a vessel for the purpose of propelling the same, when such vanes, blades, or fins are mounted on an axle or shaft vibrating or turning freely upon its axis, and moving vertically through the water.

No 10,216.—GEORGE SPENCER, of Utica, N. Y.—*Improved Apparatus for Ventilating Railway Cars.*—Patented November 8th, 1852.

The figure represents the form and construction of this ventilator. A is the mouth for the reception of the air; F, the narrow throat of the mouth; E, stratum of water; N, the barrier to prevent the water from being dashed over into the car through the conductor O. The ventilator is placed on the side of the top of the car, and the current of air is produced by the motion of the car or cars.

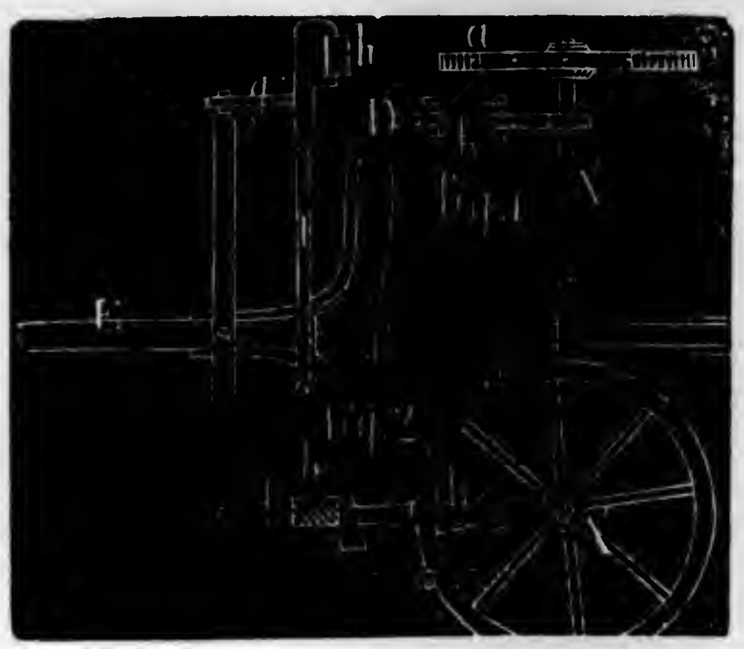
Claim.—The application of a single "throat," being the termination of a "gathering" or gradually contracted opening, in combination and immediate connection with a single enlarged air-chamber, directly above a surface of water, for the purpose of freeing the air forced into the car from dust and cinders, thus enabling the dust and cinders to fall upon the water by their own gravity alone.

No. 10,217.—Samuel D. Tillman, of Seneca Falls, N. Y.—*Improved Method of Illustrating and Measuring Musical Intervals.*—Patented November 8th, 1853.

By reference to the annexed figure, the claim will explain this invention.

Claim.—The employment of a fixed disk, on which the musical intervals within the octave are represented by divisions of a circle, and the letters commonly used to designate the notes of the fixed scale, in combination with one or more arms, disks, or rings, rotating around the centre of the circle of the fixed disk; on which rotating arms, disks, or rings, are the true and tempered divisions of the diatonic scale, so arranged that the relations of those divisions of the diatonic scale with those on the fixed scale may be clearly seen, when the point designating the tonic or key-note on the moving scale is placed opposite any of the divisions of the fixed scale.

No. 10,218.—W. D. Williams, of Raleigh, N. C.—*Improvement in Wagon-Brakes.*—Patented November 8th, 1853.



a, one of the front wheels; A, front axle; E, tongue; *h*, brake. When the wagon moves on a level, the brake will be disengaged from the wheel, as seen in fig. 2; but if moving down an inclined plane, the brake will be thrown in the position represented by dotted lines in the same figure, and the carriage will press with its whole weight against the brake.

Claim.—Forming two swinging or rolling joints between the front axle A and the front hounds D D, in combination with the swinging brake I, *h h*, *g g*, arranged on top of the reach and in front of the wheels, for the purpose of rendering the wagon more perfectly self-locking, or for applying the brakes simply by the aid of the horse and wagon, and disengaging them by the forward action of the former, the whole being constructed and operating as set forth. Also, making the brake capable of swinging on a centre, so that it may be thrown over towards the front of the reach when it is desired to dump the load, and again thrown to its proper place after dumping.

No. 10,219.—Joel Wisner, of Aurora, N. Y.—*Improvement in Washing Machines.*—Patented Nov. 8th, 1853.

The nature of this invention consists in constructing the interior surface of the tub at the bottom of the tub and under side of the rubber with radial ribs, in the form of semi-frustums of cones, with their larger bases towards the exterior of the tub and perimeter of the rubber; the under surface of the rubber being bevelled outward and upward, so that the elements of the ribs on both rubber and bottom which are farthest from said surfaces, will be parallel when the ribs have the position shown in figure 3, which represents a section through *a d*.

Claim.—Making the wash-board of a conical form, having its surface higher above the bottom of the tub at the circumference than at the centre, and attaching to it and to the bottom of the tub radial ribs, of the form of a half cone, when these ribs are formed of such depth, and with spaces so wide between them, as to receive the clothes in those spaces, in such manner as to turn or roll them over as the board is rotated back and forth.

No. 10,220.—Samuel Greene, of Lambertville, N. J.—*Improvement in Bolts or Locks for fastening Doors, Shutters, &c.*—Patented November 8th, 1853.

B is the bolt; C, case of the bolt; R, case to receive the end of the bolt when locked; D, knob sliding in a slot S in the case; E, spring, with one end fastened in the bolt, and fitting in a recess N; when drawn out, as shown in figure, the other end of the spring leaves the recess N and falls into recess G, thereby acting as a stop; at the same time the drop H, which slides in a groove in the back of the bolt, will fall into recess I, thereby acting as another stop; a key to fit in a hole in recess G is used to unlock the spring and drop when required.

Claim.—The spring and drop, or tumbler, arranged with reference to each other and the notch in the case as described, and so formed and located that they may be acted upon in the manner described by a single key.

No. 10,221.—Alexander C. Twining, of Hudson, Ohio.—*Improvement in Refrigerating Process and Apparatus for making Ice and other like purposes.*—Patented Nov. 8th, 1853.

Claim.—The combination of an exhausting pump or apparatus that is also condensing or compressing, with a restorer, and with a freezing cistern having water-chambers. Also, the same pump and restorer in combination with a separate exhaust-vessel, in or around which the ether or other liquid uncongealable at the temperature employed is cooled and made to pass into the freezing cistern and there perform its office. Also, the percolator, or apparatus introducing into the cistern, or the separate exhaust-vessel, the ether or volatile liquid, in jets or drops, in combination with the exhaust-pump and restorer. Also, the use of the water-vessel, in combination with the water-chambers and the intervening liquid for perfecting contact, as set forth. Also, in combination with the restoring apparatus, the cooling of the liquid around the same by exhaustion, using therefor the secondary pump and connections.

No. 10,222.—Erastus B. Bigelow, of Boston, Mass.—*Improvement in Looms for weaving Looped and Velvet Pile Fabrics.*—Patented November 15th, 1853.

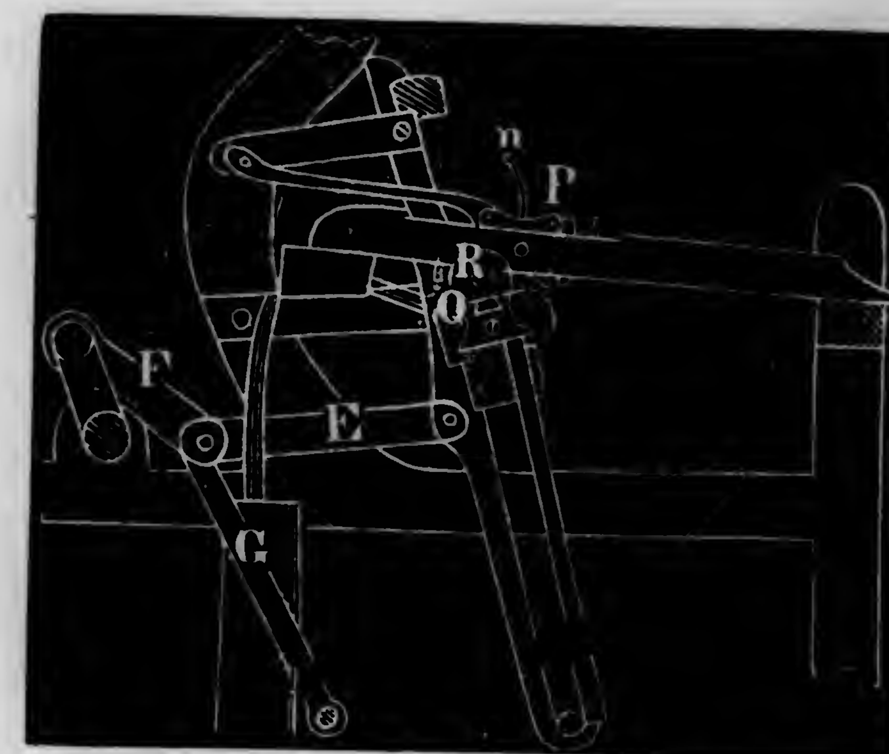
(This improvement is too complicated to admit of a brief description of its nature and operation.)

Claim.—The method of constructing and operating the pincers or their equivalents for successively operating the pile-wires, so that they shall carry said pile-wires forward to the face of the cloth, and hold them in position with their proper edges upwards until they are otherwise secured. Also, constructing the pincers for successively operating the pile-wires with grooved jaws, opening and closing in a line with the pile-wire and with a motion in advance of the lathe, whereby collision with the lathe is easily avoided. Also, the application of long horizontal guides. Also, the application of a vibrating box or holder, in combination with the pincers, or their equivalents, for successively operating the pile-wires. Also, in combination with the pile-wires, a bar or guide, which shall successively press against the pile-wires, to keep them in proper position during the operation of cutting. Also, the method of applying the tension-weight and brake to the whip-roller by means of the arms. All in the manner and for the purposes set forth in the specification.

No. 10,223.—John Gledhill, of New York, N. Y.—*Improvement in Power-Looms.*—Patented November 15th, 1853.

The improvements which constitute this invention are for the most part intended only to be applied to the weaving of hair-cloth. That part relating to the lay motion, however, is applicable to looms of every description. (See figure.)

Claim.—The combination of the main connecting-rods E, links F,



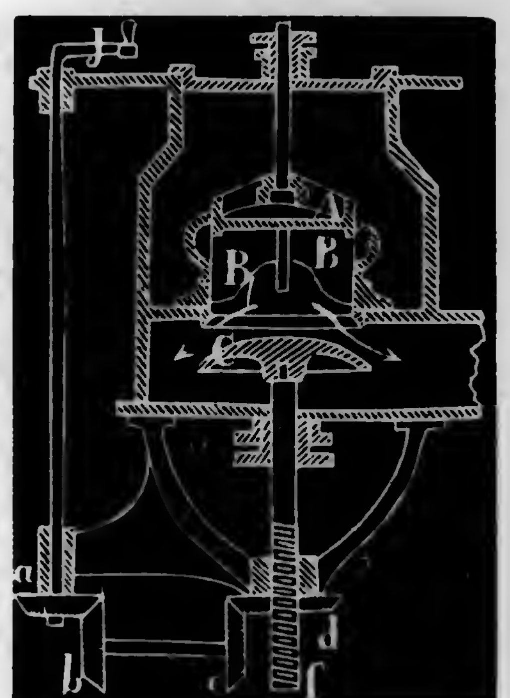
and radius-rods G, for giving the lay a motion, the forward part of which is accelerated, and the backward part retarded, for the purpose set forth. Also, the "automatic server," consisting of a block or head P, furnished with any number of hooks *n*, or analogous devices, arranged in any number of series, according to the number of bunches of filling hair or threads, and in order of succession; the said block or head being hung, substantially as described, on a pivot, in such a position that when a proper amount of circular motion is given to it by suitable mechanism, the hooks will withdraw the hairs from one or other of the bunches, and bring them to a suitable position to be taken by the nippers or other device which draws them through the warp. Also, a pair of nippers, Q R, which are operated by suitable mechanism, to make their jaws pass through the warp from one side thereof every time the shed is opened, seize one or more hairs or threads from the opposite side, and return through the open shed with the same, and release the same when it is beaten up and the shed is closed. Also, the combination of the fixed stud, finger, lever, spring, and arm, as described, the stud, finger, and spring being for the purpose of producing a proper tension on the hairs or threads as they are being drawn through the shed, and the lever and arm being for the purpose of moving the finger, to allow the nippers to pass in coming to fetch the hairs or threads.

No. 10,224.—Henry P. M. Birkinbine, of Philadelphia, Pa.—*Improved Mode of Regulating the Motion of Pumping Engines.*—Patented November 15th, 1853.

This invention relates to that description of pumping machinery generally known among engineers as the "Cornish engine," and consists of intercepting the passage through the equilibrium pipe, by

means of any convenient valve-apparatus, in connection with machinery for regulating the same.

A is the equilibrium valve; B, the valve seat, which also forms a seat for the supplementary valve C; J, crank; *a b c d*, bevel-wheels; *f*, screw-spindle, which serves to bring C further from or closer to its seat, thereby obstructing more or less the passage of the steam from the equilibrium-valve.



Claim.—The use of the adjustable valve-apparatus, or any equivalent to the same, for intercepting more or less the steam in the equilibrium passage, so as to regulate the rapidity of descent of the plunger, according as the head of water may require.

No. 10,225.—JAMES BROWN, of New York, N. Y.—*Improvement in Daguerreotype Apparatus.*—Patented November 15th, 1853.

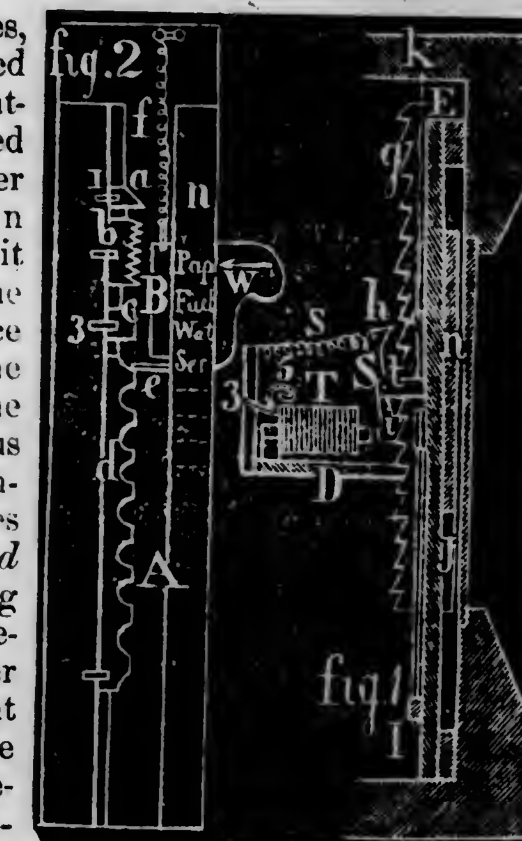
The nature of this invention consists in the employment of an ornamental diaphragm, with a suitable opening placed in a suitable position in front of the person to be represented, for the purpose of producing a portrait or picture, with an appropriate or tasteful ornamental border, either with or without the name of the person or subject, and the name of the artist.

Claim.—The employment of a diaphragm, with a suitable opening through which the person or subject is presented to the camera, when the opening is surrounded by ornament or embellishment, for the purpose of producing a portrait or picture with an ornamental or embellished border.

No. 10,226.—CHARLES S. BULKLEY, of New York, N. Y.—*Improvement in Electro-Magnetic Annunciator for Hotels.*—Patented November 15th, 1853.

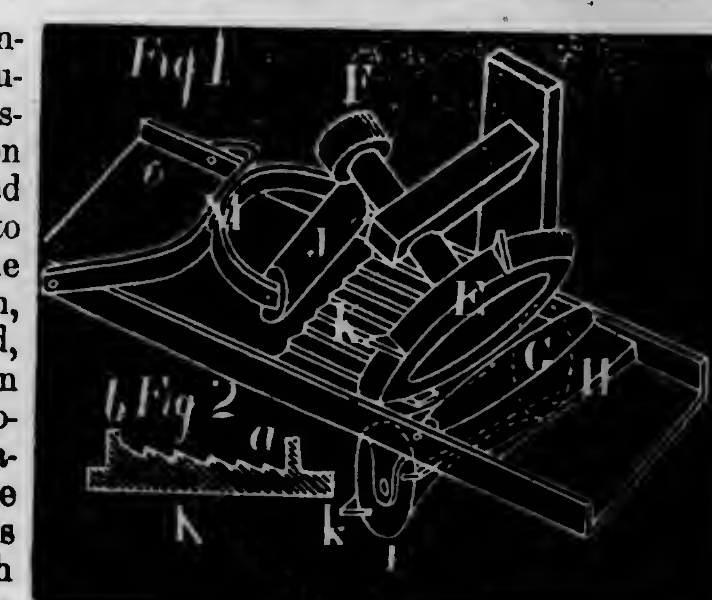
This annunciator consists of circuit closers placed in the several rooms of the hotel, and a register situated in the office of the hotel, a branched circuit of insulated wires connecting the several circuit closers with the register and a galvanic battery. When the guest wishes any thing at the office, he grasps the key B (situated in his room, and always kept drawn back by the spring *f*, except when in use), and draws it forward directly under the word which expresses his desire. By this action the pin *e* first closes the circuit with the plate *a*, which causes the bell K to strike; it then comes in contact successively with all the points of the plate *b*, whereby the

circuit with its wire is closed six times, by which the magnet W is magnetized that number of times, and consequently six teeth of the rack F are allowed to pass down by the escapement lever S, and the figure "5" is brought in sight on the face of the register; it then closes the circuit once with the plate *c*, whereby the magnet T is once magnetized, and a single tooth of the rack E allowed to escape, exposing the cipher on the face of the register; thus the number of the room (50) is communicated at the office. It then closes and breaks the circuit with plate *d* a certain number of times, according to the order in which the word he desires to communicate is arranged over the key, whereby the rack *g* is brought down that number of notches by the magnet *p*, and exhibits the corresponding word on the face of the register, where the word "Paper" agrees with the word over the key in fig. 2.



Claim.—The circuit closer, in combination with the other parts, as substantially set forth for the purposes described.

No. 10,227.—JOSEPH D. ELLIOT, of Leicester, Mass.—*Improvement in Machines for Dressing Staves.*—Patented November 15th, 1853.



The nature of this invention relates more particularly to the use of a transversely inclined bed, upon which the staves are fed into the cutters, so as to adapt the machine to the cutting of thick or thin, tapering or wedge-shaped, riven staves, with the grain of the wood, without separately adjusting the machine, or assorting the staves. (See figures.) E is the cutter-wheel, to which motion is given by means of drum F; E dresses the concave side of the stave; G, weighted roller, and so situated as to hold the stave against the bed H, and against the lifting cut of the wheel; I, concave cylinder with straight knives arranged transversely across it, which dress the convex side of the stave. The weighted roller J holds the stave against the action of the under cutter K.

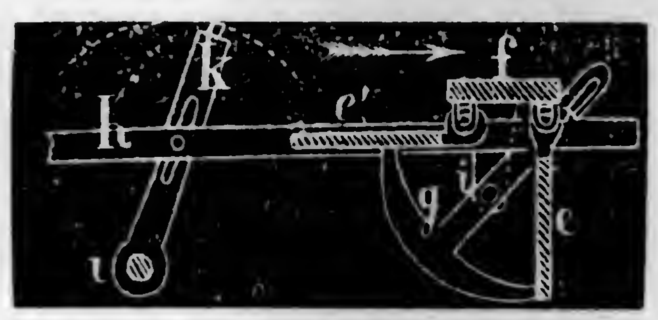
Claim.—The combination of the transversely inclined bed with the swivelled roller, for the purpose of adapting the machine to the dressing of riven staves with the grain of the wood, whether thick or thin, tapering or inclined from edge to edge, without any separate adjustment for the various sizes, substantially as described.

No. 10,228.—Franklin Fruit, of Jefferson City, Mo.—*Improvement in Machines for cutting Barrel-Heads.*—Patented November 15th, 1853.

The nature of this invention consists in holding the material of which the barrel-head is cut by means of a chuck, having a series of centres placed in circular form, and concentric with the periphery of the chuck. Each centre is provided with a spiral spring, which enables the centres individually to give or yield, so that the different pieces forming the barrel-head may vary in thickness and still be firmly held by the chuck.

Claim.—The chuck, constructed of two circular disks connected by studs, and centres placed between the studs, the centres passing through both the front and back disks, and having collars upon them; each centre being provided with a spiral spring, which is placed between the collar and the inner side of the back disk, and by which springs each centre will yield or give independently of the others, so that the different pieces forming the barrel-head may vary in thickness, and still be properly adjusted and secured between the face-plate and the chuck.

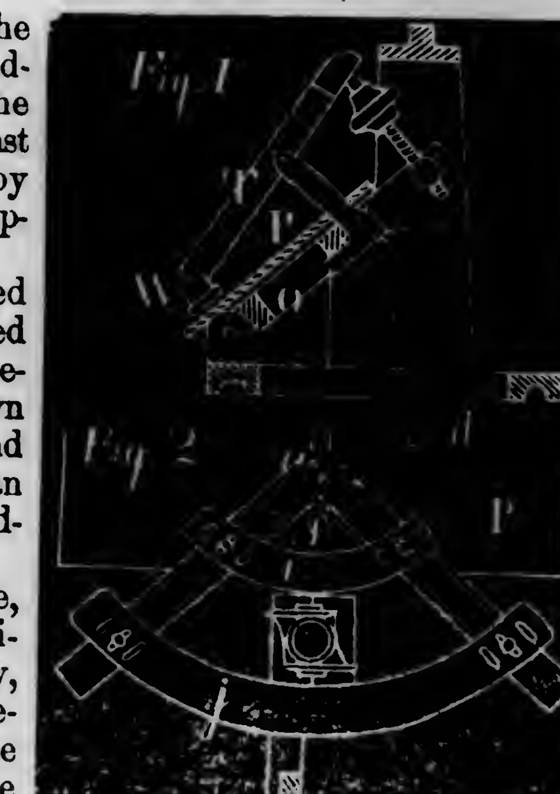
No. 10,229.—Banford Gilbert, of Pittsburgh, Pa.—*Improvement in Propellers for Steamboats.*—Patented November 15th. 1853.



f is the cross-piece of the frame, to which the floats *e e′* are attached by hinges. The arm *k* turns round *i*, and thereby transmits a horizontal reciprocating motion to rod *h*, which is pivoted to one of the anchors *g*, which are made to swing round the centre pivot *i*, and thereby alternately turn one of the floats round its hinge.

Claim.—The combination of the anchors *g* with the double floats or paddles *e e′*, suspended so as to hang vertically in the water when in use, and operating with a horizontal reciprocating motion; one of the floats in each set propelling the boat in one direction, and the other float in each set propelling it in the opposite direction; one anchor being combined with each set of double floats, for the purpose of retaining one float in a horizontal position, so as to pass through the water with the least possible resistance when not in use, and sustaining the pressure of the water against the paddle in use, when in the vertical position which the anchor compels it to retain while propelling the boat, and leaving it free to assume the angle of least resistance while returning through the water. The simultaneous reversing of the double paddles being accomplished by means of a handle which shifts the connecting-rod, to which all the anchors in one frame are attached, in the manner described.

No. 10,230.—Leonard Gilson, of Brighton, Mass.—*Improvement in Machines for Dressing Circular Sash, &c.*—Patented November 15th, 1853.

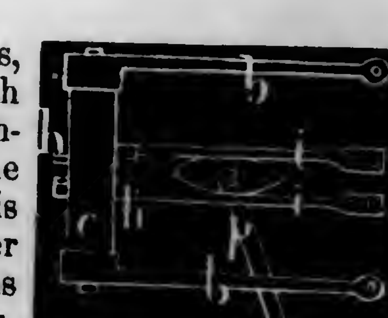


By means of the wheel *d* and the rack, the bed-frame o may be adjusted to an inclined position. The lever T can be made to press against the material to be planed at W, by screwing Y, which will raise the upper end of the lever T.

When circular work is required to be made, the carriage is placed in the centre of the frame o, and secured there, the bed is turned down at right angles with the cutters, and the levers T T are removed, and an angle-frame is placed upon the bed-plate, as shown in Fig. 2.

Claim.—The swing bed-frame, and adjustable bed-plate, in combination with the lever T, clamps W, and set-screws Y. Also, an angle-frame, with a joint at or near the vertex, to increase or diminish the angle, with a movable segment-plate thereon, in combination with the bed-plate and cutter, for circular work, as herein described.

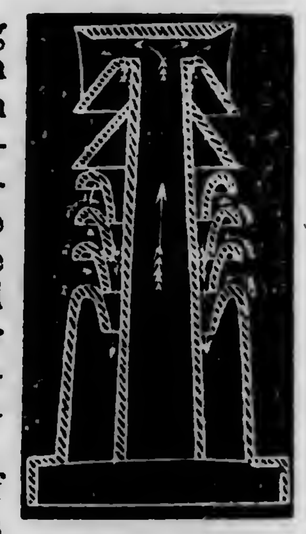
No. 10,231.—Daniel H. Hovey, of Kilborn, Ohio.—*Improved Machine for Creasing Straps of Leather, &c.*—Patented November 15th, 1853.



The operation of this invention is as follows, viz.: (See fig.) *h h* are the creasers, which are pressed together by springs *i i*. The leather is placed between said creasers; and the roller, which has its bearings in springs *b b*, is brought down upon it by depressing a lever with the foot of the operator. The strap is then drawn through the machine. The creasers will adjust themselves to the various widths of straps by means of the springs *i i*.

Claim.—The combination of the self-adjusting creasers *h h*, springs *i i*, vibrating cam *m*, and pressure-roller *c*, arranged and operating as described.

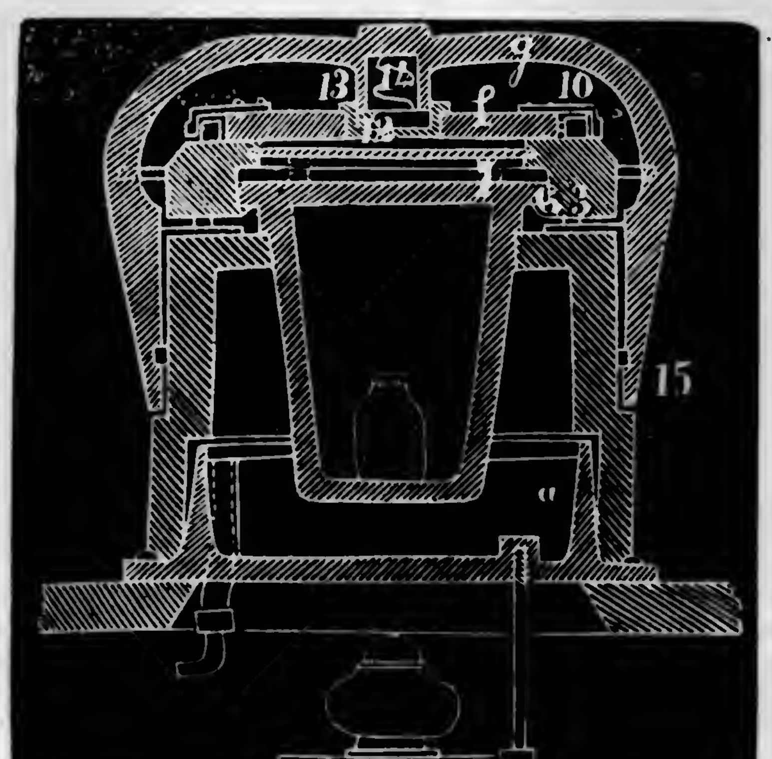
No. 10,232.—Joseph Leeds, of Philadelphia, Pa.—*Improvements in Ventilators.*—Patented November 15th, 1853.



The nature of this invention consists in arranging a series of downwardly inclined curved openings in the outer case or shell of the ventilator, for taking in and directing downward into the building to be ventilated a current or currents of pure air; and in connecting therewith a passage in the centre of the ventilator, through which the impure air may be drawn upwards by an accumulated or increased draft over the top of the passage; also in the manner of increasing the draft across the top of the ventilator, to aid the upward current of air through the centre passage.

Claim.—The combination in one case or shell of the series of downwardly inclined curved openings in the outer shell, for taking in and directing downwards a column of pure air, with the centre pipe or opening crowned with the two frustums of cones with their apices towards each other, for producing a counter-current, and carrying from the apartments to be ventilated the impure air, and increasing the ejecting current, the whole requiring but a single opening in the roof.

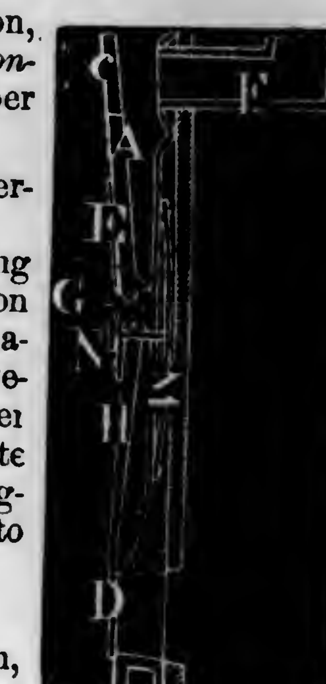
No. 10,233.—William Lewis and William H. Lewis, of New York, N. Y.—*Improved Apparatus for Chemically preparing Surfaces for the Daguerreotype, or similar Processes.*—Patented November 15th, 1853.



This improvement consists, first, in means to apply either heat or cold to the chemical, to regulate the evaporation thereof as required, and according to the state of the weather; the chemical in summer-time evaporating too quickly, while in winter it is too slow in its operation. Second, in fitting the glass pot containing the chemicals, so that it is less liable to break. Third, in providing the slide carrying the daguerreotype plate to be coated. Fourth, in fitting the cap or cover with rollers to obviate friction. Fifth, in the means for securing to the slide and adjusting the plate of glass that sets over the pot containing the chemicals. Sixth, in the means of attaching the yoke that passes over the slide, to keep it down to the box.

Claim.—The metallic base formed as a box *a*, to which cold water or heat is to be applied, to regulate the temperature of the chemicals in the coating-box. Also, suspending the glass pot within the coating box by means of a flanch or bead on the upper edge thereof. Also, the rollers 3 in combination with the ways *d*, formed with the inclines to relieve the friction. Also, the rollers 10 on the cover *f*, combined with the ways and inclines 11 on the slide, to lift the cover and relieve friction. Also, the rebates 6 to support the glass on the lower surface thereof, in combination with the screws 7 to retain the same against the rebates. Also, securing the metal yoke *g* in place by means of ribs 16 on the inner sides of the vertical parts thereof, and the slides 15. Also, the hub 13, on the yoke taking the socket 12, in the cover *f*, and containing the spring 14, whereby the cover is retained in place, but allowed to take its proper bearing.

No. 10,234.—Sergius P. Lyon, of Farmington, Mich.—*Improvement in the Method of Constructing Stove-Dampers.*—Patented November 15th, 1853.



(The claim explains this improvement by reference to the annexed figure.)

Claim.—The arrangement of the lever H, having the valve D on its lower end, and a curved portion G and flat spring E on its upper end, in combination with the lever A, pivoted between the curve-portion and spring (said lever attached to the upper valve *c*), the thumb screw N, and expansible plate M; the whole acting automatically in the regulation of the draft of air to the fire, and also to the induction of air to the flue.

No. 10,235.—William H. Muntz, of Norton, Mass.—*Improvement in Paddle-wheels for Vessels.*—Patented Nov. 15th, 1853.

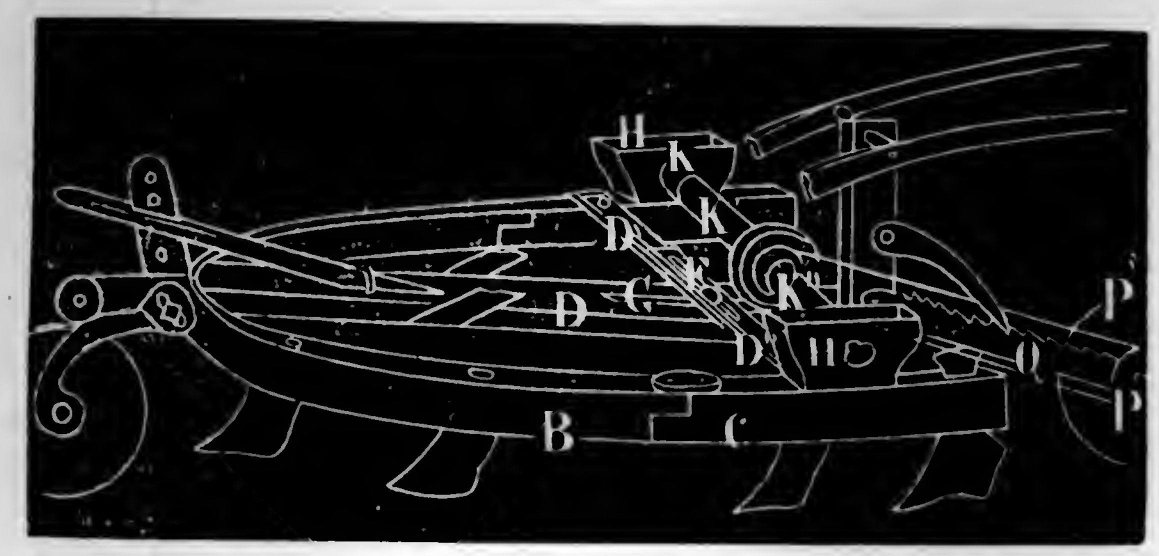
This improved wheel is constructed of three circular wheels (with a shaft passing through their centres) placed at equal distances apart. A B C are the wheels; D', the shaft. The centre wheel is about twice the diameter of the others. To these wheels the buckets are affixed; one set of them being made to extend from the inner part of one wheel A to that of the other wheel B, while the other set

are made to extend from the circumference of the wheel C to that of the wheel B.

The buckets are formed of sheet-metal, in the following manner, viz.: First, the bucket is bent so that one part *a* shall stand at about a right angle to the other part *b*. The part *a* is properly the paddle or float, and *b* the guard. These parts are each curved in a peculiar manner. The float strikes the water flatwise, but enters the water at an angle of about forty degrees to the horizontal, so that its narrowest part shall not only enter the water first, but shall be the first part of the float to leave the water.

Claim.—The mode of making the paddle-wheel, consisting in making the supports of the buckets a cutwater-wheel, and two wheels A C of smaller diameter; of forming each bucket of a float and guard, made to stand at an angle to each other; of making the guard to extend from the rim of the cutwater-wheel to the other or smaller wheel, and so that the guard shall not only pass edgewise through the water, but endwise into the water, the float being made to project inwards from the guard.

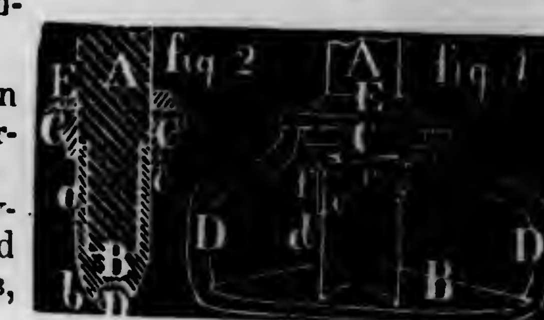
No. 10,236.—George Phillips, Philadelphia, Pa.—*Improvement in Cultivators and Seed-Planters.*—Patented Nov. 15th, 1853.



The nature of this improvement consists in so constructing and combining the several parts of the planter, harrow, and cultivator-plough, as to enable them to be separated or attached, and to perform either of the functions for which they are designed in a more effective manner than heretofore; and also in attaching to the upright post, at the back part of the centre or draught beam, a graduating and driving wheel capable of being used for those purposes, or as a pivot-wheel to turn the machine on, when it is desired to do so for any purpose. (See figure.) D′ D″ slotted bars secured by the nut-screw F passing through both the slots, and also through the slot of the centre-beam D; H, the hoppers; K, projecting tubes with suitable holes for dropping the grain; P, the band-wheel, which is made to revolve the hollow shafts K′ K″.

Claim.—The arrangement and combination of the side pieces B and C, slotted beam D, and slotted bars D′ D″, and the hollow sectional axle or shaft K, K′, and K″, for the purpose of allowing the expansion and contraction of the side pieces. Also, attaching the driving and graduating wheel to the back part of the machine by means of notched bars Q, secured to the upright post of the centre or draught beam by a bolt upon which they move, and suspending above the same pawls, which enter the notches, thus enabling the wheel to perform its functions of regulating the height of the back part of the machine, and driving the distributing-shafts, and to be drawn or thrown under the centre or draught beam, to form a pivot-wheel, upon which the machine can be raised from the ground and turned, in the manner and for the purpose specified.

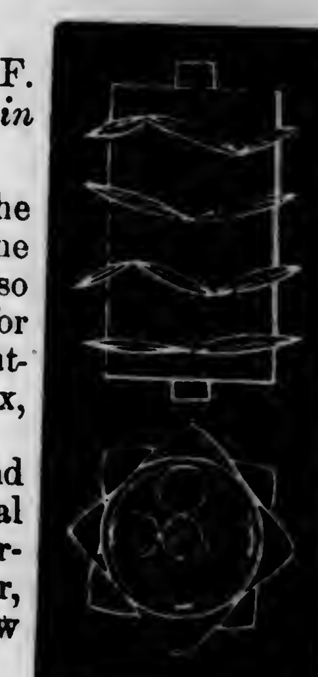
No. 10,237.—Timothy Randlett, of Enfield N. H.—*Improvement in Mop-Heads.*—Patented November 15th, 1853.



This improvement is explained in the claim of the inventor, by reference to the annexed figure.

Claim.—The binder D, and revolving tightener C, combined with and embracing the united cross-head B, the socket *a*, and ridge *d*.

No. 10,238.—Robert Sinclair, Jr., and Richard F. Maynard, of Baltimore, Md.—*Improvement in Straw-Cutters.*—Patented Nov. 15th, 1853.



This invention relates to means for feeding the straw-cutter, and consists in the employment on the feeding-roller, of alternate right and left fins, so arranged as to form a double spiral or screw, for the purpose of feeding forward the straw, preventing it from crowding to the right or left of the box, and compressing it as it is passed to the knives.

Claim.—The employment of alternate right and left fins, so arranged as to form a double spiral or screw, the fins operating together for the purpose set forth,—and constituting, all together, what the inventors denominate, "the double screw propeller" for straw-cutters.

No. 10,239.—John H. Thompson, James M. Thompson, and Hosea Q. Thompson, of Holderness, N. H.—*Improved Machine for Trimming the Soles of Boots and Shoes.*—Patented Nov. 15th, 1853.

(See figure.) *b* is the platform; upon its edge rests the sole *c*; *d d* are the knives set in the revolving knife-stock *e*; *h h*, the pattern-plate, which is first fastened to the sole; *k* is the gauge-bar; *o o*, guides.

Claim.—A machine in which the sole is trimmed by revolving knives, and guided as fed along by the operator, by an adjustable gauge-bar, against which the edge of the pattern-plate abuts.

No. 10,240.—William H. Towers, of Philadelphia, Pa.—*Improved Attachment to Registers of "Hot-air Furnaces."*—Patented Nov. 15th, 1853.

The nature of this invention consists in placing on or about the register a convenient contrivance to hold water to be evaporated in the apartment into which the register conducts the heated air, by which means the moisture of the air of each apartment may be regulated to suit the occupants.

Claim.—Placing within the jambs of each register the means of moistening the heated air.

No. 10,241.—William Townshend, of Hinsdale, Mass.—*Improvement in Looms.*—Patented Nov. 15th, 1853.

The nature of this invention consists in the use of levers, connected to the heddles, and so set on slotted fulcrums, that they receive an endwise-motion from the pattern-chain, or similar means, to connect said levers, near one end or the other, with cross-levers, to be carried up by such levers, and either elevate or depress the heddles, according to which end of said sliding-lever is elevated.

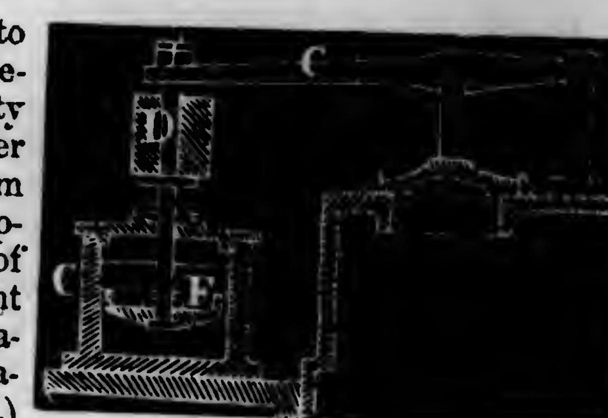
Claim.—The levers *n*, on a slotted fulcrum, with their latch-pieces *u* and *v*, or their equivalents, combined with the levers *w* and *w* 1; by which arrangement, the levers *n* are connected to either lever, *w* or *w* 1, by means of the end-motion, and carried up and down by competent power applied to the levers *w* and *w* 1.

No. 10,242.—Jonathan E. Warner, of Boston, Mass.—*Improvement in Machine for Finishing the ends of Staves.*—Patented Nov. 15th, 1853.

The object of this invention is to finish the two ends of a stave simultaneously, which includes the distinct operations of cutting the staves to the proper length, bevelling the ends, reducing to the required thickness, and cutting the groove, within which the edges of the head are to rest, or "crozing." These four combined operations are technically known as "working off," and are usually performed after the cask is "set up," and by hand-labor.

Claim.—A feed-bed revolving in bearings, which are capable of being moved by weights, springs, or other means towards the beds or stops on which the back or outer side of the stave is supported; the extent of such movement depending upon the thickness of the staves operated on. Also the combination of the feed-bed with the saws, cutters, fixed stops, and movable frame, and their equivalents, for the purpose and in the manner above described.

No. 10,243.—Henry Waterman, of the City of Hudson, N. Y.—*Improvement in the Mode of Constructing Safety-Valves.*—Patented Nov. 15th, 1853.



This improvement relates to locomotive engines, and is designed to obviate the uncertainty with which the weighted lever indicates the pressure of steam (on account of the sudden upward and downward motion of the locomotive), and to prevent the escape of steam unnecessarily; and consists in the application of weighted rod D (see fig.) to the outer end of the lever C, which is connected to the valve F, in the cylinder G, which cylinder is filled with sperm oil or other similar fluid nearly to its top, completely covering the piston. By this means the piston can move no faster than the fluid is made to pass by the piston, and consequently all sudden vibrations of the weighted lever will be checked.

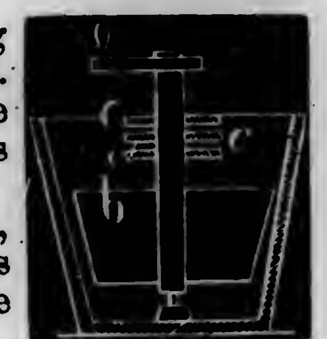
Claim.—The piston F, attached to the weighted end of the valve-lever within the cylinder G, and immersed in the liquid in the cylinder, combined and operated for the purpose and in the manner herein set forth.

No. 10,244.—Jonathan White, of Antrim, N. H.—*Improvement in Shovels.*—Patented Nov. 15th, 1853.

This improved shovel has a cast-steel blade, with iron straps to receive the handle *welded* to it, instead of being riveted as heretofore.

Claim.—The uniting, by welding, of the iron handle-straps to the sheet cast-steel blade.

No. 10,245.—Hosea H. Grover, of North Cohocton, N. Y.—*Improvement in Churns.*—Patented Nov. 15th, 1853.



(See fig.) This churn is in the form of a flaring tub: *b*, the dasher attached to the crank-shaft. The centrifugal motion of the milk causes it to rise up until it reaches the cross-pieces *c*, when it is thrown back upon the dasher.

Claim.—A churn consisting of a conical tub, furnished with a vertical revolving dasher at its bottom, combined with breakers at the top, in the manner and for the purpose set forth.

No. 10,246.—Evan H. Branson, of Fredericksburg, Va.—*Improved Mode of Planing Crooked Timber.*—Patented Nov. 15th, 1853.

The nature of this invention consists in supporting the arbor of one of two pulleys, carrying an endless belt of knives, upon elastic bearings.

Claim.—Supporting the arbor of one of two pulleys, carrying an endless belt of knives, for dressing crooked timber, upon elastic bearings, for the purpose of yielding to any undue strain upon the knives.

No. 10,247.—William Beschke, of Alexandria, Va.—*Improved Mode of Joining and Riveting Metallic Plates.*—Patented November 22d, 1853.

The claim explains the nature of this improvement.

Claim.—The method of equally dividing the weakness resulting from the joining of iron, steel, or any other metallic plates; which is effected by putting the plates together so as to break joint at the ends, and riveting over these another similar set of plates, so as to break joint at the sides and ends with the first, thus entirely covering the joints of the first; the rivets over the surface being equi-distant from each other, and from those confining the edges.

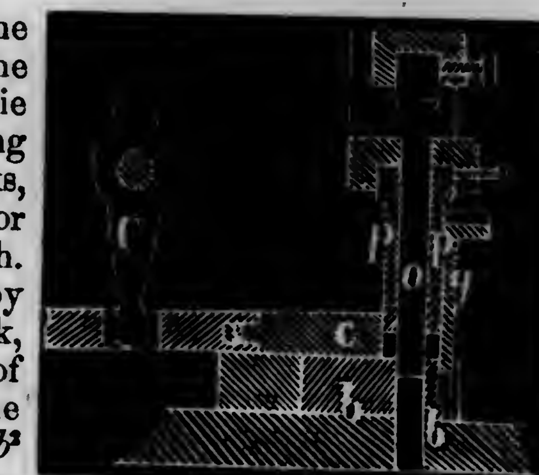
No. 10,248.—Gardner S. Browne, of Hartford, Conn.—*Improvement in Body Braces.*—Patented November 22d, 1853.

i i are the dorsal springs, with each a hole and a slot at D, into which fit screws and pivots. The pivots project from the sacral spring 3. The connection of the two springs allows a lateral motion to the dorsal springs, rendering the brace flexible and easy to the patient. 2 2 are the hip-springs; 4 4, the dorsal pads; 5 5, the star-plates, for uniting and holding the hip and sacral springs together; 6, the spring of the attachment 9, with two small knobs for depressing the springs at each end of the attachment.

Claim.—Uniting the shoulder and abdominal brace by pliable

springs *i i* so arranged and constructed that they shall be confined on each side of the spine to the abdominal brace, and when fastened at one end, permit a limited vibration, and when fastened to the other end, be rigid; whereby the same brace can be adapted to a variety of patients in different stages of disease, or to different stages of disease in the same patient.

No. 10,249.—Henry Carter and James Rees, of Pittsburgh, Pa.—*Improvement in Machines for Making Nuts.*—Patented November 22d, 1853.



These improvements refer to the die-box, and are illustrated in the accompanying drawing. The die consists of six blocks, corresponding to the sides of a nut. The die-blocks, *p* and b^2, have central apertures for the eye-punch *o* to work through. Block *p* is moved up and down, by means of a cam, to admit the blank, and reduce the end of the bar of metal to the proper thickness. The two side blocks are held against b^2 by means of set-screws. C is a cam-lever connected with the die-block *c* (back of the side blocks), for the purpose of discharging the finished nut, and moving back to receive another blank. The front die *g* rises and falls, corresponding with the movements of the back die-block. The front die-block carries a knife at its lower edge to sever the blank from the bar.

Claim.—The arrangement of the devices, substantially as herein described, for reducing the end of the blank bar to a given thickness, preparatory to severing the blank; whereby nuts of uniform thickness are produced from bars of irregular thickness, and the machine is protected against injurious strains.

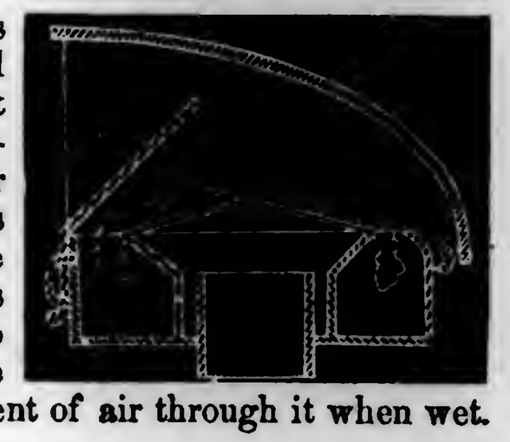
No. 10,250.—Thomas Champion and Samuel Champion, of Washington, D. C.—*Improvement in Transporting Bridges.*—Patented November 22d, 1853.

The bridge is built upon the ground near the stream over which it is to be placed. The abutments being erected, the bridge is moved upon trucks or rollers placed upon heavy plank, until its forward end projects over the first abutment. A vessel is then placed beneath the projecting end of the bridge, with a substantial frame upon its deck, upon which the bridge rests, and is carried forward. The vessel must first be ballasted with water, or other material; and as the bridge is gradually pushed forward towards the opposite side of the stream, the ballast must be removed to give proper buoyancy to the vessel, and enable it to carry the increasing weight of the bridge resting on the vessel at a suitable height to rest upon the opposite abutment. If the vessel is ballasted with water, it may be pumped out as required; or,

if other material be used as ballast, it can be removed to another vessel near by.

Claim.—The mode of operation as herein described, viz.: building bridges on shore, on a level, or thereabouts, with their resting-places on the abutments, and then setting them in place in the manner described.

No. 10,251.—Stillman A. Clemens, of Springfield, Mass.—*Improvement in Ventilators for Railroad-Cars.*—Patented Nov. 22d, 1853.



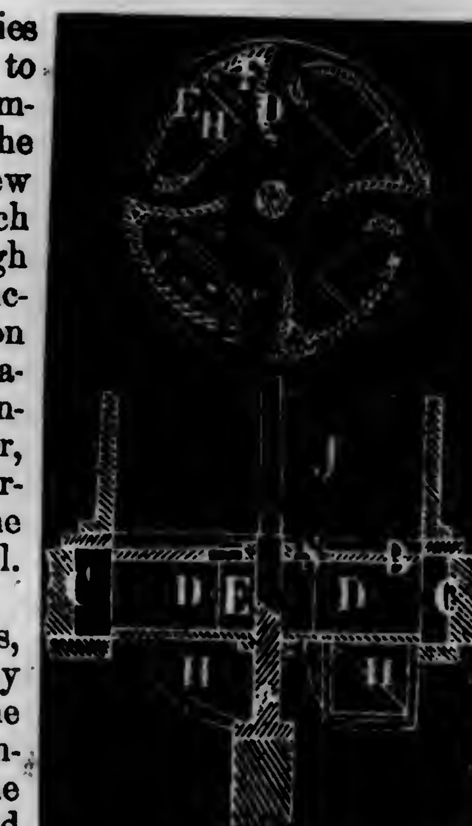
The nature of this invention consists in an air-filter, so made and arranged with other apparatus, as to be kept wet with water, and through which a current of air is directed into the car or other apartment to which the apparatus is attached. The air-filter may be made of sponge or felt, or any porous or fibrous material sufficiently porous to absorb water by capillary attraction, and at the same time admit the passage of a current of air through it when wet. (See figure.)

Claim.—The mode of ventilating railroad cars, etc., by causing the air to pass through sponge, or other suitable porous or fibrous substance or material; said material being provided with means for a continual supply of water to moisten it, and replace that which is evaporated by the air which passes through it.

No. 10,252.—Oliver A. Kelly, of Woonsocket, R. I.—*Improvement in Looms.*—Patented November 22d, 1853.

Claim.—The arrangement of levers (as described in specification), connected by a spring or elastic connecting-rod, in combination with the tappet-wheel, whereby the shuttle-boxes are raised and lowered by a yielding mechanism, which diminishes greatly the liability to breakage. Also, the method of balancing the shuttle-boxes on the lay, in combination with mechanism for simultaneously raising one set and depressing the other. Also, the reciprocating and rotating pattern-cylinder, in combination with the vibrating lever, or the equivalent thereof, for the purpose of rendering the intervals between the changes of the shuttles regular or irregular. Also, the rack-cylinder, or the equivalent thereof, in combination with the two pinions, and the mechanism for throwing them alternately into or out of gear, or the equivalent thereof, whereby the racks are moved in alternately opposite directions, with a variable range of motion, as required for operating the pattern-cylinder. Also, a series of pins, or the equivalent thereof, on the inner end of the rows of holes in the pattern-cylinder, a disk having a corresponding number of pins or teeth on its periphery, placed loosely on the axis of the rack-cylinder and the pawls, which turn the disk and pins, in combination with the rack-cylinder, whereby the latter is turned at each extreme of its vibration, so as to throw one pinion out of gear with the racks, and the other in, to reverse the motion. Also, the method of uniting the pattern-cylinder, or its equivalent, with the rack-cylinder, or its equivalent, by a yielding or slip coupling, whereby the danger of breaking the mechanism, when it happens to become deranged, is greatly lessened. Also, the method of working the same row of holes in the pattern-cylinder to the right and left in succession, in case the cylinder should not have holes enough to work the ornamental design in the cloth, by working the holes once only; whereby a cylinder of a given size will be capable of producing a much more elaborate design, or larger figure, than if the holes could be used but once in the production of the same figure.

No. 10,253.—Frederick Smith, of Pontiac, N. Y.—*Improvement in Water-wheels.*—Patented November 22d, 1853.



This improvement consists in a series of buckets D (see fig.) so arranged as to produce a twofold direct action, combined with a twofold reaction of the water upon the wheel; and in a new method of ventilating the wheel, by which a powerful draft of air is secured through the wheel, which draft acts in conjunction with the water passing down on the lower buckets, and supplies the vacuum induced in the wheel by the centrifugal force and discharge of the water, and also helps produce the curved current of the water as it passes from the upper to the lower buckets of the wheel. J is the air-tube.

Claim.—The ventilating water-wheels, inclosed by a curb, scroll, or box, by means of a tube communicating with the wheel, or in any other manner substantially the same, in combination with the buckets H, D, E, and F, constructed and arranged in the manner and for the purpose herein set forth.

No. 10,254.—James R. Kain, of Tiffin City, Ohio.—*Improved Apparatus for Cutting Screws on Bedsteads.*—Patented Nov. 22d, 1853.

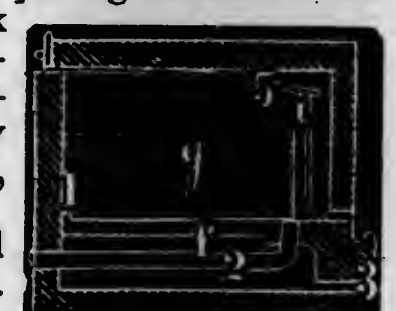
This improvement consists in the method of securing the rail in the machine, by means of spiral-faced plates, with points on their inner faces, attached to and movable by a spring-lever, the arrangements being such that the securing points advance simultaneously an equal distance on each side of the rail. Also, in the method of changing the right and left nuts, and keeping them in position by means of a spring-catch and notched tie-piece, which holds firmly the required nut against the screw. The reversible cylinder *a* (see figures) carrying the cutters *b b* sits upon the head of the double-threaded screw *c*, the nuts *d d* of which are movable about pins *e e*,

and are held together by tie *f*, having on its under edge the notches *g g*, by which the spring-catch *h* holds either of the nuts against the screw *c*. *l l*, horizontal arms; *m m*, spirals; *n n*, screw-plates; *p*, the spring which keeps the plates *n n* in place.

Claim.—The combination of the spiral-faced plates *n n'*, with the arms *l l'* and spring *p*, for securing the rail in the machine, as specified. Also, the catch *h*, in combination with the notched tie *f* and pins *e e*, for carrying the right and left nuts against the screw, and securing them in position.

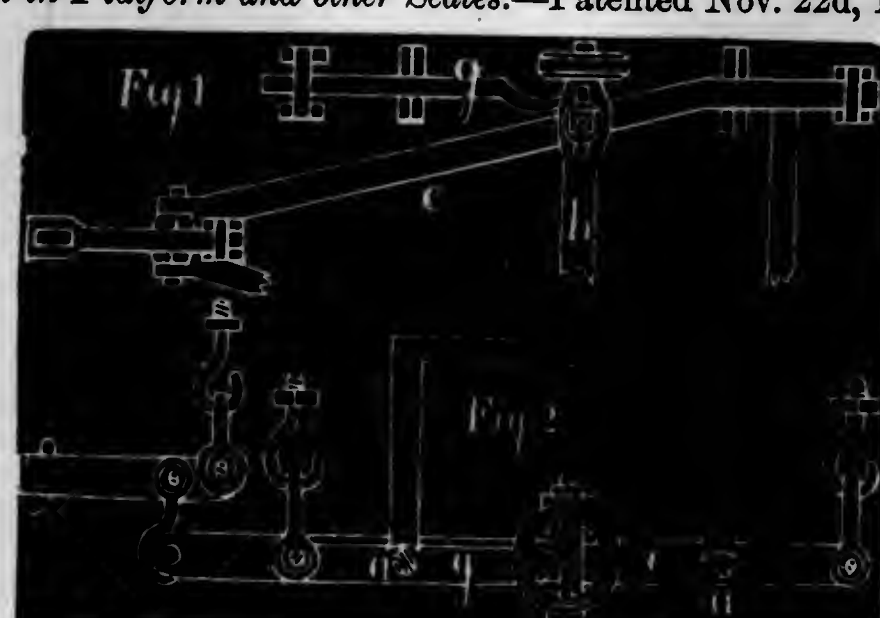
No. 10,255.—William Lewis and William H. Lewis, of New York, N. Y.—*Improved Method of Supplying Business Cards, &c.*—Patented November 22d, 1853.

The object of this invention is to furnish means whereby any person can take from a case or box one card at a time, and no more, for the purpose of business, as the address of parties, or for memoranda. (See figure.) By pulling the knob 3, the lip *i* will draw out the lowest card of the pack *g*; the gate *i*, by means of spring 5, will prevent more than one card passing at a time beneath it. The india-rubber spring 2 will draw the slide *f*, to which the knob 3 is attached, back to its first position.



Claim.—The lip 1 on the slide *f*, combined with the gate *i*, to draw out one card at a time.

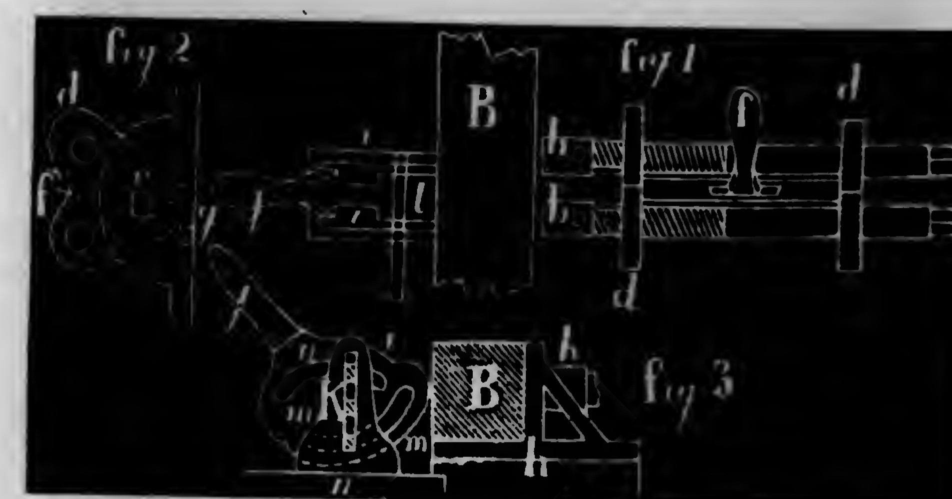
No. 10,256.—Samuel T. McDougal, of New York, N. Y.—*Improvement in Platform and other Scales.*—Patented Nov. 22d, 1853.



This improvement consists chiefly in the addition of the forward lever, and its connection with the principal lever.

Claim.—The arrangement of the triangular lever E and the two independent side-levers G, having their long arms suspended from knife-edges attached to the lever E; whereby the final adjustment necessary to make the scale give the same weight on all parts of the platform may be made by moving the bar H only, which carries the two last-named knife-edges, without the necessity of any precise adjustment of the two knife-edges A upon the levers G to equal distances from the fulcra of those two levers.

No. 10,257.—J. Parsons Owen, of Norwalk, Ohio.—*Improvement in Machines for Cutting Screws for Bedsteads.*—Patented November 22d, 1853.

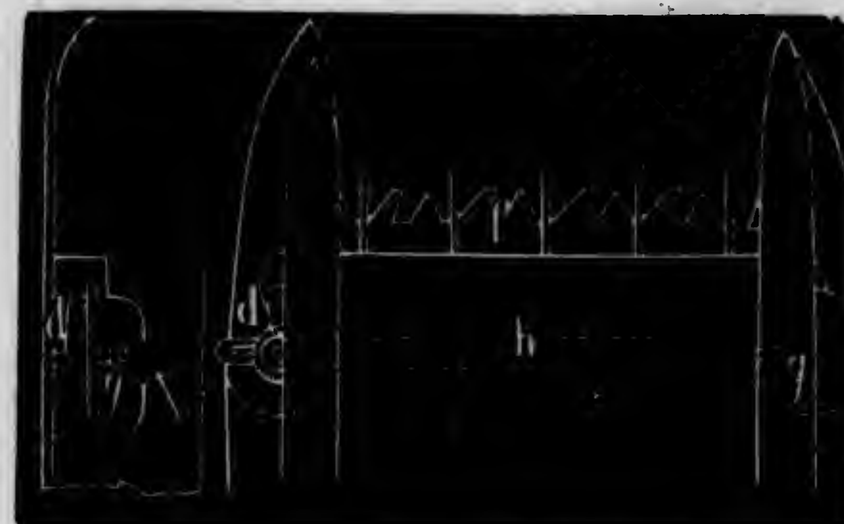


This invention refers to the manner of holding the posts and rails, and also to the mode of arranging the mandrels for cutting right and left screws, and consists in the use of eccentric cams, faced with soft metal, and operated by a lever, for holding the post in position, and also in the construction of the cams with eccentric grooves, which so operate jaws moving in them, as to hold the rail firmly for cutting the screw; the cutting being effected in both cases by reciprocating mandrels, one with a right and the other with a left screw, so supported by an oscillating frame that either can be used when occasion requires; the frame being locked by a lever and wedge during the cutting operation.

b b, mandrel heads, for cutting the post-threads; these mandrels are replaced by others when the thread is to be cut on the rails; *d*, frame, which is movable about bolt *e*, and held in position by lever *f* pressing against one side of wedge *g*. The post B is pressed into bed *h* by cams *i*, which are operated by levers *j*, and about journals K. The grooves *m m* serve to move up or down the bars *n n*, by moving lever *j*, and thereby to grasp the rail between their jaws *l*.

Claim.—Supporting the mandrels in the oscillatory frame *d*, as described, which, in combination with the lever *f* and wedge *g*, permits either mandrel to be brought effectively into operation for cutting. Also, the eccentric grooves *m* of the cams *i*, in combination with the bars *n*, for the purpose herein set forth.

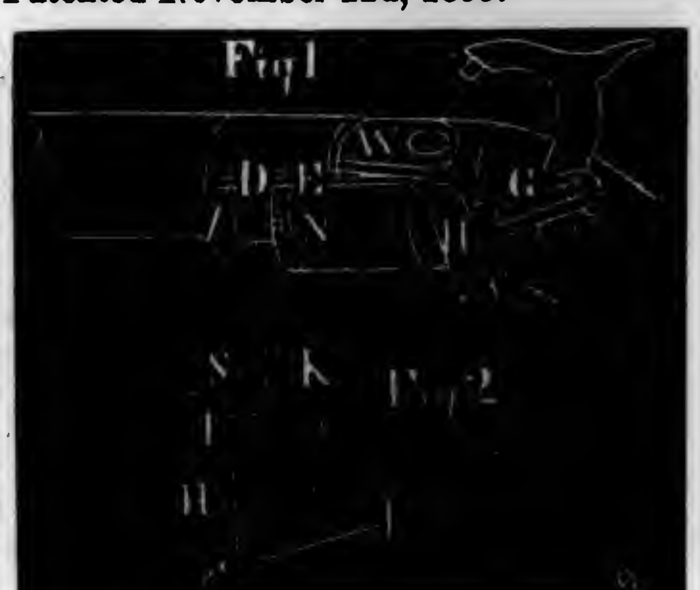
No. 10,258.—WILLIAM PIERPOINT, of Salem, N. J.—*Improvement in Mowing and Reaping Machines.*—Patented November 22d, 1853.



This improvement consists in the method of hanging and moving the cutters. The cutter is caused to advance in a curvilinear direction by means of the double crank-shafts *d* and *g*, which are connected by a rod *h*, and which receive their motion from the large carriage-wheel, to which the inner shaft *d* is geared. The cutting is effected by the movement of the cutter in one direction only; and during its return movement, it is shielded from the grass or grain, and thus prevented from becoming entangled thereby.

Claim.—Hanging the cutter-blade at each end to a crank, so as to cause the rotary draw-cut in form of a circle, in combination with the counter-rod *h*, for insuring the perfect revolution of both shafts in unison.

No. 10,259.—MORGAN L. ROOD, of Marshall, Mich.—*Improvement in Revolving Fire-Arms.*—Patented November 22d, 1853.



By reference to the annexed figure, this improvement is fully explained in the inventor's claim.

Claim.—The arrangement by which the guide-pin D, in connection with the stop-notches N N, adjusting spring E, and the hook connection between the smoke-guard W and rock-shaft I, causes a more perfect joint, and more secure connection between the cylinder and barrel; thus preventing all leakage, keeping the cylinder and its attachments clean, and protecting the surrounding charges from taking fire. Also, the arrangement of

the slotted arm G and the hammer, by means of which the gun may be cocked, with or without moving the cylinder.

No. 10,260.—WILLIAM SILVER, Jr., of Pittston, Pa.—*Improvement in the Manufacture of Blasting-Powder.*—Patented Nov. 22d, 1853.

The object of this improvement is the production of a powder that may safely be used in mines, and that will produce less suffocating gas when it is ignited. In the manufacturing of this powder, 19½ lbs. of prepared charcoal, 68 lbs. of good saltpetre, and 12½ lbs. of good sulphur, are ground together, pressed, and granulated. A strong solution of chlorate of potash is then sprinkled upon the granulated powder, until it becomes thoroughly moistened, the powder being stirred whilst it is being sprinkled. The powder is left about four days in a room heated to 100° Fahr., when it is ready for use.

Claim.—The blasting-powder, as above set forth; the same consisting in an unglazed powder, composed of charcoal, nitre, and sulphur, in the proportions specified, prepared and treated with chlorate of potash, as set forth.

"I do not claim the use of chlorate of potash as a means of preventing smoke in mine-blasting, except when combined with charcoal, sulphur, and nitre, in the manner set forth."

No. 10,261.—HIRAM SMITH, of Norwalk, Ohio.—*Improved Apparatus for Cutting Screws on Bedstead-Rails and in Posts of the same.*—Patented November 22d, 1853.

This improvement, which refers to the manner of attaching the v cutters to the cutter-heads, the attachment of the cutter-heads to the spindle, and the mode of securing the machine to the rails and posts when in operation, consists in constructing the cutters so as to form a portion of the cylindrical section of the head, attached by a base at right angles to the axis of the head, by means of bolts passing, in the case of the cutter of the male screw, through an ear upon the exterior of the head, and in the other case, through the axis of the spindle. Also, in the employment of a system of clamps, for the purpose of attaching the cutting machinery to the posts and rails during the operation of forming the threads. The operation of cutting the screws is as follows. (See figure.) The rail is first secured to a joiner's bench, or

in a vise, and the clamp C passed over its end until the shoulder of the rail rests against the stop Z on the block B, the extremity of the tenon entering the head d of the spindle a, which is withdrawn to the full extent of its thread. The lever L of the plate W is then moved to the right, forcing out the slides E and firmly grasping the rail. The cutting is performed in the usual way. The screws at both ends may be cut at the same time, by securing longitudinally, at opposite ends of the bench, cutters and clamps, as described. The operation of cutting the post-thread is similar to that described for the rail.

Claim.—The formation of the V cutters as described in sections of the cutter-heads, which are secured by means of screw-bolts. Also, securing the section of cutter-head containing the post V cutter by means of a polygonal-headed bolt passing as described through the hollow spindle, cutter-head, and section-base; which arrangement, in addition to securely holding the V cutter, admits of the adjustment of the cutter, for insuring the formation of tight joints between the post and rail. Also, the method of attaching the tenon-socket d to the spindle. Also, the arrangement of the standards A and G, and clamp C upon the blocks B and H, by which the machine is secured to the post and rails, and the operation of cutting facilitated.

No. 10,262.—Joseph Goldmark, of New York, N. Y.—*Improvement in Facing the open ends of Percussion Caps.*—Patented November 22d, 1853.

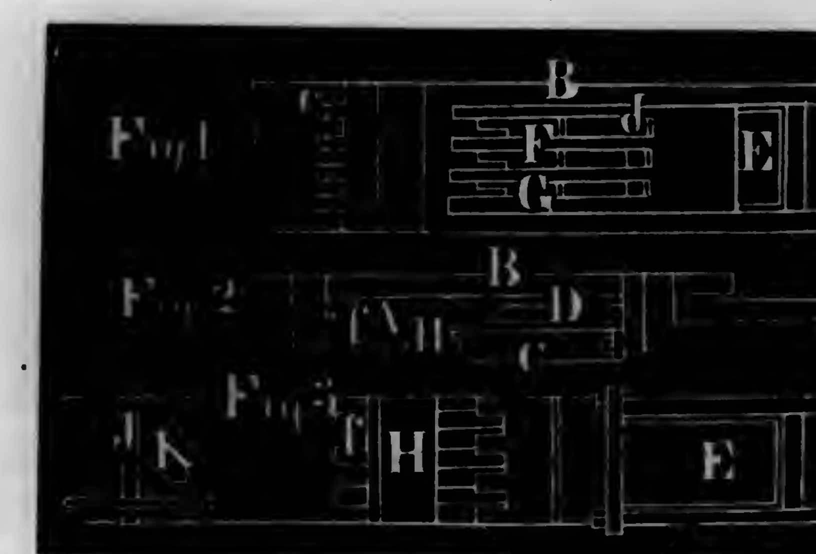
The nature of this invention consists in inserting a series of percussion caps in appropriate holes made in a plate fitted to or making part of a stock, to be used in combination with the surface of a grinding wheel, so that when so inserted in the holes of the plate, with the open ends outwards, they may be reduced to the same level by the grinding surface. Also, in the employment of another plate with similar holes for guiding the caps, as they are thrown upon the holding-plate, that the caps may readily enter the holes in the holding-plate. (See fig.) g is the plate provided with punches h, which is let down so that the punches fit into the caps and and press them down into the holes b.

Claim.—In combination with the holding-plate, the employment of the guide-plate, to facilitate the insertion of the caps into the holes of the holding-plate, for the purpose described. Also, in combination as specified, the employment of the plate with the series of punches or pins, for the purpose of forcing all the caps to the required depth in the holding-plate.

No. 10,263.—Enoch R. Morrison, of Troy, Pa.—*Improvement in Shingle Machines.*—Patented November 22d, 1853.

The nature of this invention consists in carrying the riven shingle forward by an intermittent motion, so as to be operated upon successively by the shaving and edging knives, the motion being imparted

by the reciprocating movement of the riving knife-stock, through spring-hooks, stops, or dogs, or their equivalents. Fig. 1 is a top view; fig. 2 a side view, and fig. 3 a view of the under side of the machine.



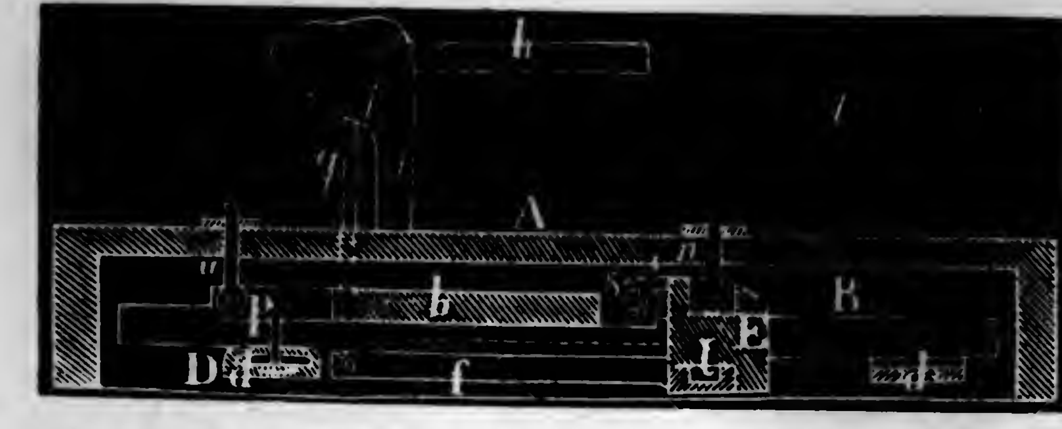
The bolt of timber is placed upon the rest C, which is connected with the stationary bed B; the reciprocating frame A, carrying the riving-knife D, moves forward and severs the shingle from the bolt, and it drops upon the second bed F. When the frame A returns for the next riving operation, the shingle last riven is caught by the dogs d, and carried forward, and held down by the spring-plate G, until it is caught by the spring-dogs $e\ e$, which rise up to catch the end of the shingle. As the frame A returns, the knife H shaves one side of the shingle; the spring-dogs f are also attached to frame A, and after the last operation, drop behind the shingle; and after the release of the dogs $e\ e, f$ takes their place, and carry, by the forward movement of the frame, the shingle to the shaving-knife J, which shaves the opposite side. The knife J being attached to the fixed-frame B, the rear portion of the moving part now becomes the bed against which the shingle is held by the spring-plate K.

Claim.—The combination of a reciprocating river and finishing knife, with a fixed knife; so that on the backward motion of the river one face of the shingle shall be dressed, and by its next forward motion the second face will be dressed by the fixed knife.

No. 10,264.—Elnathan Sampson, of Cornish, N. H.—*Improvement in Platform Scales.*—Patented November 22d, 1853.

Near the corners of the frame, four hangers $a\ a\ a\ a$ are attached, and support four levers $b\ b\ b\ b$, the vibratory ends of which are suspended at $s\ s\ s\ s$, from the ends of two short levers e, that are attached to a vibratory shaft E, passing crosswise under the middle of the frame, and supported by two hangers $n\ n$, attached to the sides thereof. Two beams D d pass crosswise under the frame, and support the platform B; these beams may be extended at both ends by means of sliding-bars $d\ d\ d\ d$, which fit in grooves. The bars are sunk entirely into the

beams when not in use. The bars on one side are to be drawn out and a plank laid on them, whenever any thing wider than the platform is to be weighed.



Claim.—The combination of the sliding-bars *d d d d* and *l*, with the platform, the actuating-levers, and the scale-beam, in such a manner as to enable the platform to be laterally expanded or contracted.

No. 10,265.—James H. Crygier, of New York, N. Y.—*Improvement in Bank and Safe Locks.*—Patented November 22d, 1853.

This improvement consists in the use of lever-guards, so arranged as to be thrown into circular toothed disks, when the bolt-tumbler is raised by the key; the lever-guards being operated by the bolt-tumbler, instead of being directly operated upon by the key. The lever-guards prevent the lock from being picked by pressure obtained upon the bolt. Also, in the peculiar manner of effecting the changes, or of altering the position of the indexes. (See figure.)

Claim.—The employment or use of the lever-guards F F′, constructed and arranged so as to operate against the disks D, and prevent them from turning as the bolt-tumbler C is raised, as shown and described in specification. Also, connecting the ratchets J to the circular toothed disks D, by means of pawls *s*, and operating said pawls by means of the tumbler M or its equivalent; whereby the ratchets may be connected and disconnected from the several disks D simultaneously, and the changes effected with the greatest facility.

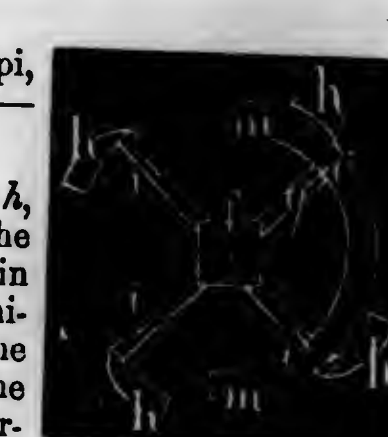
No. 10,266.—Lawrence F. Frazee, of New Brunswick, N. J.—*Improvement in Life-Floats.*—Patented November 22d, 1853.

The nature of this invention consists in combining together buoyant vessels, shaped and arranged by means of a frame; the vessels being made of canvas, india-rubber, or oil-cloth, stuffed with cork or its

equivalent; constituting as a whole a life-float, not liable to accident, nor expensive; but capable of propulsion, light, and always right side up, no matter in what manner it is thrown into the water. The frame is made of hickory wood. The bottom is one of the floats or balsas, and the two sides are also balsas or floats, constructed as above described.

Claim.—The combination of the balsas, shaped and arranged with respect to each other as described, with the frame which keeps them in shape and position, and is itself protected by the balsas; the whole constituting a life-float, having the qualities set forth.

No. 10,267.—William K. Hall, of Phillippi, Va.—*Improvement in Mowing Machines.*—Patented November 22d, 1853.

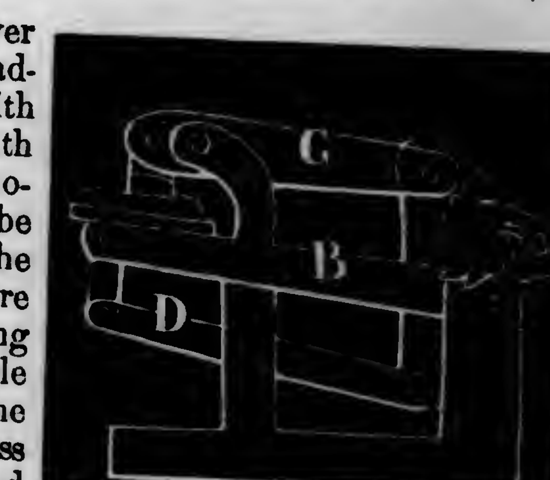


In this machine the revolving-blades *h*, (see fig.) attached to arms *g* revolve round the vertical-shaft *s*. This improvement consists in attaching to the frame of the machine a semi-circular tram *m m* slightly elevated in the rear at *a*, upon which staples *i*, attached to the arms *g*, run after the cut is made, for the purpose of raising the knives *h* above the surface of the ground, while performing the rear portion of their revolution.

Claim.—The tram *m*, in combination with the staples *i*, on the arms *g*, substantially as described, for the purposes specified.

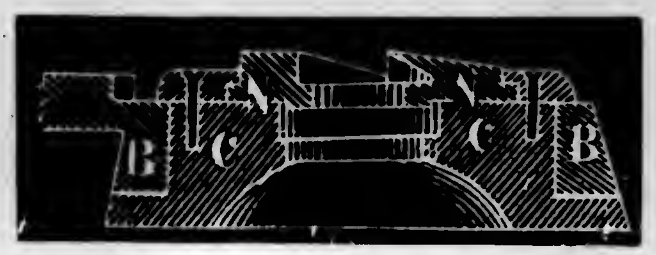
No. 10,268.—S. R. Holt, of Worthington, Ohio.—*Improvement in Self-Acting Presses.*—Patented November 22d, 1853.

By reference to the annexed figure the claim explains this improvement.



Claim.—So arranging the lever G, and providing it with a self-adjusting follower, in combination with the lever D and the bed-plate, with its supporting frame B, that the motion of the article pressed may be transmitted to the long end of the lever G, at or near the fixed centre of motion of the frame B; causing the weight of the press and article being pressed to exert power on the follower, and thereby gradually press the article into a more compact and solid form; the power being increased, when the weight of the article is not sufficient, by means of the pinion and rack-bar, which receive motion from a driving-shaft; the whole being constructed, arranged, and operating substantially as set forth in the specification.

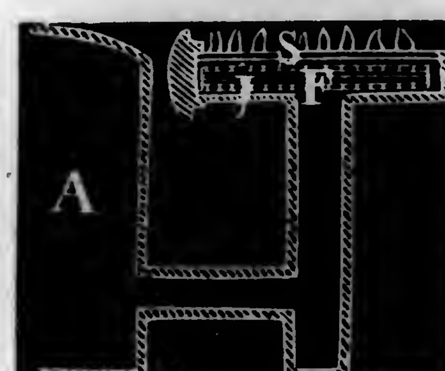
No. 10,269.—WILLARD B. CUMMINGS, of Tyngsborough, Mass., and NATHAN P. DADMAN, of Chelmsford, Mass.—*Improvement in Machines for Dressing Mill-Stones.*—Patented November 22d. 1853.



This improvement refers to the machine patented by S. W. and R. M. Draper, May 25, 1852, and consists in an arrangement by means of which the pick is caused to revolve upon a block made fast to the stone; the block serves as a bearing and a guide for the head-piece B, which is designed to prevent any tremulous or other motion from being communicated by the revolution of the cam to the bar A and the parts carrying and giving motion to the pick.

Claim.—The combination of the pedestal C, the head-piece B, and the cam N, for the purpose described.

No. 10,270.—SAMUEL F. ALLEN, of New York, N. Y.—*Improvement in Fluid-Burners or Lamps.*—Patented November 29th, 1853.



(In the figure, F represents the wick; *j*, wire-gauze; *s*, slit; A, vessel containing the camphene.) This invention consists in making the flame-tube of greater length on either side of the vertical wick-tube, and in combination with the same, encasing the wick which it carries inside of the fine wire-gauze which serves to give out the fluid in a spread and open state, and consequently to make the light more powerful, or brilliant and open, and also preserve the wick a great length of time from being charred or consumed.

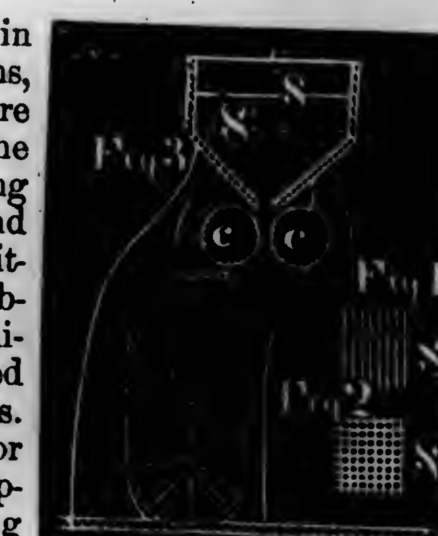
Claim.—The horizontal flame-tube, for burning camphene and like fluid, having a long slit cut in its top, in combination with the wick F, when encased in wire-gauze; the encasing of the wick in gauze causing the fluid to be discharged and burned in a sheet the full length of the slit.

No. 10,271.—J. BLOOM, of East Woburn, Mass.—*Improvement in the Method of Absorbing Smoke.*—Patented November 29th, 1853.

The nature of this invention consists in passing the smoke through water, it being conducted in pipes to the hollow of a suitable reservoir, made air-tight and nearly filled with water, which reservoir is kept constantly exhausted by air-pumps.

Claim.—Passing the smoke of furnaces or other fires through water, by means of air-pumps, in the manner described, and for the purpose set forth.

No. 10,272.—M. C. GRITZNER, of Washington, D. C.—*Improved Mode of separating Precious Metals from Ores, Sand, &c.*—Patented November 29th, 1853.



The nature of this invention consists in the arrangement of two or more screens, one having oblong and the other square meshes, the square meshes to be of the same size of the short diameter of the oblong meshes, for the purpose of separating and retaining the leaf or flake gold, and permitting the balance of the material to be subjected to a blast, in uniform or nearly uniform sizes, so as to be differently operated upon by their different specific gravities. Also, in the interposition of guide-rollers, or their equivalents, between the shaking-hopper and the blast, for the purpose of guiding or bringing the material in a proper manner to the blast.

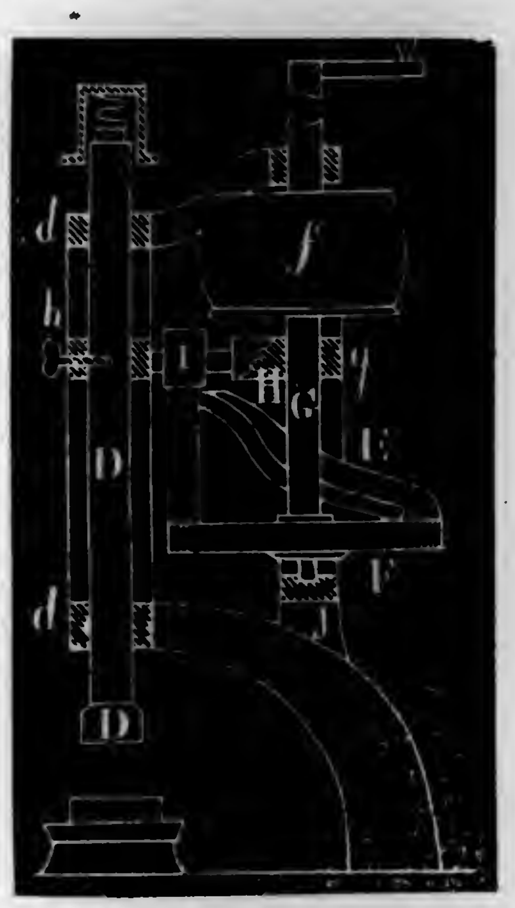
Claim.—The arrangement of the screens S S′, constructed and operating as set forth, for the purposes specified. Also, the interposition of the guide-rollers, or their equivalents, in the manner and for the purpose described.

No. 10,273.—BENJAMIN F. MILLER, of New York, N. Y.—*Improvement in Iron Fences.*—Patented November 29th, 1853.

A and B represent the ends of the halves of the top rails and of the bottom rails; E E are the filling-bars, with their countersinks D D; F F are bosses cast on the rails to fit the countersinks. By this mode of construction the fence is adapted to fit any grade or inclination of ground.

Claim.—Constructing the top and bottom rails in "lateral halves," and holding said halves together by screws, rivets, or bolts, in combination with bosses or pivots cast on the inside of the respective halves of the rail, with corresponding countersinks or perforations near the ends of the filling-bars.

No. 10,274.—JOHN W. PEER, of Schenectady, N. Y.—*Improvement in Vertical Trip-Hammers.*—Patented November 29th, 1853.

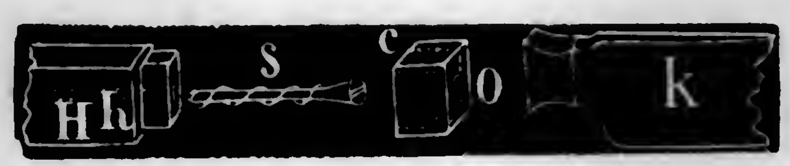


The nature of this invention consists in raising and lowering the hammer by means of a screw-cam arranged upon a circular-plate, secured fast on a revolving shaft, and connected to the helve of the hammer by means of a horizontal lifting-arm, which has one of its ends attached fast to the hammer by set-screws, and its other end sliding freely up and down over the vertical cam-shaft as the hammer rises and falls, said arm carrying a small friction-roller, which as the cam-shaft revolves, turns freely and plays upon the top of the screw-cam, and prevents friction from the weight of the hammer upon the cam, as the hammer is gradually raised by the cam. Also, in arranging the screw-cam upon a frame which is adjustable, to vary the length and force of the blow given by the hammer.

(See figure.) D, hammer; *d d*, hammer-guides; E, screw-cam; F, the screw-cam plate, secured to revolving shaft G, the lower end of which rests on the table J, which can be raised or lowered; *f*, driving-pulley; H, arm; *g* and *h*, two collars of arm H; L, friction-roller.

Claim.—The arrangement of the screw-cam E, and the adjustable table to which it is attached, for the purposes described.

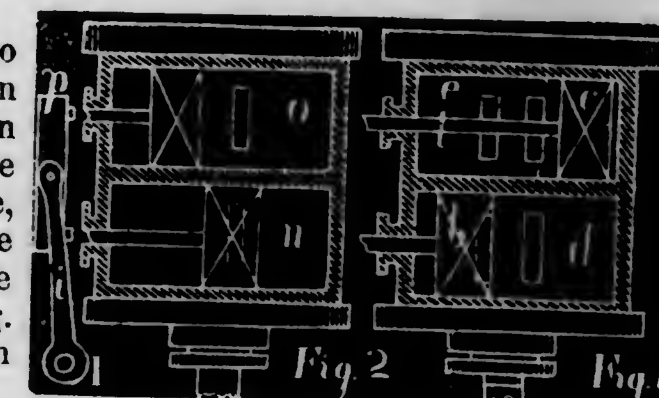
No. 10,275.—DAVID N. ROPES, of Meriden, Conn.—*Improvement in the Mode of fastening Handles to the Blades of Table-Knives and Forks.*—Patented November 29th, 1853.



K is the blade; *c*, the cap; *s*, screw; H, handle; *o*, hole in cap *c*; *h*, thread cut in the handle. When screwed together, the bolster *g* is soldered to cap *c*.

Claim.—The use of the metallic cap, interposed between the handle and the blade of the knife or fork, and secured to each substantially in the manner described.

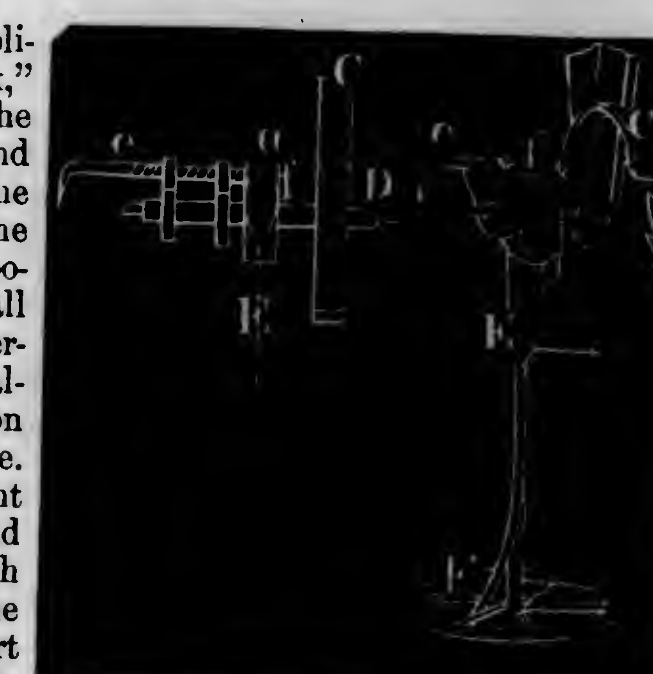
No. 10,276.—ROBERT R. TAYLOR, of Reading, Pa.—*Improvement in Valves, Ports, and Passages for operating Steam-Hammers.*—Patented Nov. 29th, 1853.



The steam-valves are so arranged that the steam can at will be made to act on the lower side only of the piston, or on its upper side, with more or less force. The chests and valves of the steam side are shown in fig. 1, and of the exhaust side in fig. 2.

Claim.—The arrangement, as described, of the steam ports and passages; the variable automatic valve, for directing the steam alternately above and below the piston, and for admitting a variable quantity of steam beneath the piston; and the adjustable hand-valve, to exclude altogether the steam above the piston, or to admit a greater or less quantity of it; both valves being adjustable while the hammer is in operation, so that the steam can be made to act with a variable force on either the up or down stroke of the piston, or on both, or prevented from acting on the down stroke, without interrupting the action of the hammer, as herein set forth.

No. 10,277.—SILAS B. TERRY, of Plymouth, Conn.—*Improvements in Time-Pieces.*—Patented November 29th, 1853.



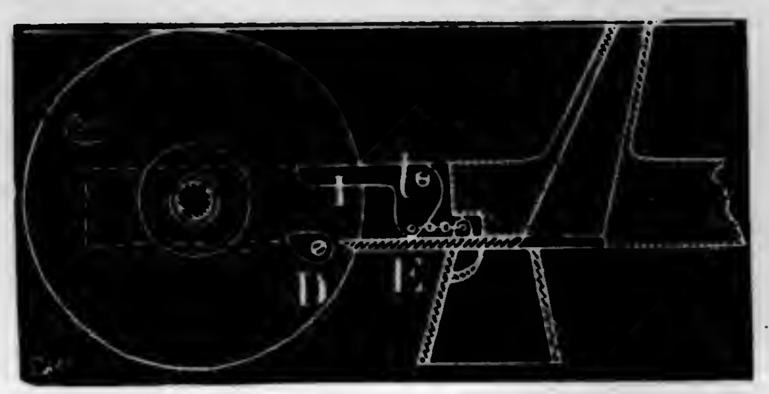
This improvement is applicable to the "marine clock," and consists in making the "fork or crutch-wire" a flat and elastic spring at and near the end where it is attached to the verge or verge arbor, the opposite end being made small and round to enter a hole perforated in the arm of the balance-wheel, or in a collet on the balance arbor or spindle. This arbor is placed at right angles to the verge arbor, and in a line with the crutch where it is attached to the verge arbor. The spring part of the crutch should be made of sufficient strength to produce the oscillations or vibrations of the balance, when set in motion by the motive power of the clock, in about such time as may be desired. It consists also in regulating the force

of the crutch-spring by increasing or lessening its tension, by means of screws and a collet.

(See figures.) B, escapement-wheel; C, verge; D, verge-arbor; E, crutch-spring attached to the verge-shaft by means of collet *a*; F, balance; *d d*, cams fast to the verge-shaft, in each of which are female screws which admit the regulator screw *e*, which screw terminates on the wire *f*, which is flattened where it passes partly round collet *a*, to which it is hung by pins J, and in contact with the crutch-spring.

Claim.—Making the crutch-spring E perform the office of the common hair-spring in producing the vibrations of the balance, substantially in the manner herein set forth.

No. 10,278.—R. C. WRENN, of Mount Gilead, Ohio.—*Improvement in Seed-Planters.*—Patented November 29th, 1853.



This invention consists in the employment of the elbow slide-shifters attached to the bottom of the slides, in combination with one or more cams arranged fast on the outer faces and near the periphery of the propelling wheels, whereby the slides can be moved inwards and outwards, and made to perform their functions at every quarter, half, or whole revolution of the wheels, as may be desired.

Claim.—The combination of the slides E, cams D, and elbow levers or shifters I J, arranged and operating in the manner and for the purpose set forth in the specification.

No. 10,279.—EPHRAIM B. BENEDICT, of Clinton, N. Y.—*Improvement in Fastening Shafts to Axles of Carriages, &c.*—Patented November 29th, 1853.

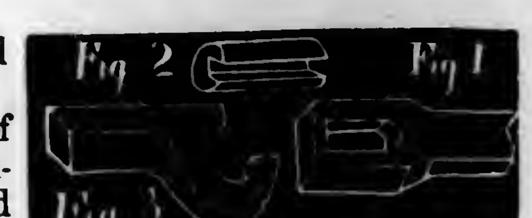
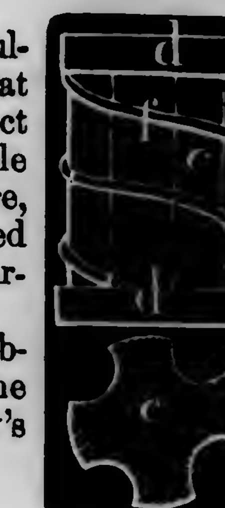


Fig. 1 is the clip; fig. 2 the slotted tumbler; fig. 3 the draught iron.

Claim.—The coupling, consisting of the combination of the clip, the tumbler, and draught iron, constructed and arranged as described (in specification), for the purpose of a secure and expeditious attachment of the shafts or pole to carriages and other vehicles.

No. 10,280.—ERASTUS T. BUSSELL, of Shelbyville, Ind.—*Improvement in the combination of India-Rubber and Steel.*—Patented November 29th, 1853.



This improvement consists in a combination of vulcanized india-rubber with spiral steel, so arranged that each sustains the other, so as to make a "most perfect spring" for elasticity and durability, which is applicable to railroad cars, carriages, buggies, &c. In the figure, *d d* represent the metallic caps on each end of a fluted column of india-rubber (of which *c'* is a section), surrounded with steel spring *f*.

Claim.—Fluting a column of vulcanized india-rubber longitudinally, and then surrounding it with the helical spring: being an improvement on "Ray's spring."

No. 10,281.—SAMUEL CHAPMAN, Jr., of New York, N. Y.—*Improvement in Machines for Sawing Stone.*—Patented November 29th, 1853.

Fig. 1.

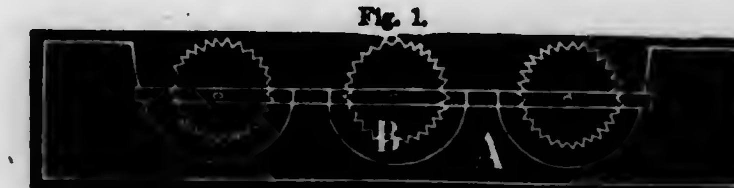
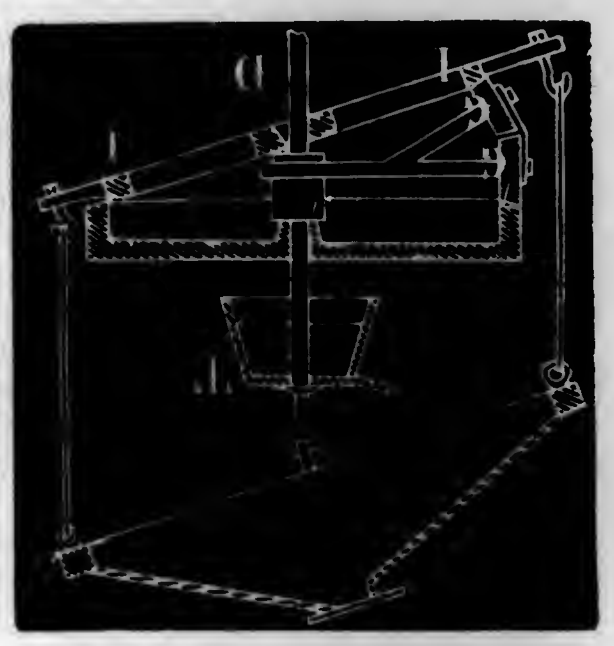


Fig. 2.

The nature of this invention consists in the application, adaptation, and arranging of a series of circular saws, attached in alternate countersinks or perforations to the sides, near the edge of a straight, or the periphery of a circular driving-plate, in such a manner as to cut an entire kerf, of sufficient width to allow the combination of saws and their fastenings to pass through, in like manner as a saw of ordinary construction, changing by this combined arrangement the cut or working effect of the teeth from the ordinary drawing cut, parallel with the line of motion, to the effect or cut of the edge of a chisel or drill driven from and nearly perpendicular thereto, pressed to and penetrating the stone, in direction, and by force and leverage resulting from motion, consequent upon this combined arrangement.

Claim.—The application, adaptation, and arranging of a series of circular saws, as set forth, so as to produce the effect, in the manner described.

No. 10,282.—Richard Edwards, of Eagle River, Michigan.—*Improvement in Machinery for Washing Ores.*—Patented November 29th, 1853.



This invention is applicable more particularly to the washing of copper ore upon a large scale, and consists in the employment of a rotating hopper L (see fig.), and a suspended oscillating basin.

D is the revolving-shaft; G G, wheels attached and revolving with the shaft, the lower wheel resting on a stationary circular way, and the upper wheel striking against the ways I I.

Claim.—The rotating-hopper, and the suspended oscillating basin, arranged and operating as described in specification.

No. 10,283.—John Crabtree and Joseph Hopkinson, of Philadelphia, Pa.—*Improved mode of Packing Steam-Engines, Pumps, &c.*—Patented November 29th, 1853.

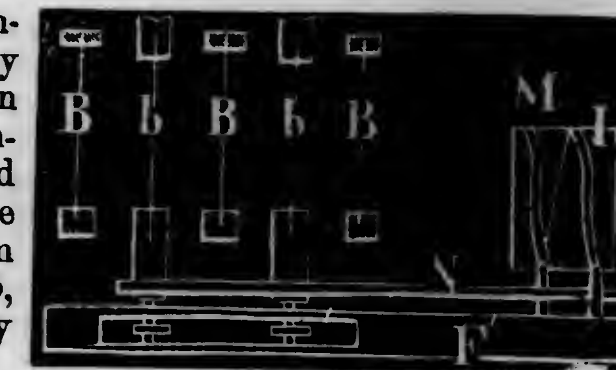
This invention consists in a peculiar mode of tightening the packing of pistons of steam and other engines and pumps, whereby the necessity of removing the cylinder-head, or follower, for the purpose of adjusting or tightening the packing, is entirely obviated.

The packing is composed of two pairs of conical rings A B, each pair consisting of two rings.

Claim.—Tightening the packing of the piston by the rod passed down through the hollow piston-rod, and attached to follower, the nuts, key, and hollow piston-rod, combined and operating substantially as described in the specification.

No. 10,284.—Israel Graves and Charles A. Bogert, of West Dresden, N. Y.—*Improvement in Shingle-Machines.*—Patented November 29th, 1853.

This invention consists in the employment of a gang of stationary and movable vertical saws, hung in an ordinary saw-gate, and so arranged in connection with cams, or their equivalents, that the movable saws will be caused, as the gate moves up and down, to have a gradual lateral movement from and towards the stationary saws as the stuff is fed in, and also at the same time a movement out of a parallel line



with the direction of feed communicated to them, and they consequently caused to cut in an inclined direction or line, instead of in a direct line, and thereby give the proper shape and taper to the shingle from tip to butt. (See figure.) *b b*, movable, and B B B, stationary saws.

Claim.—The machine for sawing shingles, arranged and operating as described in specification; the lateral movement of the saws being caused by means of grooved cams L M, which operate upon the pintle *j* of the sliding-bars N O, carrying the movable saws: the movement slightly out of a parallel line with the direction of feed being caused by means of the cams H I, which operate upon the pintle of the sliding-bars F G; the movement last mentioned causing the stuff to be cut tapering, or of any other required form.

No. 10,285.—Charles Phelps, of Salem, Mass.—*Improvement for Supporting Table-Leaves.*—Patented November 29th, 1853.

When the short arm *a* of lever A is pressed back, the end of the longer arm of A will move towards *j*, and overcome the force of spring *j*; when depressed the catch *i* will leave the edge of piece *l*, and the leaf L of the table will be lowered. The lever A slides through opening in the piece *l j*.

Claim. The application to the falling leaf of tables of a hinged supporting-brace in the form of a bent lever, combined with a spring on the under side for throwing it upward into its catch, whereby the table-leaf can be conveniently released to let down, by a pull at the short arm of the bent lever.

No. 10,286.—John B. Poague, and William F. Poague, of Fancy Hill, Va.—*Improvements in Moulds for making Hydraulic Cement Pipes.*—Patented November 29th, 1853.

The nature of this invention consists in forming the moulds of two side pieces, which are permanently lined with cloth or similar porous flexible material on their insides, and provided with air-openings, between which openings the cloth is tacked, or otherwise fastened to the moulds, so that when the moulds are opened at one end the cloth will strip or part from the pipe, the air-tubes or openings allowing the air to pass in between the cloth and pipe to facilitate the operation, and

thus leave the pipe in its green or undried state, in the precise spot where it was moulded. Also, in covering the mandrel with a bag made of cloth to fit it, the bag being made fast to one end of the mandrel, will turn inside out, and be withdrawn with the mandrel.

Claim.—In combination with the moulds permanently lined with cloth or other porous flexible material, the air-spaces intermediately placed between the fastenings of the cloth, so that it may *give* to the pipe, or mould, as it is stripped from the pipe. Also, the manner of withdrawing or stripping the cloth from the inside of the freshly formed pile, by attaching it to the end of the mandrel, so that in withdrawing the mandrel the cloth will turn inside out and strip from the pipe.

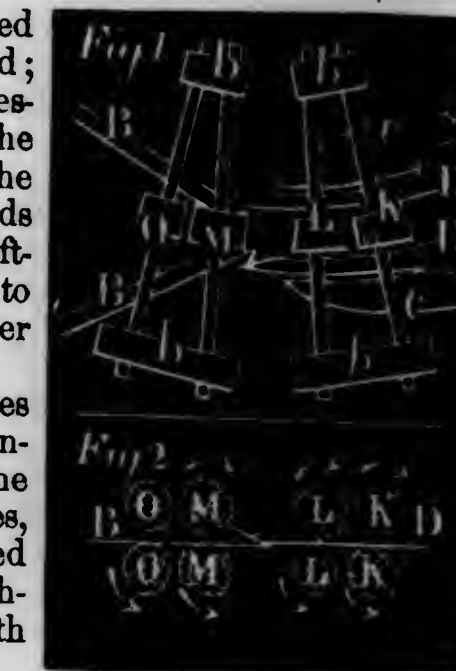
No. 10,287.—Frederick Seibert, of Williamsburgh, N. Y.—*Improved Machine for Dressing Morocco, or Polishing the same.*—Patented November 29th 1853.

This improvement consists in the employment of a glass cylinder rubber, together with the devices to which it is affixed. In the figure, *c* represents the glass cylinder rubber, on the pendulous arm or lever *a*, and supported by the plates *b*, one of which is adjustable at *b''*, to make the rubber work accurately upon the bed-piece; *h* is a spring.

Claim.—The circular or curvilinear glass rubber, combined with giving it a tilting motion, for the purpose of enabling it, after passing off the edge of the leather at the end of the stroke, to roll back and mount upon the leather without scraping it up.

No. 10,288.—Samuel J. Trofatter and Charles H. Trofatter, of Salem, Mass.—*Improved Machine for Skiving Boot-Counters.*—Patented November 29th, 1853.

Figure 1 is a top view, and figure 2 a section of the apparatus; D D, spring-bearers fastened to the top of guides O O, the edge of one of which is convex, and the edge of the other concave; B B, knives to operate on both edges of the leather. The rollers K K', L L', M M', and O O', are conical frustra, the sides of which as well as their axles converge to one common centre, which is also the centre for the curva-



ture of the guides O O; the rollers are geared together; the three first pairs are fluted; K L M and O receive their downward pressure by means of springs acting upon the blocks *b*; K K' and L L' serve to keep the leather straight, and to advance it towards the knives; M M' and O O' operate as draft-rollers, O O' at the same time serving to smooth the creases made in the leather by the preceding rollers.

Claim.—The arrangement of the axles of the pressure and draft rollers, in convergent lines, in combination with the curved guides, as applied to the knives, the whole being made to advance a curved piece of leather between the guides, without undue pressure against either, but with equality of pressure against the guides.

No. 10,289.—J. Heilmann, of France.—*Improvement in Machinery for Combing Wool and other Fibrous Substances.*—Patented November 29th, 1853.

The object of this invention is to remove from the wool, or other fibrous material, all the short fibres, and also all foreign substances which may be mingled therewith.

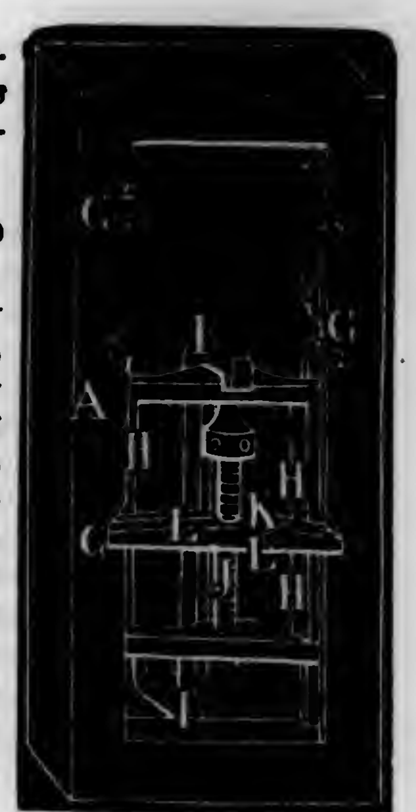
Claim.—The segment-drum, constructed and arranged substantially as described in the specification. Also, the jaws, for griping and presenting the wool properly to the combs to be combed, and in connection therewith the bars and comb for delivering the wool. Also, the rollers, or their equivalent, for seizing and retaining the wool as it is combed, and forming it into a continuous sliver, substantially as specified.

No. 10,290.—William Baird, of Philadelphia, Pa.—*Improvement in Power-Looms.*—Patented November 29th, 1853.

The nature of this invention consists in an arrangement for immediately arresting the forward motion of the lay of a loom when a picker-strap breaks, which arrangement at the same time will stop the motion of the loom. F is a plate secured to the breast-beam by means of a screw; and when the picker-strap breaks, the picker-stick strikes the strap B, and withdraws the pin G from the loop in the rod D; the spring E then instantly acts upon plate F, and draws it over the palm of the breast-beam lever, where it is stopped by a pin: this prevents the lathe from coming forward so that it can strike the shuttle, and at the same time shifts the belt on to the loose pulley.

Claim.—The arrangement of the plate F with its spring, link, staple, and pin, arranged and operating in the manner and for the purpose described.

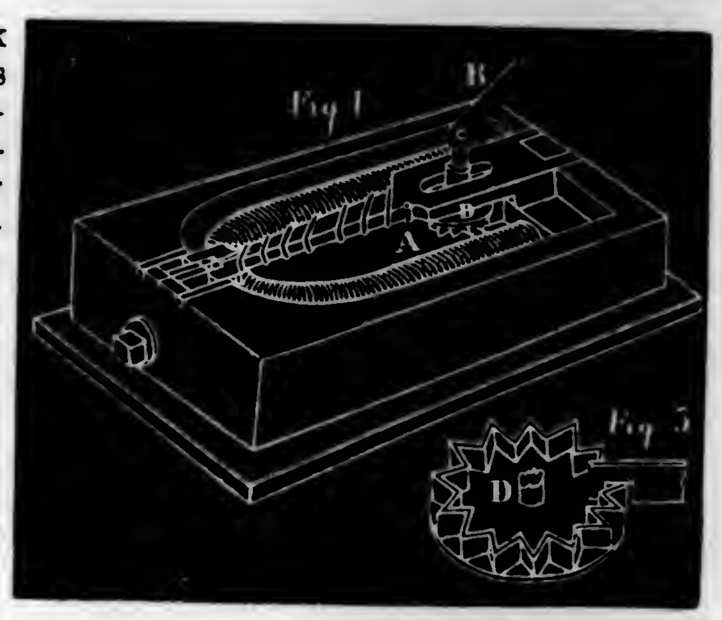
No. 10,291.—Frederick Nicholson, of Warsaw, N. Y.—*Improvement in Screw-Jacks for raising Buildings.*—Patented November 29th, 1853.



(By reference to the annexed figure, the claim explains this improvement.)

Claim.—The peculiar combination and employment of the hook I, the lifting-frame H, the screw J, the divided nuts K, and the supporting-frame A; their combination being such that by the alternate employment of a pair of divided nuts K, held stationary in transverse notches G of the supporting-frame A, the screw J may be continued up to any desired height, carrying with it the lifting-frame H, in which it is confined, and which slides in the longitudinal grooves of the supporting-frame A, and carries along with itself the hook I, substantially as described in the specification.

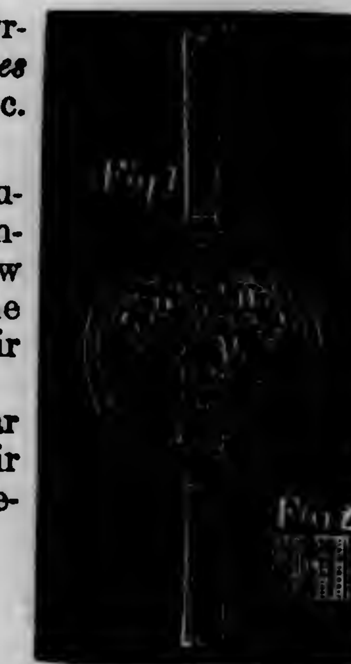
No. 10,292.—John Davis, of New Bedford, Mass.—*Improvement in Operating the Electro-Magnetic Telegraph.*—Patented Dec. 6th, 1853.



There is a circular index above the working parts shown in fig. 4, concentric with the axis D, provided with a hand or pointer B. A is the electro-magnet, the armature of which is provided with a slide C, and carrying a notched stud or "impeller" E (fig. 5); this notched impeller embraces the inclined-planes of the zigzag wheel D, and, by its alternate action upon those inclined-planes, moves the pointer to indicate certain letters or numerals of the index.

Claim.—The improvement which consists in operating the electromagnetic telegraph, by means of the index or escape-wheel, slider, and impeller, as set forth in the specification, and thereby spelling intelligence by pointing out the letters composing the words of the communication, on a similar contrivance at the distant office to which the intelligence is sent by telegraph.

No. 10,293.—Simeon Goodfellow, of New Orleans, La.—*Improvement in Stocks and Dies for Cutting Bolts and Screws.*—Patented Dec. 6th, 1853.



The dies and cutters are circular, and graduated to different sizes, as indicated by the numbers 1, 2, 3, 4, &c. Fig. 1 represents a top view of the stock and dies, and fig. 2 a side view of one of the dies. The dies D D are tapered from their upper surfaces downwards.

Claim.—The arrangement of the circular dies, having threaded scores or recesses in their peripheries of various depths or sizes in the die-stock.

No. 10,294.—Ebenezer W. Hanson, of Spring Garden, Pa.— *Improvement in Pen-Holders.*—Patented Dec. 6th, 1853.

By reference to the figure the claim explains this improvement.

Claim.—The peculiar construction and application of the thumb and finger rests to pen-holders; viz., making the projecting part of the thumb and finger rests of an oblong or parallelogramic form, so that they shall cross the thumb and finger respectively when held for use, whether the rest be fixed or made adjustable.

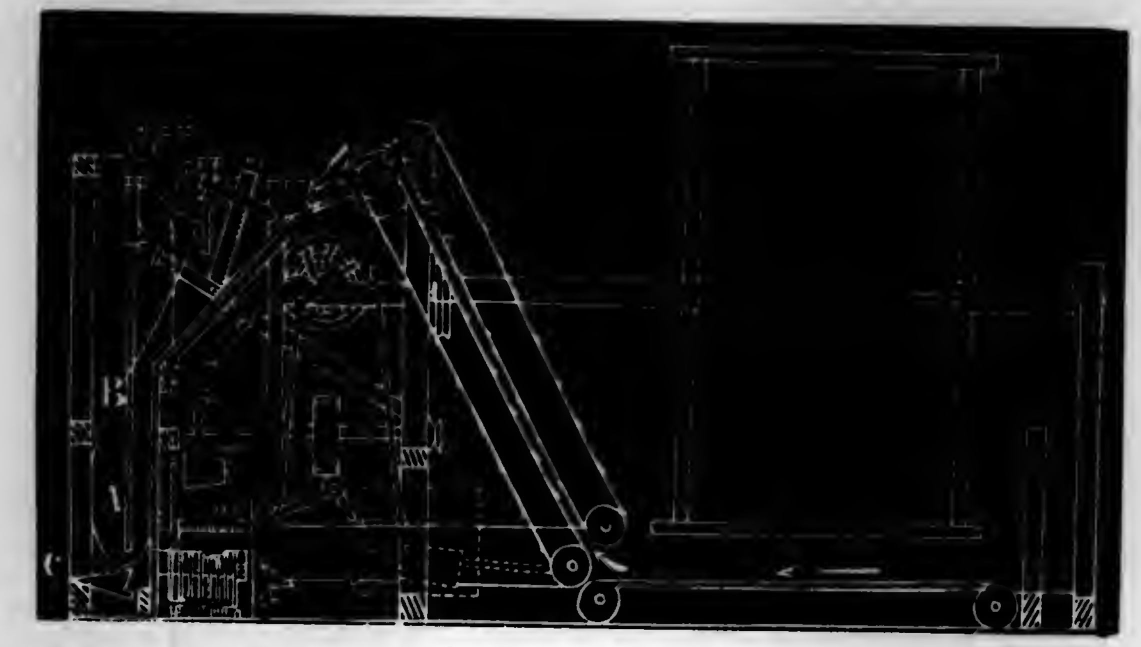
No. 10,295.—David Matthew, of Philadelphia, Pa.—*Spark-burners and Feed-water Heaters.*—Patented Dec. 6th, 1853.

The nature of this invention consists in constructing and providing the engine of locomotives with an apparatus which receives and consumes the sparks, presents an inner water-surface to their fire, an' outer and also central water-surface to the heat from the flues of the boiler, and heats the feed-water in a reservoir or space between these water-surfaces, for supplying the boiler; by which the sparks are saved and made to aid in generating steam. (See fig.) A is the boiler; B, the apparatus; C, the spark-furnace; D D, feed-

water spaces; J J are the pipes for the conveyance of the exhaust-steam to draw the sparks from the spark-catcher to the furnace; I I are the air-pipes of the furnace, which also serve to support the apparatus.

Claim.—The arrangement and application of the two concentric pipes, the curved plate-rings, the pipes I I I, the furnace-grate H, the cover M, and pipes K P Q and N, forming a combined apparatus in the smoke-box for burning the sparks and heating the feed-water.

No. 9,930.—P. H. Watson and E. S. Renwick, of Washington, D. C.—*Improvement in Grain-Harvesters and Binders.*—Patented Dec. 6th, 1853; antedated June 6th, 1853.



The cut grain falls upon a revolving apron, and is carried by the apron off at the side into a receptacle, where it is separated and bound into sheaves with a cord, and discharged by means of a complicated arrangement of mechanism, somewhat analogous to that employed in net machinery. The annexed figure shows a vertical cross-section of the machine, in which the course of the grain is indicated by the arrows.

Claim.—The combination of a continuously-acting rake with a binding mechanism. Also the method of compressing the loose grain into sheaves, vertically instead of horizontally. Also, the shifting conveyor. Also, the combination in a grain-harvester of two series of bands, one or both armed with teeth for carrying the grain from the rake to the binder. Also, the combination of a shifting stripper with a conveyor. Also, the combination of the discharging gate with the receiving platform and the binding crib. Also, the travelling cord-nippers. Also, the combination of the cord-clamp with the cord-feeder. Also, the method of drawing the binding-cord round the sheaf with the proper degree of tightness. Also, the traversing movement of the tying-forceps in alternately opposite directions, in combination with their opening and closing movement. Also, the pronged standard, in combination with the tying-forceps and the finger. Also, the method of rendering slack-cord to facilitate the tying of the band.

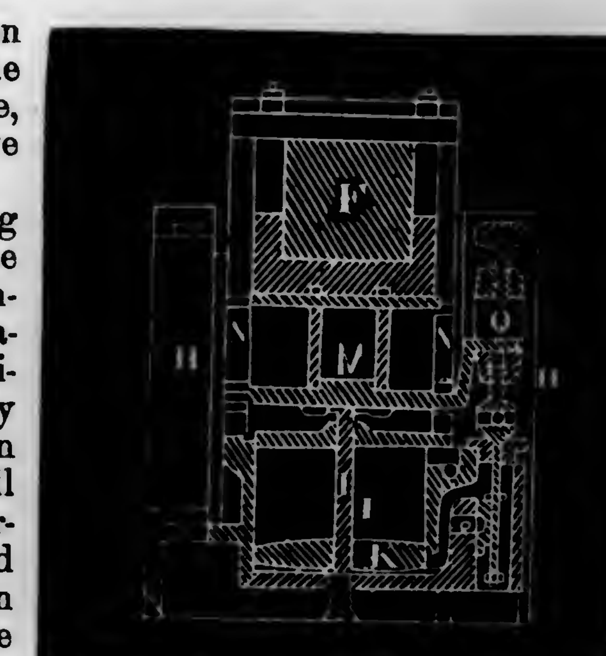
Also, the arrangement of the cord-nippers upon a sliding-stock. Also, the retarding of the cord by means of a break. Also, the arrangement of the sides and bottom of the binding-crib so that it can be depressed to permit the discharge of the sheaf. Also, the arrangement of the cutting and binding mechanism on opposite sides of the driving-wheel.

No. 10,296.—Ira F. Payson, of New York, N. Y.—*Improvement in the Manufacture of Soap.*—Patented Dec. 6th, 1853.

The nature of this invention consists in the employment of sal ammoniac in the manufacture of soap, in combination, in part or in whole, with wheat-flour, potatoes, borax, sal soda, "Meen Fun," or satin-white, and fullers' earth, or their equivalents; the combination being a soap which maintains its consistency in all states of the atmosphere, and which will wash in water, hard or soft. The parts are, 3 gallons of water (heated to nearly the boiling point); 50 lbs. Meen Fun, or satin-white; 100 lbs. fullers' soap; 25 lbs. pulverized potatoes; 2 lbs. sal soda, finely pulverized; half a pound of sal ammoniac; 2 lbs. wheat flour, made into a thin paste; half a pound of finely pulverized borax. Stir for 25 minutes over a gentle fire.

Claim.—The use of sal ammoniac, in combination with the other ingredients.

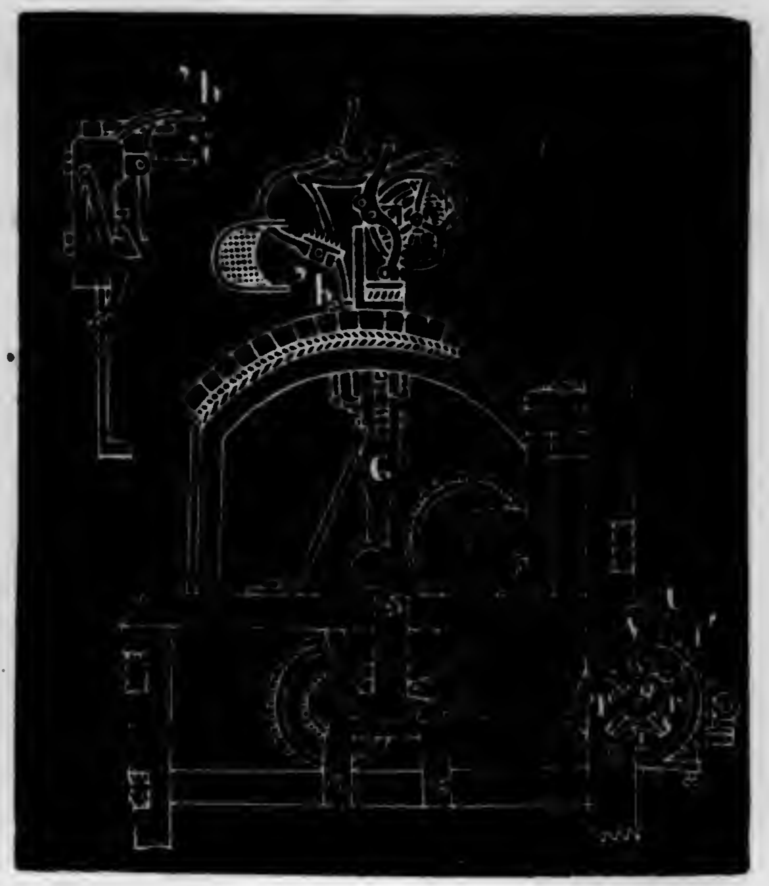
No. 10,297.—James Watt, of South Boston, Mass.—*Improvement in Steam-Hammers.*—Patented Dec. 6th, 1853.



The object of this invention is to regulate the force of the blow of the hammer at pleasure, or suspend the hammer above the anvil.

Claim. — The revolving valve-rod, the barrel *g*, and the adjustable screw-stop *l*, constructed, arranged, and operating as described (in the specification), by which steam may be admitted beneath the piston during any portion of the fall of the hammer, without altering the effective force and length of the stroke. Also, in connection with the above, the arrangement for throttling the steam on its way from beneath the piston; by which means the intensity of the blow may be regulated to any degree of nicety, or the hammer be held suspended above the anvil, in the manner and for the purpose set forth.

No. 10,298.—George Wellman, of Lowell, Mass.—*Improvement in Carding-Engines.*—Patented Dec. 6th, 1853.

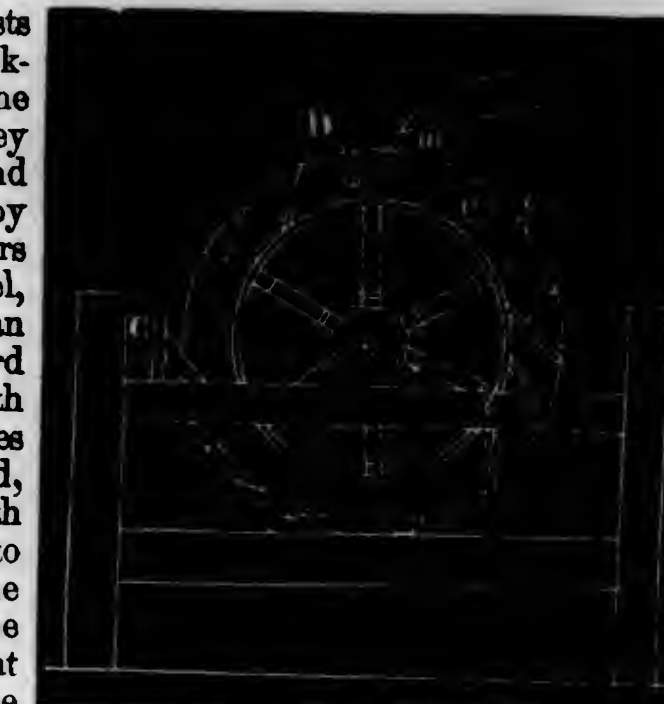


The object of this invention is to effect the elevation of each and every one of the top cards from their beds, or the frame on which they are supported; the cleansing of these top cards; and their return to their respective beds after being so cleansed: thus producing by mechanism what has heretofore been accomplished by hand labor. The figure represents a side elevation of the machine, in which the main card-cylinder, doffers, &c., are not shown. T is the block; W, the arm; U, the wheel; Q and V, shafts; G is the frame which carries the mechanism, which takes hold of both ends of a top card and lifts it upwards above the rest, where it is held until cleansed by a brush, which is actuated by appropriate mechanism.

Claim.—In combination with a series of top cards of a carding engine, not only a mechanism for raising one or more of such top cards, and holding the same upwards, and afterwards depressing the same back into place, but a mechanism for acting on and cleansing such top card or cards, when or while so elevated; not meaning to claim the mechanism for moving the top card or cards, or that for cleansing it or them in their separate combination with the series of top cards, but both in their joint combination, and with the series of top cards. Also, in combination with the series of top cards, and mechanism for raising and cleansing a top card and restoring it to its seat, the mechanism for moving the raising and cleansing mechanism in succession from one top card to the other, and whether from one card to the next one throughout the series, or from one to another of them to the next but one, or in any

other order. Also, the combination of the grooved block T, the arm W, with its stud *s*, and the notched wheel U, as applied to the shafts Q and V, and made to operate together.

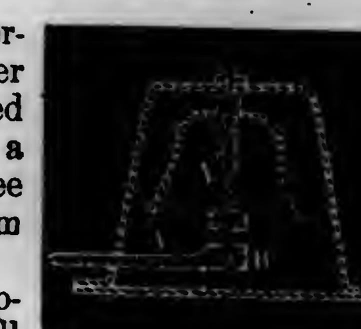
No. 10,299.—John E. Whitemore, of Joilet, Ill.—*Improvement in Overshot Water-wheels.*—Patented Dec. 6th, 1853.



This improvement consists in so constructing the buckets, that after receiving the impulsion of the water they are closed by its action, and the covers fastened down by means of springs and levers on the face of the wheel, which latter, by striking an exterior cam, throw forward the bolt-rods connected with them, permitting the catches of the covers to descend, when the spring beneath the lever draws the bolt into the catch and secures the cover, thus confining the water and allowing its weight to act until the bottom of the wheel is reached, when another cam, striking the lever attached to the bolt-rod, releases the catch from the bolt, and permits the confined water to throw open the door and fall from the wheel, contributing, by its reactive power on leaving the bucket, to the propulsion of the wheel. The cover hangs loose during the remainder of its revolution, and presents an open bucket to the action of the water.

Claim.—The construction of the buckets, with the covers D, operating substantially as described. Also, the levers *d*, springs F, and bolt-rods, in combination with the cams G and P, or their equivalents, for closing and opening the buckets, in the manner and for the purposes set forth.

No. 10,300.—Alfred Carson, of New York, N. Y.—*Improvement in the Mode of Ringing fixed Bells.*—Patented Dec. 6th, 1853.



This invention consists in a device for operating the clapper of a bell, by means of a lever that turns on a centre below, and is connected with the arm of the clapper by means of a slotted swivel near the upper part thereof. (See fig.) A A is the elbow lever, having its fulcrum at B.

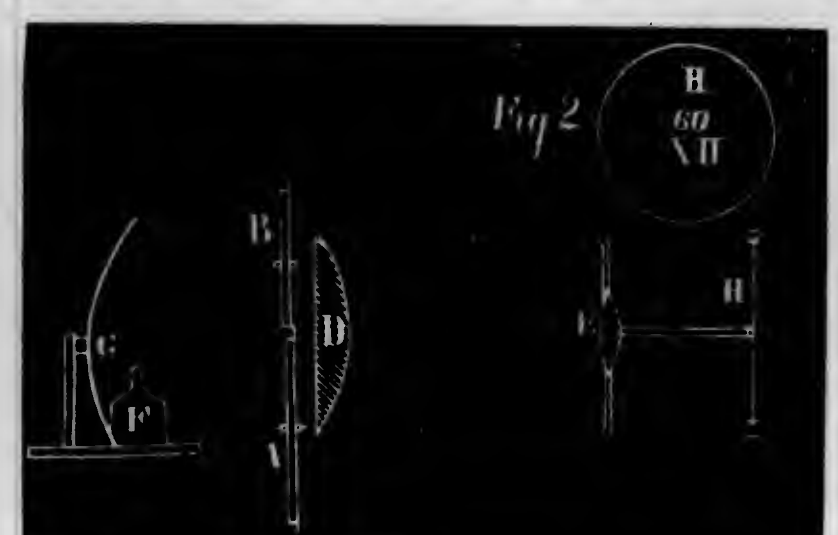
Claim.—The device herein described, as applied to the working of the clapper of a bell hung in the usual manner, as set forth

No. 10,301.—Lucian B. Flanders, of Dunkirk, N. Y.—*Improvement in Apparatus for Replacing Cars upon the Track of Railroads.*—Patented Dec. 6th, 1853.

This apparatus consists of two flanges with inclined bottoms; the flanges being fitted to the rails, and one of them being provided with a movable guide, which, as the car is moved forward and up the inclined flanges, guides the truck to its proper position upon the rails. The two flanges are placed opposite to each other, one upon each rail, and adjusted to the rails, so that the lower ends of the bottoms of the flanges will be in contact with the wheels that are off the track. (See figure.)

Claim.—Replacing railroad cars and locomotives upon the track, by means of flanges c c′, having inclined bottoms, and secured or attached to the rails, when used, by lips or projections *b* on the sides of the flanges; said lips or projections clasping or fitting over the rails. The flange c′ being provided with a movable guide E, which directs or guides the wheels upon the rails; and which guide, by being movable, will act upon the wheels, the flange c′ being adjusted to either side of the rails.

No. 10,302.—James Glenn, of New York, N. Y.—*Improvement in Time Indicators.*—Patented December 6th, 1853.



The nature of this invention consists in making two circular brass plates A B (see figs.), having the figures of time cut through them—one having the hour figures, and the other having the minute figures. These plates are made to revolve by clock-work, between the light of a lamp and two magnifying lenses, which throw the images of two divisions of the minute figures, and one division of the hour figures, on a screen or plate of ground glass placed in front. The figures are thus represented *in light* for the purpose of being more readily seen than in other methods now in use. Figure 2 represents a front view of the ground glass. G is the reflector; D and E are the lenses; H, the ground glass, also shown at fig. 2.

Claim.—The construction of two circular dial-plates, arranged and operating as described, in connection with the other parts, by means of which the time is represented in *white light* figures, which may be seen to a greater distance, and more distinctly than by any other method at present in use, whether used with or without a magnifying lens.

No. 10,303.—Ira Warren, of Boston, Mass.—*Improved Surgical Syringe.*—Patented December 6th, 1853.

The object of this invention is to eject suitable solutions to diseased parts of the throat and nose, in place of using the sponge, as heretofore. The syringe is of the usual form, to which is attached a pipe that may be bent, or straight, as may be required, at the end of which is a small hollow globe, full of fine holes, through which the solution is ejected.

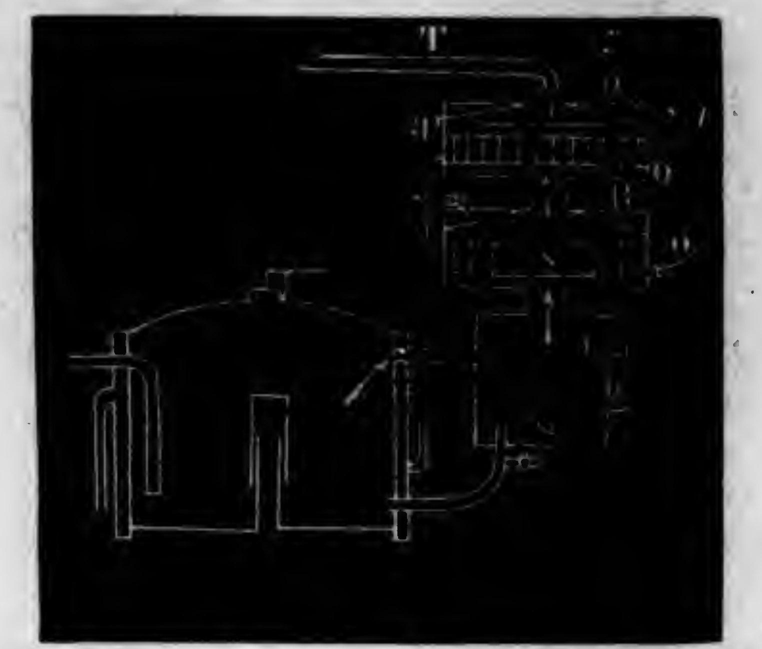
Claim.—The syringe, as above described, constructed of the form and of the materials described, for the purposes set forth.

No. 10,304.—R. M. Evans, of Gilford, N. H.—*Improvement in Irons for Planing Mouldings, &c.*—Patented December 6th, 1853.

The object of this improvement is to furnish a plane which, by changing its irons, will produce any kind of moulding desired. The irons are made in small sections or types, so as to be conveniently adjusted to the shape of any given pattern. When so adjusted, they are fastened in the clamp (see fig.), and an exact edge is obtained by grinding or filing.

Claim.—Making the cutting-irons of moulding-planes or turning-tools of thin sections, in the manner described, which, after being set to a pattern, and confined in a clamp, may be brought to an exact edge by filing or grinding.

No. 10,305.—Carl E. Werner, of Newcastle, Ill.—*Improved Distilling Apparatus.*—Patented December 6th, 1853.

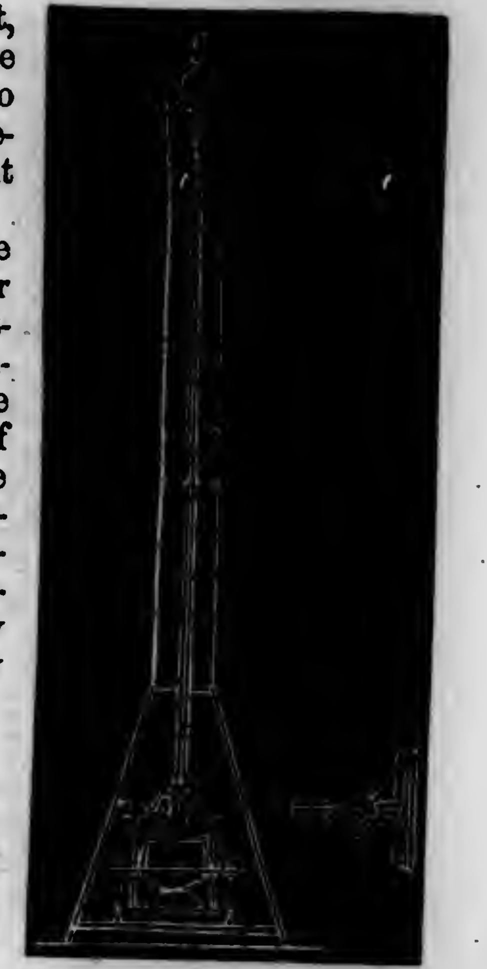


The object of this apparatus is to condense and, with facility, to eliminate spirit of any determinate strength, and consists of a cucurbit, of cylindrical form, surrounded by a steam-jacket, which imparts the required degree of heat, without the admission of steam into the beer. This cucurbit is divided by diaphragms into four chambers of equal height. The chamber N (see figure) communicates with a water-tank by a pipe O passing across the intervening water-space, by which it is kept constantly full; the chamber N, also, is divided by two or more upright tubes P P, which pass through it, and are secured to each of its heads, and strengthen it against the hydrostatic pressure, and also afford additional condensing surface. The upper chamber Q has a greater number of tubes P^2 P^2 for the passage of vapor. These tubes, or chambers, are extended above the head so as to form a trough R R. The arrows show the direction of the vapor in its passage through the neck T, which conducts it to the beer-heater, and thence to a worm in a refrigerator, from whence it is discharged in the form of spirits.

Claim.—The construction of the condenser, consisting of an outer upright cylinder, with its upper chime projecting above the head, so as to form a circular trough, and an inner refrigerating cylinder, traversed by vertical tubes, which connect the vapor spaces above and below; the whole being situated above, and discharging the condensed fluid back into the rectifier.

No. 10,306.—James Cochrane, of New York, N. Y.—*Improvement in Hydrants.*—Patented December 13th, 1853.

The object of this improvement is to prevent the water from freezing in the discharge-pipe of the hydrant, and consists in combining with the discharge-pipe a contracting and expanding chamber, which is expanded when the main valve of the hydrant is being closed by the ordinary waste-water running or falling therein from the discharge-pipe to protect it from the frost, and contracted or emptied before or at the time the main valve or cock is opened to force the water back into the discharge-pipe. By this means the water is kept out of the discharge-pipe.



Claim.—Combining with the issuing-pipe and main-cock, or two-way cock, flat or conical valve, and leakage waste-way, a piston and chamber, or a partly flexible chamber, emptying into and receiving from the issuing-pipe water between the interval of opening and closing the main and leakage waste-way. Also, the shutting force by hydrostatic pressure and gravity of the ordinary waste water; also, the general arrangement of the moving parts by their gravity to favor the shutting force, substantially such as herein described and set forth.

No. 10,307.—John Comstock, of New London, Conn.—*Improvement in Bit-Stocks of Braces.*—Patented December 13th, 1853.

The nature of this invention consists in the manner of operating the catch which holds the bit or tool in the stock. After inserting the bit, with its notch towards the catch *h* (see figure), the ring A is turned so that the point of the screw *c* will ride upon the back of catch *h*, and force the catch into the notch of the bit. To remove the bit, turn the ring back; and as soon as the end of the screw is off of the catch, the helical spring will push the catch out of the notch.

Claim.—The arrangement of the ring A, with its pin or screw *c*, in combination with the eccentric-shaped back-catch *h* and the helical spring *d*, the whole being combined and arranged substantially as set forth.

No. 10,308.—Norman Cook, of New York, N. Y.—*Improvement in Umbrella Coverings.*—Patented December 13th, 1853.

Claim.—The application of a dilute solution of india-rubber paste, or cement, to cotton or gingham umbrella coverings; for the purpose of enveloping the fibre of the cloth, and setting the color of the same, without adding to the weight of the umbrella.

No. 10,309.—Carmi Hart, of Bridgeport, Conn.—*Improvement in Cast-Iron Railroad Car-Wheels.*—Patented December 13th, 1853.

By reference to the accompanying figures, the claim will explain this improvement.

Claim.—The arrangement of the plates of the wheel in the arch at the hub, so that its opposite sides curve in similar curves, adapting themselves to each other, and are also ogees; and whose continuation from the apex or point of union is also an ogee to the rim, in combination with the spokes or radii, which are ogees on the surface of the inner plate, and also ogees sidewise, and forms a continuous part of the inside plate itself.

No. 10,310.—Joseph Nock, of Philadelphia, Pa.—*Improvement in Ink-Stands.*—Patented December 13th, 1853.

This improvement consists in providing the ink-stand or ink-well cover with a curvilinear hinge on the top of the ink-stand or ink-well cover, which cover (see figure) is to be closed to form a round or smooth-turned face, and gives an opportunity of cleaning when soiled, inside as well as outside.

Claim.—The application of the stamped round part and the solid part (or the moving lid or cover), fitted together as a hinge, which forms a rounded, smooth-turned face; and the manner in which the pin is connected with both parts, using for that purpose the two pieces to form a regular curvilinear or round-turned hinge, made of any materials which will produce the intended effect.

No. 10,311.—F. S. Hotchkiss and C. W. Blakeslee, of Northfield, Conn.—*Improvement in Clothes-Pins.*—Patented December 13th, 1853.

The figure and claim fully illustrate and explain this improvement.

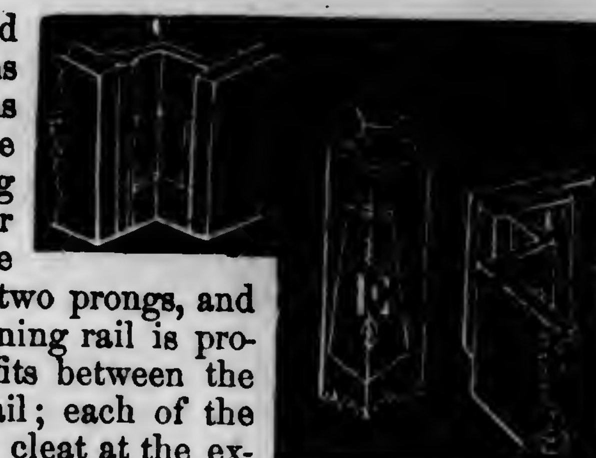
Claim.—The connecting together of the two levers by one piece of metal, in such form and manner as to constitute both spring and hinge, for the purpose set forth.

No. 10,312.—Melvin Jinks, of Wayland, N. Y.—*Improvement in Turnkeys for Extracting Teeth.*—Patented December 13th, 1853.

This improvement consists in providing turnkeys with an additional adjustable claw E. (See figure.)

Claim.—The adjustable claw E, constructed and arranged substantially as described, in combination with the claw *b*, and the rolling fulcrum having a limited motion.

No. 10,313.—Westley E. Merrill and Freeman Tupper, of Nashua, N. H.—*Improvement in Fastenings for Bedsteads.*—Patented Dec. 13th, 1853.



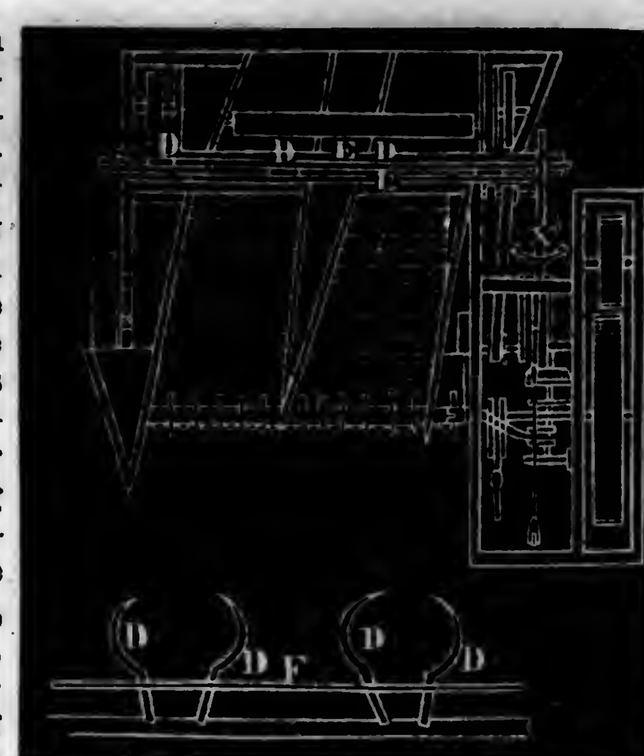
The posts and rails are attached together by means of corner-irons and clamps. The corner-irons are attached to the ends of the rails, and are bent in a zig-zag form, so as to make a recess for the reception of the post. The iron on the end of one rail has two prongs, and the iron on the end of the adjoining rail is provided with one prong, which fits between the two prongs of the adjoining rail; each of the prongs is provided with a small cleat at the extreme end of the rail; and the post has a bevelled clamp or dog E, which fits in the recess formed by the corner-irons, and binds against the cleats; and thus the post and rails are firmly secured together. (See figures.)

Claim.—Securing the posts and rails together by means of the corner-irons C attached to the ends of the rails, and the clamp, or dog, E attached to the posts; said corner-irons and clamps, or dogs, being constructed and arranged substantially as set forth.

No. 10,314.—Joseph E. Nesen, of Buffalo, N. Y.—*Improvement in Harvesting Machines.*—Patented Dec. 13th, 1853.

This invention consists in the employment of an endless apron, having an intermitting motion, for the purpose of conveying the grain in proper quantity to the binding-hooks. Also, in gathering in bundles, by means of binding-hooks, the grain cut by the reaper, the grain being carried up to the hooks by the endless apron; the binding-hooks are operated by means of slides having a reciprocating motion. Also, in the combination of the binding-hooks and endless apron.

Claim.—Giving the endless apron C an intermitting motion, for the



purpose of carrying the grain to the binding-hooks, at intervals and in proper quantity; said motion being communicated to the apron by means of belt shipper x worked automatically from some moving position of the machine. Also, gathering the grain in bundles or sheaves by means of the binding-hooks D D D′ D′, or their equivalents, motion being communicated to the binding-hooks by means of the reciprocating bars E F. Also, the binding-hooks D D D′ D′, in combination with the endless intermittently moving apron c, the hooks and apron being constructed and arranged and operating substantially as set forth in the specification.

No. 10,315.—Charles Page, of North Danvers, Mass.—*Improvements in Sectional Bedsteads.*—Patented Dec. 13th, 1853.

The inventor's claim will explain this improvement by reference to the annexed figure.

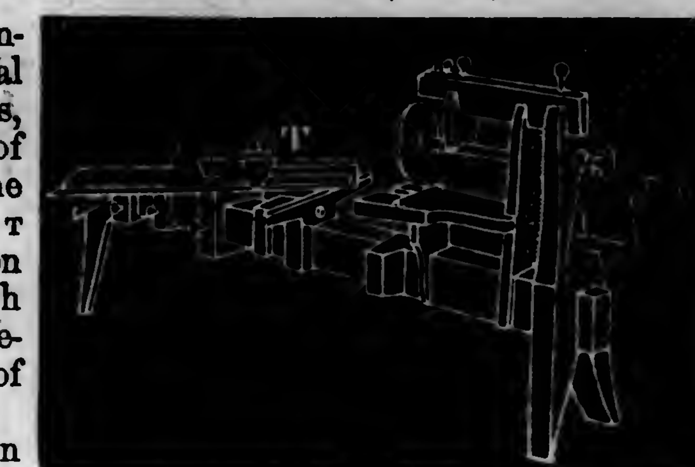
Claim.—In a sectional folding-bedstead, the combination of the adjustable sections B B′, with the revolving head and foot boards C C′; by means of which the bedstead may at any time be converted into an invalid bedstead, and extended in such manner that the body and head of the patient may be raised and lowered independently of each other, his feet being furnished with an elastic foot-board.

No. 10,316.—Joseph Sawyer and Lyman Clark, of South Royalston, Mass.—*Improvements in "Peg Rasps."*—Patented Dec. 13, 1853.

The nature of this invention consists in hanging the rasp upon a pivot, and adapting thereto a spring-bolt; by which means it may be securely fastened in one of two positions, so that the same instrument may be readily adapted to work either in the heel or the toe of the boot.

Claim.—The combination of the spring-bolt and thumb-piece, or their equivalents, with the pivoted rasp.

No. 10,317.—John Wilmington, of South Bend, Ind.—*Improved Sheet-Metal Cutter.*—Patented December 13th, 1853.



The object of this invention is to cut sheet-metal into angles, parallel lines, circles, and segments of circles, and consists in the employment of the vice T (see figure) in combination with the tram upon which it moves. The cut represents a perspective view of the apparatus.

Claim.—The vice T in combination with the tram upon which it moves, and upon which the sheet rests during the operation of cutting.

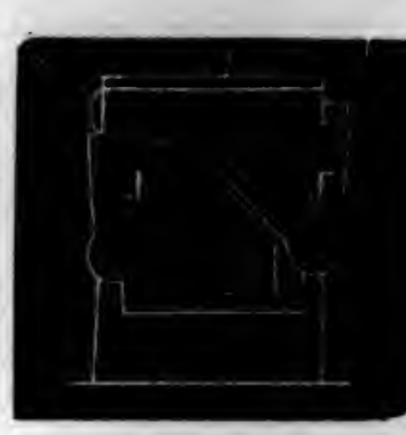
No. 10,318.—Joel R. Bassett, of Cincinnati, Ohio.—*Improvements in Valves for Pumps.*—Patented December 13th, 1853.

These improvements consist in an arrangement by which the advantages of a pneumatic cushion, check-valve, and stationary valve, are combined; and in providing the discharge openings of a double-acting pump with a slide-valve common to both, moving simultaneously with, and actuated by, the supply-valves.

Claim.—The construction of the puppet check-valve, serving also as the piston of a pneumatic spring, and provided at its lower end with a small starting valve, substantially in the manner and for the objects explained in the specification. Also, the seg-

mental cylindric slide-valve of the discharge-openings, having prongs, as described, connecting it with the clack-valves upon the supply-openings, so that the motion of the supply-valves shall be communicated to the discharge-valve.

No. 10,319.—John Butter, of Buffalo, N. Y. *Improvement in Machines for Moulding Brick.* Patented Dec. 13th, 1853.

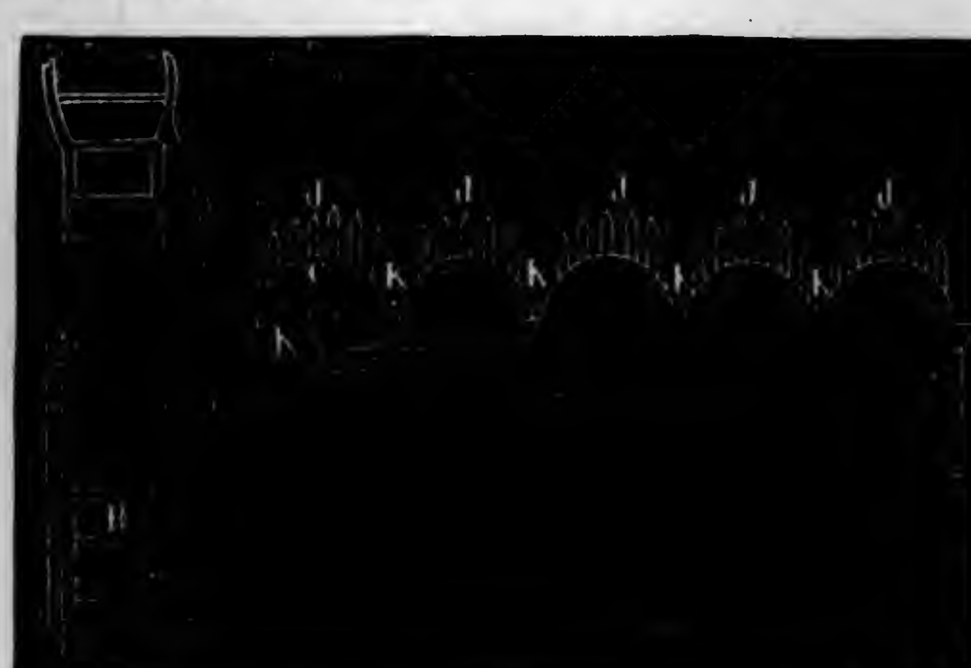


J J are two followers, operated by either levers or gears, to press the clay from opposite directions into the moulds.

Claim.—Two hinged followers, so constructed and operated as to press the clay uniformly into the moulds, that is, each end alike, whether operated by gears or levers.

No. 10,320.—John E. Brown and Stephen S. Bartlett, of Woonsocket, R. I.—*Improvement in Harvesters.*—Patented December 20th, 1853.

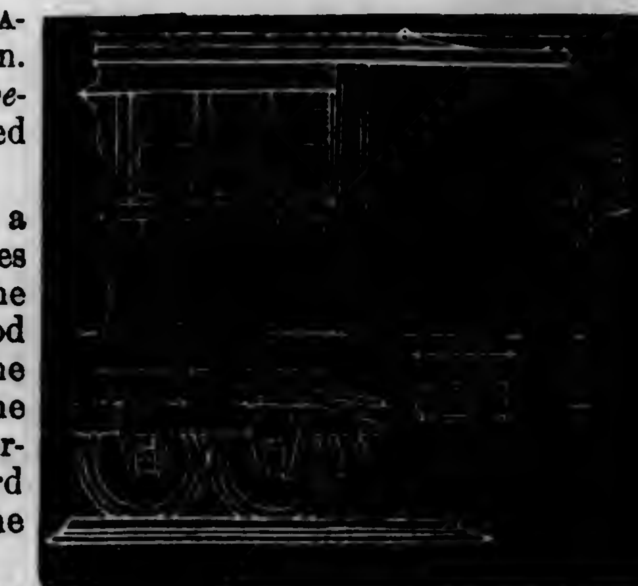
By reference to the annexed figure the claim explains this improvement. The teeth *d d*, &c., gather the grain or grass, and the double bladed-knives K K K, &c., cut it.



Claim.—The double-bladed or two-edged knife K or its equivalent, so constructed as to cut in each direction as it is vibrated, as described in specification. Also, the knife K, in combination with the curves c and teeth *d d*, &c. Also, the mode of operating the double-bladed knives or cutters K K by means of the rack M and pinions L L, substantially as set forth. Also, the arrangement of the devices which communicate motion from the internal part of the driving-wheel to the rack M. Also, the gearing arranged and combined so as to work

within the main-wheel B², and operate the crank upon the axle of the main-wheel, substantially as described.

No. 10,321.—Wm. G. Creamer, of New Haven, Conn. —*Improved Mode of Operating Brakes.* — Patented December 20th, 1853.



This invention consists in a mode of opening the brakes of railroad cars by pulling the signal cord, which method does not interfere with the use of the brakes by the brakeman as usual, nor interfere with the use of the cord for transmitting signals to the engineer.

Claim. — The method (as described in the specification) of attaching the lines that operate the springs or weights to the signal-line, so that the engineer may be able to close all the brakes by said line, while it may be used for transmitting signals from the rear of the train to the engineer without operating the brakes.

No. 10,322.—Benjamin H. Franklin, of Worcester, Mass.—*Improvement in Manure and other Forks.* — Patented December 20th, 1853.

(See figure.)

Claim.—Making the tines of forks three-sided, whereby the weight is diminished, the strength retained, and the holding properties of the fork improved; and at the same time it is prevented from choking, and the article is more cheaply constructed.

No. 10,323.—Uriah H. Goble, of Springfield, Ohio.—*Improvement in Harvesters.*—Patented December 20th, 1853.

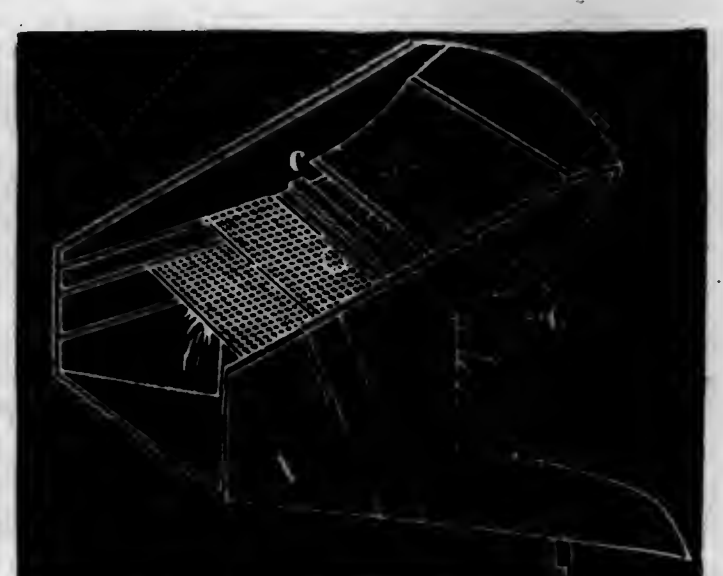
The nature of this invention consists, first, in making the driving or ground wheel conical, with the larger diameter next the grain, for the double purpose of throwing forward that end of the machine which is in the grain, and causing it to *run out* of the grain, as it were (its natural tendency being, through leverage and the resistance of the standing grain, to run into it), and also for balancing the machine, by throwing the weight of it on the outside of the wheel, and preventing the side draft, or counteracting it, and causing the reaper to follow the line of draft. Also, in leaving a space entirely

around the cutter-bar where it passes through the guard or fingers, which space may be enlarged in rear of the bar, and supporting and guiding the bar in its reciprocating movement in guides or boxes placed between the fingers, for the purpose of preventing the bar from clogging in the fingers, and allow it to clear itself of the gum, straw,

or lint. Also, in hinging an apron on the rear part of the platform, in such a manner, that by means of a cam on the reel-shaft, and a swung-lever, or their equivalents, said rear part of the platform may, at stated periods, be let down, to facilitate the throwing off the cut grain from the platform. (See fig.) B is the conical shaped-wheel; C, the cam; D, lever; A, platform.

Claim.—The above description embraces the claim of the inventor.

No. 10,324.—JOSEPH MONTGOMERY and JAMES MONTGOMERY, of Lancaster, Pa.—*Improvements in Winnowing Machines.*—Patented December 20th, 1853.

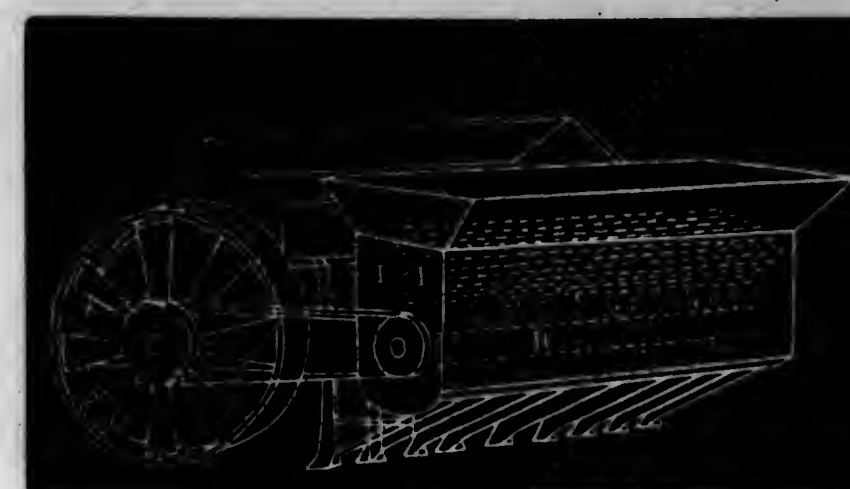


This invention consists in the combination of an additional removable shoe and a closable door, or aperture, in the apron of a winnowing machine, with an ordinary winnowing machine. (See fig.) G is the shoe; C, the opening. The object is to increase or diminish the screening surface, and thereby adapt the machine to cleaning various sized seed or grain, more expeditiously than hitherto.

Claim.—The construction and arrangement of the ordinary shoe A, so as to receive an extra shoe G, and door C, substantially in the manner and for the purposes specified.

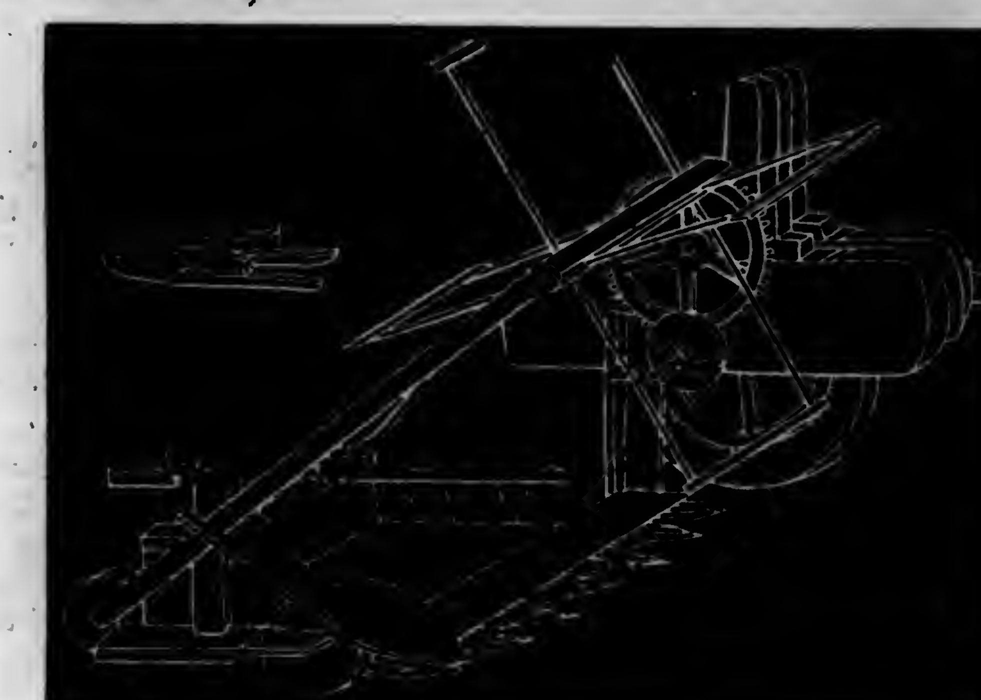
No. 10,325.—THOMAS F. NELSON, of Clark Co., Va.—*Improved Mode of Sowing Guano and other fine Manures.*—Patented December 20th, 1853.

This invention consists of two toothed cylinders I I, and shaft B, in combination with a seed-planter (see fig.), for pulverizing and sowing manures.



Claim.—The combination of the fluted or toothed cylinders I' I'' with the toothed-shaft B, for the purpose of grinding and distributing guano, &c., the whole being in combination with any ordinary seed-planter.

No. 10,326.—WILLIAM SCHNEBLY and THOMAS SCHNEBLY of New York, N. Y.—*Improvement in Grain and Grass Harvesters.*—Patented December 20th, 1853.

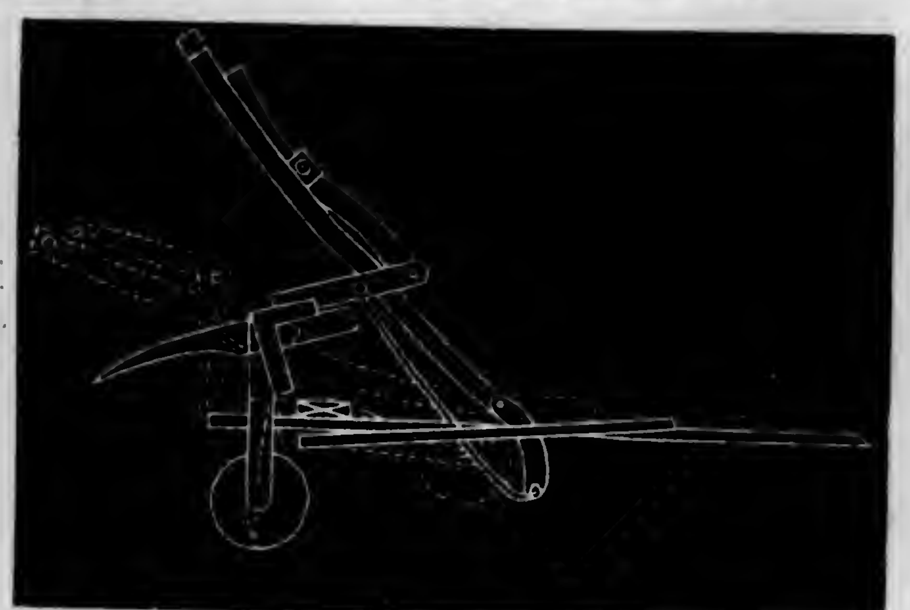


This invention consists in the arrangement of the gear by which the lateral motion of the cutters is regulated; in the construction of the guard-fingers; and the arrangement of the self-acting rake.

Claim.—The method of arranging the gear in combination with the movable plate to which the crank-pin F X is fastened, said movable plate being located on the flange F of the second pinion; by which method the lateral distance of the motion of the cutters can be increased or diminished. Also, the method of constructing the hollow guard-fingers, each one being a single piece only. Also, the self-acting rake with jointed fingers, in combination with the guide-rods upon which it is made to slide back and forth.

No. 10,327.—Hiram N. Tripp, of Alfred, Me.—*Improvement in Power-Rakes.*—Patented December 20th, 1853.

The annexed figure shows two positions of this rake.

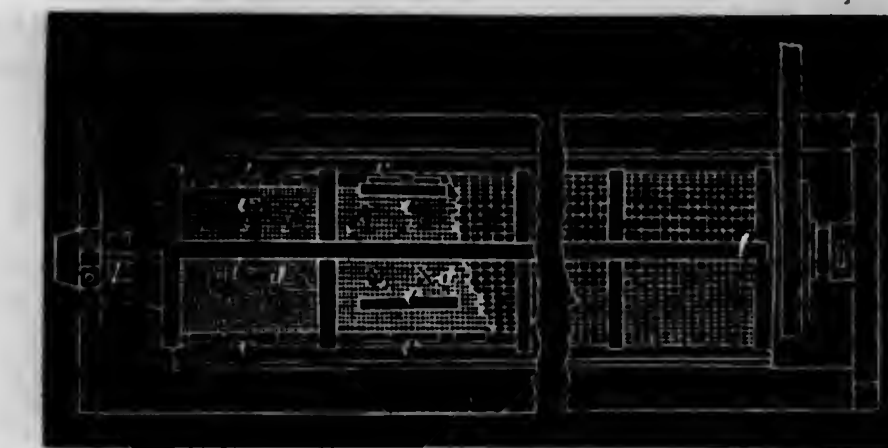


Claim.—The combination of a set of levers and braked raft-bars with the rake-head and shafts, so that, by the conjoined action of the forward draft of the horse and the back draft of the attendant, the rake may be either turned up or off the ground, and supported on its wheels, or turned down so as to bring its teeth in contact with the ground.

No. 10,328.—Robert P. Walker, of New York, N. Y.—*Improved Machine for Hulling and Scouring Coffee.*—Patented December 20th, 1853.

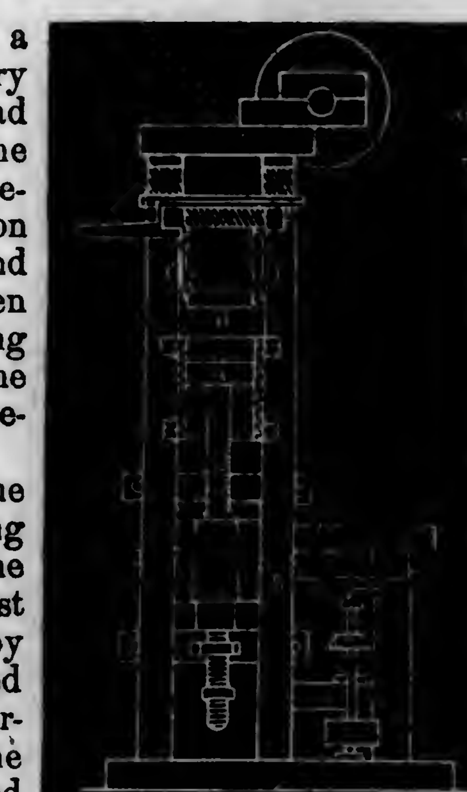
This invention consists in providing a revolving cylinder, covered with wire-net, with a series of rasping or toothed beaters *c d* (see fig.), which can be set at any desired angle; together with a series of springing gum-elastic rubbers, for the purpose of giving a proper direction to the coffee; separating the shell and inner coatings of the kernels, and scouring the grains.

Claim.—The combination of the springing rubber-flaps, or scourers



and polishers *e e e* with the angularly set hullers or beaters *c d*, the whole being constructed and arranged in any equivalent manner to that described, and operating as set forth.

No. 10,329.—J. B. Armstrong, of Barnwell, S. C.—*Improvement in Cotton-Presses.*—Patented December 20th, 1853.



This invention consists in the use of a false platen *n*, in addition to the ordinary platen A, so arranged as to carry the load of cotton under compression during the ascent of the screw. The bale is restrained from yielding by its retention between the false top and bed—and while thus, is stitched and roped—when the link-rods are unhooked from holding the false top, which drops down on the main platen, and the finished bale is removed.

Claim.—The method of holding the bale under compression, and preventing it from springing or yielding during the stitching and roping of the same, whilst the platen is being run down or back by means of a false top or platen, hooked or otherwise hitched to the bed, and arranged to work in connection with the main platen, whereby time is economized in the operation of the press.

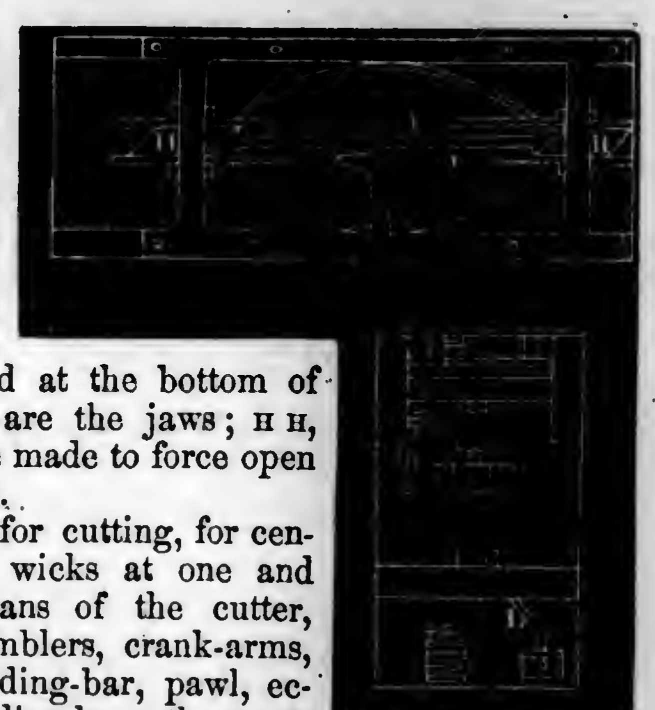
No. 10,330.—Charles Atwood, of Birmingham, Conn.—*Improved Mode of Attaching Hooks and Eyes to Cards.*—Patented December 20th, 1853.

This invention consists in the manner of fastening hooks and

eyes, with thread, small splints of wood, or other suitable material, to crimped cards which have been pierced with transverse rows of mortise holes—suitable for laying them in, or passing them through; and also in the process of attaching them to the cards, by the aid of suitable apparatus. (See figure.)

Claim.—The crimped and perforated cards, combined with thread or thin splints, to fasten hooks and eyes to them, as described. Also, the attaching of hooks by the aid of a block, clamp, and cords, or by means substantially the same.

No. 10,331.—D. E. BATTERSHALL and M. BATTERSHALL, of Troy, N. Y. —*Improvement in Candle-Moulds.*—Patented December 20th, 1853.



The nature of this invention consists in the peculiar manner of cutting, centering, and holding the wick tight in the moulds, in readiness for use; by means of spring-jaws, with cutter, centering-plate, and wick-holder, arranged on the top of the machine and moulds; also a wick-tightener arranged at the bottom of the machine. (See fig.) J J are the jaws; H H, buttons or tumblers, which are made to force open the jaws, or bear against them.

Claim.—The arrangement for cutting, for centering, and for holding the wicks at one and the same operation, by means of the cutter, guide-plate, jaws, springs, tumblers, crank-arms, connecting-rods, horizontal sliding-bar, pawl, eccentric-plate, and vertical sliding-bar; the parts being arranged and operating in the manner and for the purposes set forth. Also, the wick-tightener L.

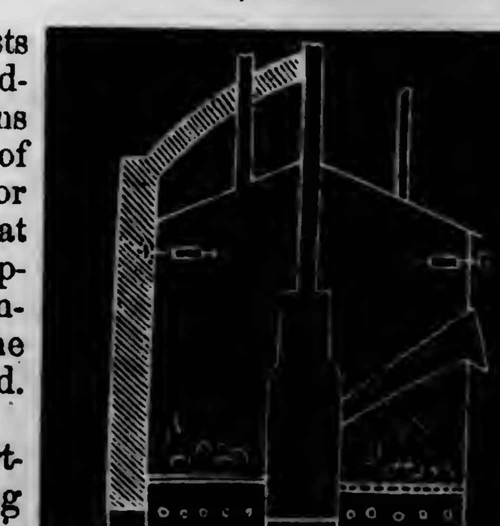
No. 10,332.—JAMES BAXENDALE, of Providence, R. I.—*Machine for Stamping Patterns on Rollers.*—Patented December 20th, 1853.

This invention consists in stamping the rollers with any device, repeated in circular, spiral, longitudinal, or irregular succession, by means of a punch or punches, attached to a weighted arm or lever, which is raised by a cam, and which falls on an elastic gauge, which serves to raise the punch from the surface of the roller, immediately after the blow is struck, and prevents it from being broken either by

too severe concussion, or by the movement of the roller while it remains in the indentation it has made.

Claim.—Stamping rollers for printing cotton or other textile fabrics by means of a punch *c*, which is attached to a weighted arm or lever H raised by a cam J, and allowed to fall on an elastic gauge N, at regular intervals of time, while the roller is moved in the direction in which the pattern is to be repeated.

No. 10,333.—JAMES BOLTON, M. D., of Richmond, Va.—*Improvement in Hot-Air Furnaces.*—Patented December 20th, 1853.



The nature of this invention consists in dividing an air-chamber, surrounding a stove or furnace by partitions into separate compartments, each of which is to be connected with one or more separate warm air flues, so that each flue or set of flues may be supplied with warm air from that compartment exclusively with which the flues or set of flues may be connected. (See fig.)

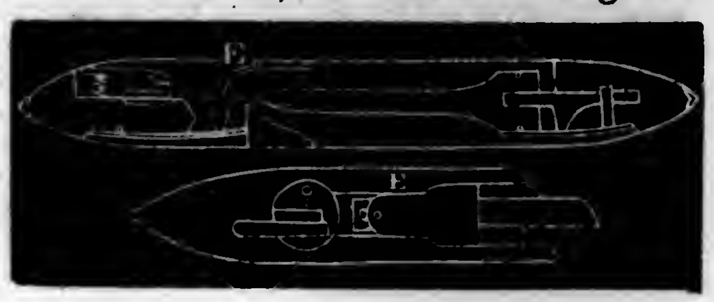
Claim.—The division into compartments of the air-chamber surrounding a stove, furnace, pipe, or other contrivance for warming the air which it contains, so that the warm air may be drawn off by flues from each compartment, without interfering with the supply of warm air from the other compartments.

No. 10,334.—Lazare Cantel, of New York, N. Y.—*Improvement in Metallic Trunk-Frames.*—Patented December 20th, 1853.

Claim.—Forming the joints of trunks (see fig.) by arming the edges of the material of which the body is composed with sheet metal covering, crimped in the form of tongues, whereby protection to the surface from wear is obtained; and also the effect of a stiffening frame, as well as strength in the tongues, and at a small expense.

No. 10,335.—David Carroll, of Baltimore, Md.—*Improvement in Shuttles.*—Patented December 20th, 1853.

The object of this invention is to prevent the thread from looping when it plays off too fast from the bobbin, and consists of a guard-plate, placed in front of the point of the bobbin, and extending back over the point of the bobbin, by which means the thread is prevented from getting back far enough to throw out from the shuttle. (See figures.)



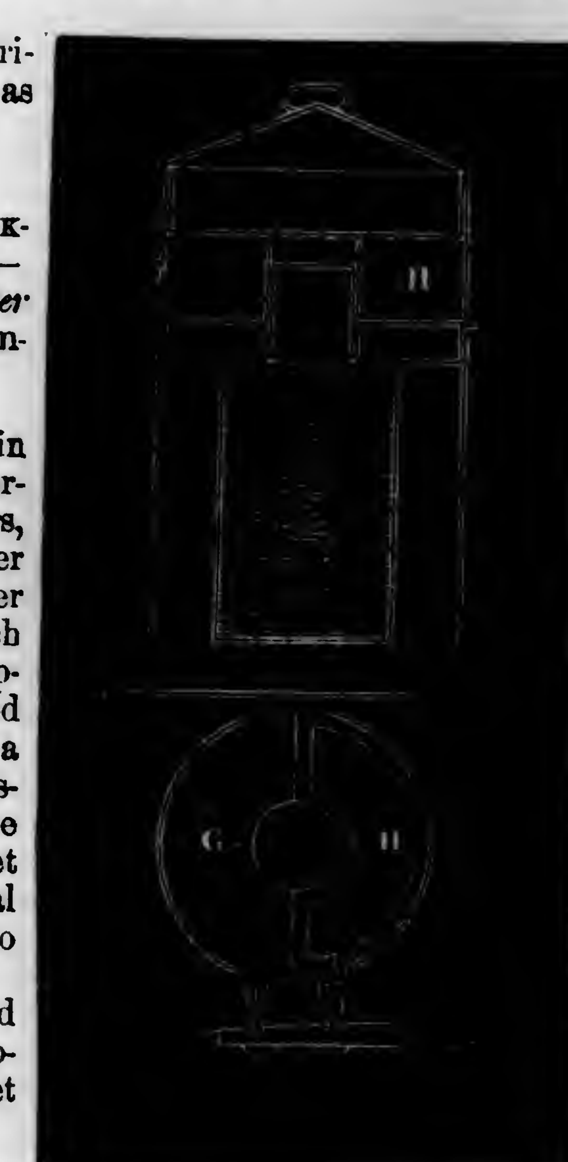
Claim.—In combination with the bobbin of an ordinary shuttle, the hinged guard projecting from and over the point towards the heel of the bobbin, for the purpose of preventing the thread or yarn, when playing off too fast, from looping or tying.

No. 10,336.—John D'Homergue, of New York, N. Y.—*Improvement in Railroad Car-Brakes.*—Patented December 20th, 1853.

This invention consists in the employment of hollow sheaves attached permanently to the middle of the axles, within each of which sheaves, and detached from it, is a system of cams, moved simultaneously, and made to press against the inner periphery of the rim of the sheave, making an effectual brake.

Claim.—The arrangement of the cams c, as described, upon the blocks d, and within the sheaves b, so as to press simultaneously against the inner periphery of said

sheaves by the action of the tri-branched ring r, substantially as specified.

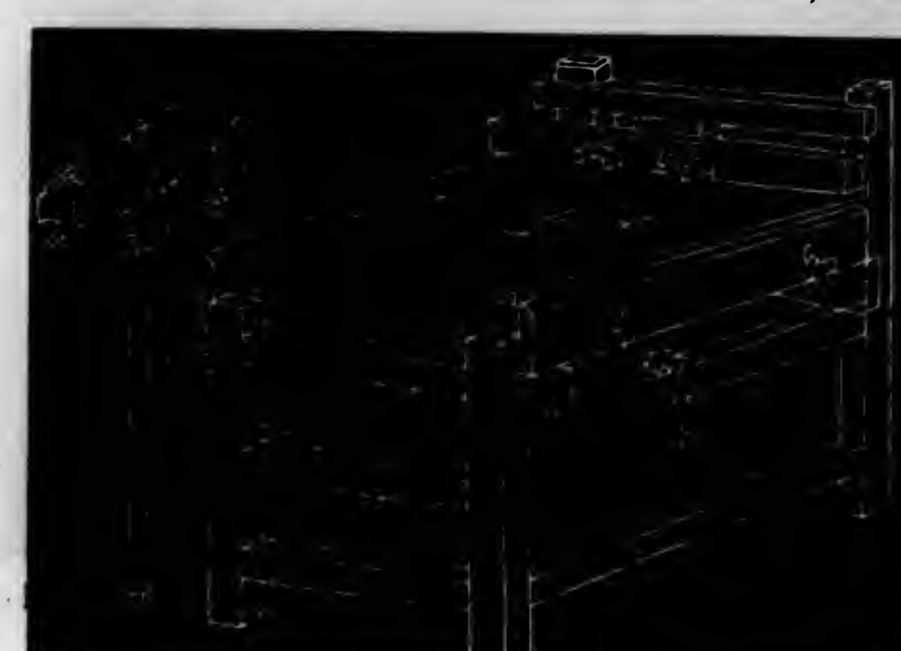


No. 10,337.—Alexander Frankenberg, of Columbus, Ohio.—*Improvement in Soda-Water Fountains.*—Patented December 20th, 1853.

This soda fountain consists in combining with an ordinary water-cooler a vessel with two chambers, one for the acid and the other for the soda, the acid-chamber being lined with bees-wax; each chamber is supplied with a stop-cock, which stop-cocks are united together by a spigot which has a soda and acid passage in it, corresponding to the passages in the faucet; the soda and acid are let out by this apparatus, in equal quantities at the same time, into the tumbler.

Claim.—The arrangement and combination of the stop-cock apparatus with reservoirs g h, as set forth.

No. 10,338.—W. J. Hatfield, of Dayton, Ohio.—*Machine for Jointing Table Tops or Leaves.*—Patented December 20th, 1853.



In the machine represented in the figure, the top or leaf of the table to be jointed is fed along over a bed, with its edge to be dressed bearing against a guide-strip, through which rotary cutters project and perform the work of jointing the edges of the top and leaves as they are passed in succession over the bed. The cutters turn horizontally, and are to be driven by pulleys.

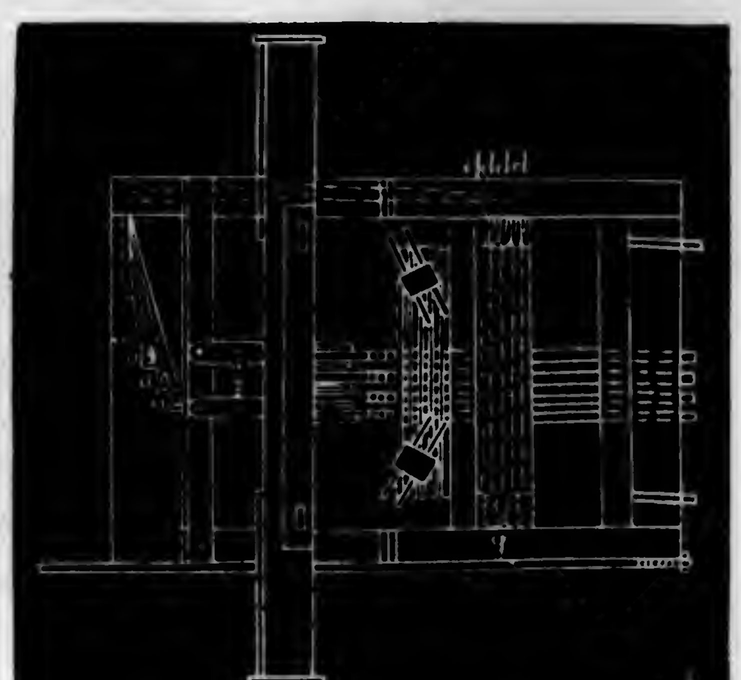
Claim.—The method described of jointing and hanging tables, by means of rotary cutters, arranged and operating as specified, whereby time and labor are economized, and greater accuracy is insured.

No. 10,339.—L. Otto P. Meyer, of Newtown, Conn.—*Improvement in the Manufacture of Caoutchouc and other Vulcanizable Gums.*—Patented December 20th, 1853.

The nature of this invention consists in producing, by means of oil and other fatty substance, smooth and glossy surfaces upon the material commonly known as the hard compound of vulcanized caoutchouc, or gutta-percha, or other similar gums, which may be manufactured according to the processes described in letters-patent granted to Charles Goodyear, June 15th, 1844, and Nelson Goodyear, May 6th, 1851.

Claim.—The producing of smooth and glossy surfaces upon the hard compounds of caoutchouc, and other vulcanizable gums, by means of the use of oil, or other equivalent substance, applied to the surface of the prepared gum, and between the gum and the plates of metal, or the moulds.

No. 10,340.—James A. Mitchell, of Ringgold, Ga.—*Improvement in Hand-Looms.*—Patented December 20th, 1853.

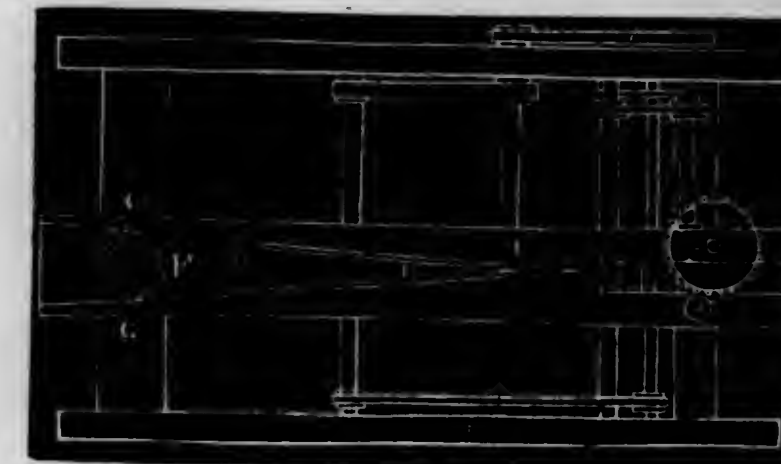


This invention consists in the employment and arrangement of suitable mechanism, whereby the heddles of hand-looms are made to operate the harness by the fingers of the operator. (See figure.)

Claim.—The combination of the keys or pegs *a a a a*, through the rods *b*, levers c, links *d*, and springs *g*, or their equivalents, with the treadles, substantially in the manner described in specification; whereby the harness of hand-looms is caused to operate by a movement of the ***fingers*, instead of the** *feet.*

No. 10,341.—Ephraim Parker, of Rock Island, Ill.—*Machine for Sawing and Planing Clapboards.*—Patented December 20th, 1853.

Claim.—Planing or dressing the insides of two clapboards at the same time, by means of the combination of the saw *c*, parting-guide



E, one cutter-head F, and the adjustable metallic-beds G G; the above parts being arranged and operating substantially as described in the specification.

No. 10,342.—Godfrey Simon, of Reading, Pa.—*Improvement in Carriages with Shifting Seats.*—Patented December 20th, 1853.

This carriage is so constructed as to be readily converted from a double to a single seated carriage; which is accomplished by removing the front seat and foot-board, and sliding back the dash-board. (See figure.)

Claim.—The manner herein described of constructing, arranging, and applying or using the removable front seat, foot-board, and dash-board, and of adapting the body of the carriage thereto.

No. 10,343.—SOLON STAPLES, of Topsham, Me.—*Screw for Planking Ships.*—Patented December 20th, 1853.

This invention consists in bringing the planks used in ship-building to their proper position for being spiked to the timbers, by the use or employment of the device shown in the figure, denominated by the inventor, a "self-holding planking-screw."

Claim.—The combination of the shank A, its arm B, and screw G, with the brace I K L, screw C, and chain M, constructed and combined in the manner set forth.

No. 10,344.—HENRY L. SWEET, of Foxborough, Mass.—*Improvement in Guides for Sewing-Machines.*—Patented December 20th, 1853.

The object of this improvement is to aid in sewing on binding to hats and the like. Fig. 1 is a top view. Fig. 2, a front view. Fig. 3, its receiving end. Fig. 4, its delivery end; and fig. 5, a perspective view of the guide. This guide is to be used in sewing-machines.

Claim.—The doubling-guide, as not only made with a flat mouth, or one capable of receiving the ribbon, tape, or binding, in a flattened state, but with a bent channel or sides, such as shall gradually bend or double it, and discharge it at the other end in a doubled state, ready to be applied to any article conveniently placed to receive it, and leave it sewed thereon.

No. 10,345.—WILLIAM H. TOWERS, of Philadelphia, Pa.—*Improvement in Horse-shoes.*—Patented December 20th, 1853.

The nature of this invention consists in making the shoe with inclined flanges or lips, rising from the front and sides of its upper surface, corresponding in form with the parts of the hoof against which they are caused to bear, when fitted to the horse. One of the side flanges is made separate from the shoe, and fastened to it by sliding the base of the flange into a corresponding recess in the side of the shoe, the base being secured by a screw passed through it and the shoe.

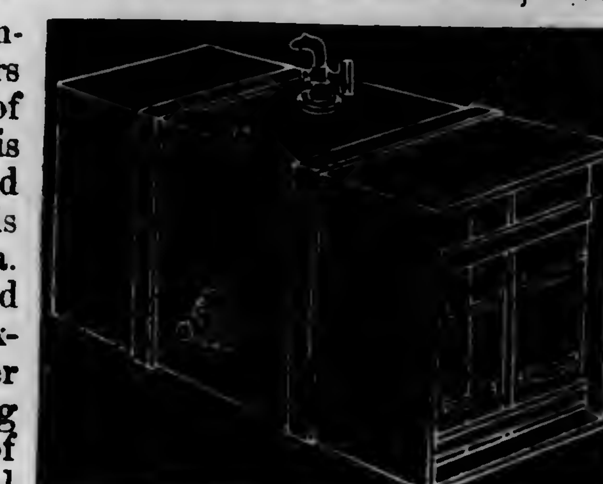
Claim.—Constructing the shoe with a detached flange, secured substantially as described, so that the side and front flanges shall firmly fasten the shoe (without the aid of nails) to the hoof.

No. 10,346.—ELIAS UNGER, of Dayton, Ohio.—*Machine for Dressing Timber for Cabinet Purposes.*—Patented December 20th, 1853.

The object of this machine is dressing timber to various forms, suitable to cabinet-ware; and consists in the employment of a slotted table, carrying standards for holding timber in the desired position, while the table is moved longitudinally, so as to bring the material against the cutters of a rotary face-plate; the standards being furnished with eccentric points for securing the timber at the proper angle for the dress required.

Claim.—Securing the timber to be dressed between two clamps, on traversing carriages, by means of "eccentric pins," so that the faces or surfaces dressed by the cutter may have any desired angle with the axis of the piece, for the purposes and in the manner set forth.

No. 10,347.—WILLIAM WISDOM, of Cleveland, Ohio.—*Improved Mode of Cleansing Hair for Beds,* &c.—Patented December 20th, 1853.



The figure represents a chamber, in which hair or feathers are subjected to a vapor-bath of chlorine gas. The material is first washed in clear water, and then drained, and afterwards washed in a solution of sal soda.

Claim.—Purifying hair and feathers by destroying all noxious insects or infectious matter contained therein, by subjecting the same to a vapor-bath of chlorine gas, after the material has been cleansed by a bath of sal soda.

No. 10,348.—EDMUND H. BARD and HENRY H. WILSON, of Philadelphia, Pa.—*Improvement in Gold Pens.*—Patented December 20th, 1853.

Claim.—The construction of metallic pens, having the form of the semi-cylindrical barrel, combined with the angular diverging planes, by compressing the metal between correspondingly shaped dies.

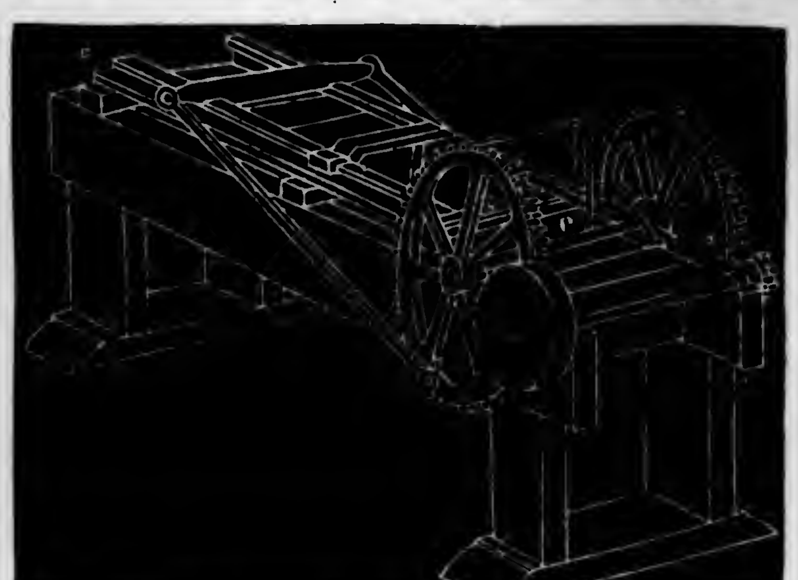
No. 10,349.—B. F. Greenough, of Cincinnati, Ohio.—*Improvement in Separating Alcohol from Water and other Heavier Fluids.*—Patented December 20th, 1853.

Claim.—The separating of alcohol and its compounds of parts of different specific gravities, by means of the pressure of a column of such liquids, thereby causing what the inventor denominates "hydrostatic displacement."

No. 10,350.—Benjamin F. Stevens and Walter Kidder, of Lowell, Mass.—*Improvement in Shingle-Machines.*—Patented December 20th, 1853.

The principal feature of this improvement consists in the arrangement of two shaving-knives *o e* in a reciprocating frame; the lower knife being so arranged as to be raised, by means of cams, on the main-shaft, so as to taper the shingle gradually, and in a more perfect manner than by the machines heretofore in use.

Claim.—The combination of the movable side-bars



with the shaving knives and cams, arranged and operated as shown and described. Also, the combination of the sliding-arms carrying the riving-knife with the driver, for the purposes specified.

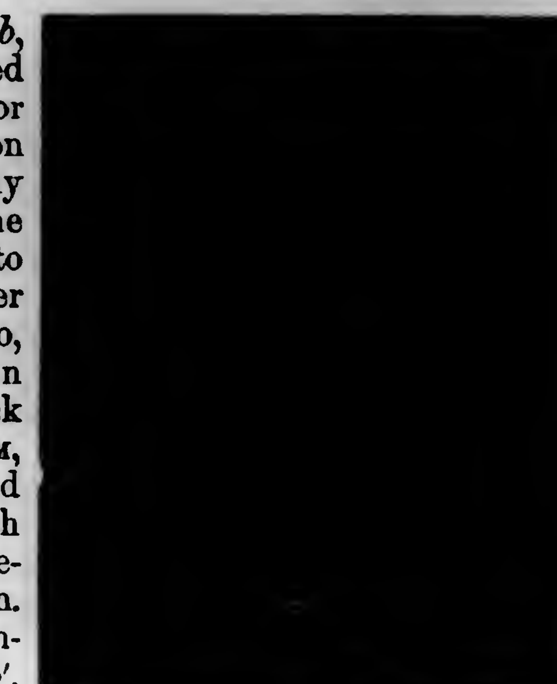
No. 10,351.—Andres E. Botter, of New York, N. Y.—*Improved Folding Wardrobe Bedstead.*—Patented December 20th, 1853.

By reference to the annexed figure, the claim will explain this improvement.

Claim.—The peculiar construction of the bedstead, having the two parts *b c* connected by hinges, connected to a chest A by

hinges *e*; by which construction the bedstead may be folded or shut up during the day, occupying but little room, and resembling a piece of room furniture, and unfolded at night when desired for use. The chest A being provided either with drawers, or a crib for children.

No. 10,352.—Isaac D. Garlick, of Lyons, N. Y.—*Self-acting Apparatus for Weighing Grain and Making a Record of the Weight.*—Patented December 20th, 1853.



Claim.—The auxiliary-gate *b*, when combined with the loaded bent lever *u* and cam-catch *q*, or their equivalents, which act upon the steelyard so as to lift it shortly before the weight of grain in the weighing-box becomes sufficient to raise it, substantially in the manner set forth in the specification. Also, suspending the weighing-box O in the frame D, by means of the rack *l*, pinion *m*, and loaded lever M, whereby it is made to slide up and down within said frame at each weighing, and to produce the movements described in specification. Also, the arrangement and combination of the bent cam-lever *b'*, the pin *c'*, on the frame D, and the curved elastic rod *a'*, connecting the lever with the lid N, for the purpose of opening the lid at each descent of the weighing-box, within the frame D, and then closing it by the ascent thereof. Also, the suspended hopper E, in combination with the vibratory lever K. Also, the combination of the notches *h k* and catch-wire *j* with the elastic shoe *g* and pin *i* of the lever *f*, arranged in such manner that said lever is successively set free from the notch *h*, catch *j*, and notch *k*, respectively by the ascent, descent, and second ascent of the steelyard. Also, the adjustable cam-catch *o*, in combination with the shouldered-rod Q, for the purpose set forth. Also, the slotted-rod *v*, in combination with the vibratory lever K, when arranged in such a manner that the ascent of the lever will raise the gate *b*, and hook the catch *q* over the pin *p* of the steelyard, but will not disturb the gate in its descent. Also, the arrangement and combination of the adjustable notched and perforated disk *d''*, the coupling-pins *s''* and *t''*, index *m''*, arm T, and stop *t'*.

No. 10,353.—Charles F. Sibbald, of Philadelphia, Pa.—*Improvement in Steam-Boilers.*—Patented December 20th, 1853.

This invention consists in a certain arrangement of flue and water

spaces of a certain form, in connection with the arrangement of the fire-chamber, so as to obtain a great surface for the rapid development of steam, and a great saving of fuel; also in the mode of putting together the plates composing a boiler, of such form and arrangement as to make a very tight and strong boiler; and in an arrangement for circulation. This last-named improvement, the inventor denominates the "Condensed Plate-boiler."

Claim.—The fire-box, deflecting-plates, fire-surface, and water-surface, as constructed and arranged. Also, the additional steam-chamber placed below the water-surface and behind the fire-box, and connected to the main steam-chamber by a pipe passing through the smoke-stack.

No. 10,354.—Sherburne C. Blodgett, of Georgetown, Mass.—*Improvement in Sewing-Machines.*—Patented December 20th, 1853.

By reference to the figure, the claim will explain the nature of this invention.

Claim.—The formation of a seam in cloth or other material, by the interlooping of two threads, by the conjoint action of two needles in such manner that each needle shall be made to carry a loop of thread through a loop formed by the other needle, and through the cloth, whereby one thread serves as a binding-thread to the other.

No. 10,355.—William H. Akins, of Ithaca, New York.—*Improvement in Machines for Registering Time.*—Patented December 20th, 1853.

To give a full description of the operation and arrangement of this machine, would require too much space for this Report.

The object of this invention is to register days, months, and years, as well as hours, minutes, and seconds.

Claim.—The particular arrangement of the months, with their appropriate number of days, on the paper R, and for the purposes described in the specification, commencing February 1st, February 2d, and so on for twenty-eight days only, and then all of the other months in their regular order, with their appropriate number of days for the whole year (with the February first mentioned having twenty-eight days). Then again, February having twenty-nine days, and also eight or ten days of another March, at the last end of the paper R, and within which eight or ten days the machine must be wound up in every bissextile year, and requiring to be wound up in the first, second, and third years after leap-year during February having twenty-nine days, and before the twenty-ninth day thereof. Also, the arrangement and combined action of the rollers K and L, showing the day of the week, and drawing up the paper R, exhibiting the month and days of the month in their regular order; the paper after it is drawn between the rollers K and L, being disposed of by winding it upon the roller S, by means of a weight or spring.

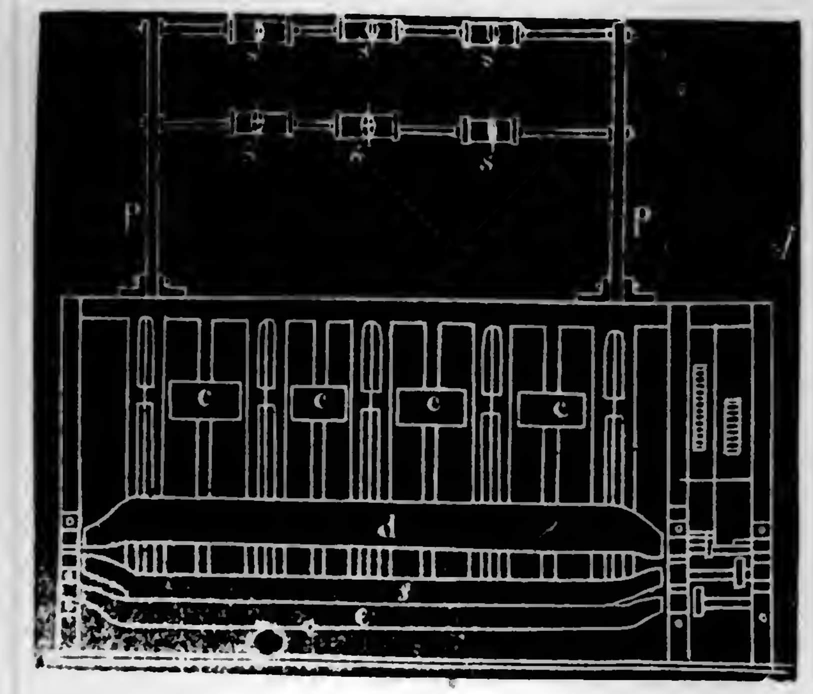
No. 10,356.—John C. Concklin, of Peekskill, N. Y.—*Improvement in Pick-axes.*—Patented December 20th, 1853.

Claim.—The combination of the bar A with the braces *b b* and the loops *c c*, substantially in the manner set forth.

No. 10,357.—William A. Martin, of Brooklyn, N. Y.—*Machine for Folding Seidlitz-Powders.*—Patented December 20th, 1853.

The powders are first parcelled out upon papers, and then subjected to the action of the machine, which cuts the papers and folds them, ready to be packed in boxes.

Claim.—The bars *d e* and *f*, moved by the means herein shown, or any analogous device, for folding the paper. Also, the frame *p*, with



its cutters *s*, and blocks *r*, in combination with the beds on which the paper lies, to divide the papers containing the powder, and fold the ends against the ends of the blocks *c*, as specified.

LIST OF RE-ISSUES AND CLAIMS FOR 1853.

No. 229.—*Improvement in Apparatus for Discharging Water from the Holds of Vessels.*

I claim the combination of a system of two series of chambers, connecting-pipes, discharging-pipe, receiving-hole or orifice, and ventilating-pipes, as arranged, connected, and applied to the hold of a navigable vessel, and made to operate during the rolling or pitching movements thereof, substantially in manner and for the purpose of elevating and discharging water therefrom, as set forth.

NEHEMIAH HODGE.

No. 230.—*Improvement in Excluding Dust from Railroad Cars.*

I claim, and desire to secure by letters patent, inducing outward currents of air through the windows of railroad cars, to prevent the entrance of dust, &c., by the action of the surrounding air on deflectors, combined with the sides of the car, substantially as specified, and operating on the principle set forth.

E. HAMILTON.

No. 231.—*Improvement in the Mode of Operating Brakes for Cars.*

I claim an improvement in actuating the brakes of a car having two trucks, that is to say, a combination of two levers *f f*, a rod *h*, two levers *c c*, and rods *d d*, as applied to the brakes and two windlasses of the car, and operated by either of the windlasses, so as to bring down at the same time the brakes of both trucks upon the wheels thereof with the same, or practically the same, degree of force, and whether, when the car is running on the railway, the axles of one truck, or of the wheels of one truck, are thrown or moved out of parallelism with those of the other truck, or the rubbers or brakes become unequally worn, or of an unequal thickness, as stated.

NEHEMIAH HODGE.

No. 232.—*Improvement in Splints for Fractures.*

I claim and desire to secure, by letters patent, the cutting out a portion of the splint, to afford an opportunity for dressing as often as may be necessary, the upper and lower portions of the splint being kept firmly united by means of the brace B, so as, by extension and counter extension, to keep throughout the treatment the proper relative position of the parts concerned, the slide being replaced after each dressing, or any other device substantially the same.

ADAM HAYS.

No. 233.—*Improvement in Self-acting Mules for Spinning.*

I claim and desire to secure, by letters patent, governing the revolution of the spindles in winding the yarn on the cop, and also in backing off during the progressive stages of the building, by means of a cam B, or any equivalent device of irregular form, circumferentially, with the said irregularity, varying from end to end; the said cam, or equivalent, being caused to operate upon the mechanism which drives the spindles in any way that will produce the result set forth. I also claim the mechanism for causing the finger *d*, through which the irregular surface of the cam B, or its equivalent, acts upon the mechanism which drives the spindles, in backing off and building on, to traverse the said cam, and to be kept close to its surface, consisting of the screws *e* and K, the nut *j*, cord or chain *f*, lever G, and stud *h*, operating in combination, in the manner substantially as set forth.

WANTON ROUSE.

No. 234.—*Machine for Arranging and Feeding Screw-Blanks.*

I claim and desire to secure, by letters patent, the lifters which select and lift the blanks, etc., from the hopper, substantially as specified, in combination with ways or conductors, or the equivalents thereof, substantially as specified, into or on to which the blanks, etc., are transferred, as specified. I also claim giving to the lifters, or to the inclined ways, or their equivalents, a lateral motion, in combination with

a stop or detector, substantially as specified, for the purpose of arresting the operation of the lifters until a further supply is required, as specified. I also claim the sliding-carrier, with its recess for receiving and holding the screw-blanks, substantially as specified, in combination with the spring-fingers, substantially as specified, for taking the screw-blanks from the carrier, and presenting them to the jaws, as specified.

THOS. J. SLOANE.

No. 235.—*Improvement in Machinery for Trimming Books, &c.*

I claim the turning and adjustable book-holder, arranged as described, so as to be made to assume either of the three positions specified, and so that the three edges of a book may be trimmed by a single adjustment of the same in said holder, and by the movement of said holder on its pivot consecutively to each of the aforesaid three positions, whether such holder be combined with a reciprocating knife or cutter having any other shape or motion. I also claim the adjustable frame F, in combination with the turning book-holder, or the turning and adjustable book-holder, for the purpose specified. I also claim the combination of the table (on which the book-holder is supported), arranged so as to be gradually raised to convey the edges of the book to the knife, with a reciprocating knife, or any other knife or cutter having any other shape or motion.

LARNARD F. MARKHAM.

No. 236.—*Improvements in Movable Breeches for Fire-Arms, and Appurtenances of the same.*

I claim and desire to secure, by letters patent, in combination with a hinged breech-piece, the support G, the slot Y, and lever L, whereby the said breech-piece is easily moved into and out of place, in closing and opening the gun for the purpose of loading, swabbing, &c., substantially as described. I also claim, in combination with a gun having a dissected screw-breech, the flanged shield through which the cartridge is made to pass into chamber over the dissected screw, without danger of being broken by the ends and edges of the threads, as set forth. I also claim, in combination with a rammer for charging guns at the breech, the projecting central point *n*, whereby the cartridge, in being driven to its place in the chamber, is perforated at its base, to receive the point of the percussion-cap described, for the purpose of insuring the ignition of the gunpowder, as set forth. I also claim the enlargement *x*, near the shoulder *s'*, of the rammer, whereby the shield through which the cartridge has been rammed is made to adhere by friction to the rammer, and to be drawn out of the breech of the gun without requiring a separate operation for taking it out.

B. CHAMBERS.

No. 237.—*Improved Cannon-Lock.*

I claim and desire to secure, by letters patent, the method of securing the lock to the gun by means of the sectional or quarter screws *t t'*, for the purpose of speedily opening or removing the lock, to supply it with the cap, pellet, or other material by which the gunpowder is ignited, and for firmly holding the same in place on the gun when it is to be discharged, substantially as described. I also claim forming the gun-lock in such a manner that the hammer-rod and the percussion-rod shall be in separate pieces, lying axially within the same barrel, whereby the coiled main-spring is made to urge the hammer-rod against the head of the percussion-rod to discharge the piece, and the recoil-spring on the percussion-rod is made immediately to draw back and hold the valve which closes the interior of the lock against access of smoke and gases, as set forth.

B. CHAMBERS.

No. 238.—*Improvement in Reaping-Machines.*

I claim and desire to secure, by letters patent, placing the cutter-bar and cutters lower than the frame of the machine, and opposite the side of the plane of the wheel, in such a manner as to leave unobstructed space below the frame, and also between the wheel and the cutters, with their supports, to allow the machine to pass freely and without clogging over the cut grass or grain, as set forth. I also claim placing the cutters lower than the frame and axle, and in, or nearly in, the same vertical plane with the axle on which the frame hangs and vibrates, and parallel, or nearly so, to said axle, so that the vibrations of the frame on uneven ground shall not materially elevate or depress the cutters, as set forth. I also claim the endless chain of cutters, in combination with the guard-teeth, operating substantially as described.

WM. F. KETCHUM.

No. 239.—*Improvement in Reaping-Machines.*

I claim and desire to secure, by letters patent, placing the gearing and crank forward of the driving-wheel, for protection from dirt, &c., and thus carrying the driving-wheel further back than heretofore, and sufficiently so to balance the rear part of the frame and the raker thereon, when this position of the parts is combined with the sickle back of the axis of motion of the driving-wheel by means of the vibrating-lever, substantially as described. I also claim the combination of the reel for gathering the grain to the cutting-apparatus, and depositing it on the platform with the seat or position for the raker, arranged and located as described, or the equivalent thereof, to enable the raker to rake the grain from the platform, and deliver and lay it on the ground at the side of the machine, as described.

C. H. MCCORMICK.

No. 240.—*Improvement in Cooking-Ranges.*

I claim the improvements by which the hot-water back is connected with the plate G, and by means of which said hot-water back may be

either readily removed at any time, or applied in such manner that the directions of its water-pipes may be disposed so as to accommodate the bath-boiler into which they are usually led, on whatever side of the range the said bath-boiler may be placed; the said improvements consisting, first, in the connecting-piece H, and the attachments of it, and the hot-water back; the whole being made to operate together substantially in the manner set forth. I also claim a second set of attachments (fixed on the opposite face of the water-back), in combination with the first set thereof, as described. I also claim the peculiar arrangement of the flues which lead the smoke and volatile products of combustion directly around the oven, the said arrangement of flues causing the heat to course against a portion or one half of the bottom of the oven, next into another flue, which takes it backwards and against the other portion or half of the bottom of the oven, thence up a flue against the oven, thence through a flue extending over and against a portion or half of the top of the oven, thence into and through another flue, which carries it backwards and over and against the top of the oven, and conveys it to the chimney or discharge flue. I also claim the two recesses *l m*, and two flue-plates *p q*, applied to the plate K, in combination with the two valve-openings X A', their damper, and cover-plate, as applied to the top-plate of the oven-frame, and used under an arrangement of oven-flues, substantially as described, the same allowing of the adaptation of the oven to either side of the fire-place, or the use of two such ovens and their frames in connection with the fire-place, all essentially as stated. I also claim the improvement by which the oven can be raised and readily removed, and by which the smoke is prevented from passing underneath the partition which separates the flues on top of the oven, the same consisting in the sliding or gravitating plate G affixed to the partition, and made to operate substantially in the manner specified.

MOSES POND.

No. 241.—*Improved Lubricating Compound.*

I claim and desire to secure, by letters patent, the combination of a solution of caoutchouc, or other similar gum, with animal or vegetable oil, or fatty matter, substantially as specified, applicable as a substitute for oil in lubricating machinery, and for other purposes.

PATRICK S. DEVLAN.

No. 242.—*Improvement in apparatus for operating Shuttle-Boxes of Looms.*

What is claimed therein as the invention of the said Robert Burns Goodyer, is the employment, for the purposes of weaving, of an index-plate, having movable and adjustable pins, projecting at different distances from the face of said plate, in combination with the shoe H or its equivalent, having projections corresponding to the different length of pins, for the purpose of raising and falling the shuttle-boxes

to correspond with the pattern desired to be formed. The whole constructed and arranged in the manner herein described.

JAMES A. BOWIE.
CHARLES CARR.

No. 243.—*Improvement in Machinery for making Mouldings.*

What I claim as new, and desire to secure by letters patent, is: First, The combination of a ring or rings with a cutter or cutters for operating on an angular strip for making a moulding, whether the said cutter or cutters be rotating or stationary, or both, and whether the said cutter or cutters operate on the face or on the edge of the strip, or on both the face and the edge, substantially as herein described; and, Second, The combination of the adjustable bed with the ring or rings and a cutter or cutters as aforesaid, for operating on an angular strip for making a moulding; whether the cutter or cutters be rotating or stationary, or both, and whether the said cutter or cutters operate on the face or on the edge of the strip, or on both the face and the edge, substantially as described.

ALFRED T. SERRELL.

No. 244.—*Improvement in Gas-Regulators.*

What I claim as my invention, and desire to secure by letters patent, is balancing the varying pressure of the gas in the main by connecting with the valve a disk which receives pressure from the main, to balance the pressure on the valve, substantially as described, or the equivalent therefor, in combination with the method, substantially as described, of governing the aperture through which the gas passes to the branch of the varying pressure of the gas, beyond the valve which governs the aperture, as described; so that when the pressure becomes too great, the aperture shall be reduced, and vice versa. And I also claim, in combination with the above, making the disk so that it shall be also acted upon by the varying pressure in the branch, to assist in moving the valve to govern the aperture for the passage of the gas, substantially as specified, whereby the action of the instrument is rendered more sensitive and prompt as a governor.

WALTER KIDDER.

No. 245.—*Improvement in the process of Flouring.*

What I claim as my invention and improvement, and desire to secure by letters patent, is the process of grinding the offal of grain immediately after it has passed from the bolts, cotemporaneous with the first flouring; and by the continuous operation of machinery adapted to said process, substantially as set forth, for the purpose of increasing the quantity and improving the quality of the superfine or other flour.

DAVID P. BONNELL.

No. 246.—*Improvement in Composition for Stereotype Plates.*

What I claim as my invention, and desire to secure by letters patents, is, First, The mixture (herein described) of shellac, tar, and sand, as a substitute for type metal. Second, I claim the use of shellac as a basis to form a substitute for type metal, when it be mixed with the substances I have mentioned, or with other substances of a similar nature. Third, I claim also the use of clay, clay mixed with sand in various proportions, also with gum arabic, bees-wax, stearine, tallow, and oil, as before described, for the purpose of engraving or forming matrices or moulds, in which to make casts for typographical purposes, of the material and in the manner substantially as herein set forth. Fourth, I claim also the use of clay as a basis from which to form matrices or moulds as aforesaid, whether it be mixed with the materials I have mentioned, or whether other substances be used instead of them, but substantially of the same nature. Fifth, I claim, in combination with the employment of plastic material for stereotyping, the employment of the bearers in the manner described, for the purpose of obtaining casts, exactly level, and of type height.

JOSIAH WARREN.

No. 247.—*Improvement in Figure or Fancy Power-Looms.*

What I claim therein, is, First, The jacks with hooks or projections thereon, capable of being taken or passed by the lifter and depresser, as required, in combination with the harness or heddles, for the purpose of opening the shed. Second, The combination of the jacks, constructed and arranged substantially as described, with the lifter and depresser, as described. Third, The combination of the pattern-chain or cylinder with the jacks constructed in the manner described. Fourth, Arranging and connecting the lifter and depresser which operate the jacks, in such a manner that they shall operate simultaneously to elevate and depress the jacks and warps in forming the shed, substantially as described. Fifth, Giving motion to the pattern-chain or cylinder substantially as described. Sixth, The combination of the pattern-chain or cylinder with the jacks, lifter, and depresser as described. Seventh, So constructing or arranging the lifter and depresser, and the hooks or projections on the jacks, with reference to each other, substantially as set forth, as to bring the upper warps all into the same plane, and the lower warp all into another, when the shed is opened. Eighth, Connecting the hook-jacks to the bottom treadles or levers by inclined wires or their equivalents, to hold the jacks against the tubes or bars of the pattern-cylinder or chain, when not thrown out by the rollers, or other projections thereon.

WILLIAM CROMPTON.
MERRILL A. FURBUSH.
GEORGE CROMPTON.

No. 248.—*Improvement in Spark and Gas Consumers.*

What I claim, is the manner in which I have constructed and arranged the respective parts that constitute the inner and outer cases of the apparatus, which is placed at the top of the chimney. Also, I claim the manner of constructing and arranging the trumpet-mouthed tube D within the inner case, said tube being divided into two or more parts, and being made to deposit and discharge the larger portion of the sparks, by the aid of the opening between said parts as described, substantially as set forth. I also claim the manner in which I connect the apparatus at the top of the chimney with the furnace or fire-box, by means of the tube or pipes H, the cases L L, and the openings thence into the fire-box or furnace, for the purpose made known. I likewise claim the manner of preventing the entrance of water into the fire-chamber by the employment of the tubes M, in combination with the tubes H H'.

DAVID MATTHEW.

No. 249.—*Improvement in Planing Machines.*

First, What I claim, is the reciprocating beds, arranged with respect to the stationary beds substantially as described, in combination with the clamps or their equivalents attached to them; whereby the board is clamped between said movable beds and the clamps, and is free to move over the stationary planing-bed, and is fed, during the backward stroke of the planes, the whole length of said stroke. Second, I claim the within described method, or any substantially the same, of clamping and feeding lumber to knives or chisels.

ARETUS A. WILDER.

No. 250.—*Improvement in Oil Presses.*

I claim, First, The pipes sliding into and out of stuffing-boxes, in combination with the pressing-plates, for the purposes and in the manner set forth. Second, I claim, in combination with the pressing-plates, the complete boxes or cases, formed on the surface of the plates, as shown; where the openings to the said boxes or cases for the entrance or exit of the substance to be pressed, are closed with the doors and caps as set forth, the cap sliding over and thus securing the doors when the press is brought into action. This combination, when used in connection with a horizontal-press, enables me to communicate and press the substance, and discharge the refuse or cake, without the use of bags or mats, and without handling, and at the same time to secure a perfect and free discharge of oil from the entire surface of the cake, through the metallic filterers and vertical-channels.

D. L. LATOURETTE.

No. 251.—*Improvement in attaching Mineral Vitrifiable Matter to Metal.*

What is claimed, is attaching mineral vitrifiable matter to metal by inserting a metallic tubular shank involving the characteristics of thinness, yet stiffness enough to resist lateral strain, elasticity, and

centre vent into the mineral vitrified matter, as herein described; so that the quantity of metal, in proportion to the bulk of mineral admissible in the case, being thus very small, the vitrified mineral enjoys the capacity to embrace and attach itself to the metal without any strain in or upon itself during its crystallization, the difference between the expansibility and contractility of the metal and the mineral, the one to the other, being also reduced below any practically injurious degree, that is to say, the glass being just as strong with as without such a shank. THOMAS G. CLINTON.

No. 252.—*Improvement in Utilizing Slags of Furnaces.*

What I claim is the process, substantially as described, of producing ware from the slag or scoria ejected from smelting furnaces for reducing iron, copper, zinc, and other metals by separating therefrom, and casting, moulding, blowing, or pressing the same in the heated state, as it comes from the smelting furnace, and then annealing, whether additional heat be applied or not, substantially as and for the purpose specified. And I also claim the method of obtaining slag or scoria from smelting furnaces in a vitrified state, fit for remelting, to be worked into ware, substantially as described, by casting it into thin sheets on to cold plates of metal, or other good conducting substances, as specified. WILLIAM H. SMITH.

No. 253.—*Improvement in Looms for Weaving Figured Fabrics.*

What I claim is, First, The combination of the angularly moving catch-bars, operated substantially in the manner described, with the shifting-hooks hung on the jacks, so as to vibrate independently thereof, for the purpose of connecting and disconnecting the jacks with the said catch-bars. Second, The method substantially as described, of combining and arranging the parts for turning the figuring chain or cylinder in either direction.

C. W. BLANCHARD.

No. 254.—*Improvement in Stuffing-Boxes.*

What we claim, consists in combining with a stationary stuffing or packing box, a cup or ring, or its equivalent, through which the piston rod or shaft passes and works so fitted, substantially as described, that the end thereof shall make a close joint, by means of end pressure at the bottom of the stuffing or packing box, and be free to slide thereon laterally, to follow the vibrations of the piston rod or shaft, as set forth. And we also claim making the inner bore of the cup conical, in combination with the cut metallic rings fitted thereto, substantially as described, so that by the application of end pressure, the cut rings shall be forced into close contact with the periphery of the piston rod or shaft, and the end of the cup into close contact with the bottom of the box as described, and thus effectually prevent the escape of steam

or other fluid, and at the same time permit the required lateral play, as set forth. THOS. W. ALLEN.
CHAS. W. NOYES.

No. 255.—*Improved Valves for Governors.*

What we claim is, the making the opening or openings, controlled by the governor valves of steam-engines, of gradually increasing capacity from the closed towards the open position, substantially in the manner and for the purpose specified. And we also claim interposing a spring between the valve cover and the set-screw, or its equivalent, which determines or sets the position of the face of the valve to its seat, so that the tension of the said spring shall resist the pressure of the steam on the valve cover, and thereby produce an increased flow of steam to the cylinders, substantially as specified. And we also claim the employment of the valve-lever, adjustable to the stem of the valve, in combination with a fixed indicator, substantially as specified, for the purpose of setting the valve in any required position, without opening the valve-box, as set forth.

JUNIUS JUDSON.
ALFRED JUDSON.

No. 256.—*Improvement in Portable Horse-Powers.*

What I claim is, such a wheel and axle, composed of a number of parts, arranged and connected substantially in the method herein described, so that the wheel can readily be taken apart and put together again, to facilitate the frequent removal of the horse-power from place to place, to bring it near the work on which it is to be used. I also claim connecting the segments of the rim of the horse-power by means of clamps, constructed as herein set forth.

JOHN A. TAPLIN.

No. 257.—*Improvement in Apparatus for opening Gates.*

What I claim is, First, Opening, closing, fastening, and unfastening the gate, by moving the bottom of the gate in an oblique direction, from and to the post upon which it is hung, as above specified. Second, I also claim the use of the pendulous and vertical levers *f f* and *i i*, and arms *g g* and *h h*, in combination with the hinges of the gate, the whole being operated and arranged substantially in the manner and for the purpose as above set forth.

SAMUEL G. DUGDALE.

LIST OF DESIGNS AND CLAIMS FOR 1853.

No. 540.—*Design for a Cooking Stove.*

We claim, and desire to secure by letters patent, the device, "Prairie Flower" on the front plate, the arrangement and configuration of the floral device ornamenting the side-door C, consisting of a full-blown central flower *e*, stems, foliage, and pendant flowers *g*, and the ornamental configuration of the smaller door D, as represented and described.

SHERMAN S. JEWETT.
FRANCIS H. ROOT.

No. 541.—*Design for a Wood Stove.*

We claim, and desire to secure by letters patent, the configuration and arrangement of the ornamental device on the side-plates of the stove, as represented and described. We also claim the ornamental design of the fire-door, as represented and described. We likewise claim the ornamental configuration of the bottom plate F, as described.

SHERMAN S. JEWETT.
FRANCIS H. ROOT.

No. 542.—*Design for a Cooking Stove.*

We claim, and desire to secure by letters patent, the configuration and arrangement of the ornamental design of the plate E, as described.

SHERMAN S. JEWETT.
FRANCIS H. ROOT.

No. 543.—*Design for a Cooking Stove.*

I claim the arrangement and combination of the represented ornaments, mouldings, panellings, and shapes in the above specified design for cooking stoves, substantially as shown.

JOSEPH G. LAMB.

No. 544.—*Design for a Cooking Stove.*

I claim the ornamental configuration or design, substantially as represented in the drawings and as described.

JOSEPH PRATT.

No. 545.—*Design for a Parlor Stove.*

I claim, and desire to secure by letters patent, the combination and arrangement of the ornamental forms and figures represented in the drawings, and forming together an ornamental design for a parlor stove.

JAMES A. CONKLIN.

No. 546.—*Design for a Sewing-Bird.*

I claim the design represented by the feathered bird on the wing, bearing a burden upon its back.

CHAS. WATERMAN.

No. 547.—*Design for a Cradle.*

I claim, and desire to secure by letters patent, the design and configuration of the ornaments described and set forth, forming together an ornamental design for a horological cradle.

ALEX. EDMONDS.

No. 548.—*Design for a Bust for Daniel Webster.*

I claim, and desire to secure by letters patent, the new design of a bust of Daniel Webster, of colossal size, as represented in the drawing.

T. BALL.

No. 549.—*Design for a Water-Cooler.*

We claim, and desire to secure by letters patent, the design and configuration of the ornamental water-cooler, described and set forth in the accompanying drawing.

EDWARD M. MANIGLE.
GEORGE PHIPPS.

No. 550.—*Design for a Clock-Case Front.*

I claim the design and configuration of the plate shown in the drawings, forming the front of a clock-case.

CHAS. CHINNOCK.

No. 551.—*Design for a Clock-Case Front.*

I claim, and desire to secure by letters patent, the design and configuration of the metal plate represented fully in the drawings, the same forming the front of a clock-case.

CHAS. CHINNOCK.

No. 552.—*Design for a Clock-Case Front.*

I claim the design and configuration of the plate as described and represented, forming the front of a clock-case.

CHAS. CHINNOCK.

No. 553.—*Design for a Cooking Stove.*

I claim, and desire to secure by letters patent, the combination and arrangement of the ornamental forms and figures, represented and forming together an ornamental design for a cooking stove.

JACOB BEESLEY.

No. 554.—*Design for a Cooking Stove.*

I claim, and desire to secure by letters patent, the configuration and arrangement of the ornaments in bas relief, on the front plates A and D, feed door B, curved surface E, doors C and F, panels G, and legs K and L, forming a new and original design for a cook stove, denominated the "Victor Complete."

S. H. SAILOR.

No. 555.—*Design for Girandoles, Candelabra, &c.*

I claim, and desire to secure by letters patent, the combination and arrangement of the ornaments as described and set forth, to form an ornamental design for girandoles, candelabra, &c.

ROBERT E. DEITZ.

No. 556.—*Design for Ladies' Hair Combs.*

I claim, and desire to secure by letters patent, the design and configuration of the series of loops forming the chains, as described and represented.

JEREMIAH HILLS.

No. 557.—*Design for a Portable Range.*

We claim, and desire to secure by letters patent, the design and configuration of the mouldings and ornamental work as described, forming an ornamental design for a portable range.

GARRETTSON SMITH.
HENRY BROWN.

No. 558.—*Design for a Cooking Stove.*

I claim, and desire to secure by letters patent, the configuration and arrangement of the ornaments in bas-relief, upon the doors A, B, C, and D, side-plates F, bed-plate K, back W, and feet P, as described, forming a new and original design for cook stoves, designated as "The Capitol."

S. H. SAILOR.

No. 559.—*Design for a Portable Range.*

I claim, and desire to secure by letters patent, the configuration and arrangement of the ornaments and mouldings upon the plate B, door A, and foot C, as set forth, forming a new and original design for the front of a portable range.

JOHN C. SMITH.

No. 560.—*Design for a Grate Frame.*

I claim, and desire to secure by letters patent, the combination and arrangement of the figures, flowers, and ornaments represented, the whole forming an ornamental design for a grate frame.

JAMES L. JACKSON.

No. 561.—*Design for a Grate Frame.*

I claim, and desire to secure by letters patent, the combination and arrangement of the figures, flowers, and ornaments represented, the whole forming an ornamental design for a grate frame.

JAMES L. JACKSON.

No. 562.—*Design for a Grate Frame.*

I claim, and desire to secure by letters patent, the combination and arrangement of the figures, flowers, and ornaments represented, the whole forming an ornamental design for a grate frame.

JAMES L. JACKSON.

No. 563.—*Design for a Grate Frame and Summer Piece.*

I claim, and desire to secure by letters patent, the combination and arrangement of the figures, flowers, and ornaments represented, the whole forming an ornamental design for a grate frame and summer piece.

JAMES L. JACKSON.

No. 564.—*Design for a Cooking Stove.*

I claim, and desire to secure by letters patent, the configuration and arrangement of the ornaments in bas-relief, and mouldings on the front-plate P, side-plates H, back-plate X, base-plate V, oven-doors A and D, door and panel F, feed-doors K, draft-doors M, and feet P′, as set forth and described, forming a new and ornamental design for the cook stove designated as the "New World."

S. H. SAILOR.

No. 565.—*Design for a Cooking Stove.*

I claim, and desire to secure by letters patent, the configuration and arrangement of the ornaments in bas-relief, and mouldings on the doors A, E, and F, plates C and S, and feet U and V, as set forth and

described, forming the ornamental design of the cook stove designated as the "Enchantress."

JULIUS HOLZER.

No. 566.—*Design for a Cooking Stove.*

I claim the ornamental configuration or design as exhibited in the drawings.

E. F. ROBINSON.

No. 567.—*Design for a Parlor Stove.*

I claim, and desire to secure by letters patent, the combination of mouldings and ornaments, as arranged in the parlor stove D, the whole forming an ornamental design.

SAMUEL D. VOSE.

No. 568.—*Design for a Cooking Stove.*

We claim, and desire to secure by letters patent, the design and configuration of the ornaments for a cooking stove, as described and shown in the drawings.

ANTHONY J. GALLAGHER.
JOHN J. BAKER.

No. 569.—*Design for a Jamb or Side-Plate for a Cook-Stove.*

What I claim, and desire to secure by letters patent, is the ornamental design and configuration of jamb-plate for a cook-stove, such as herein described and represented in the annexed drawing.

JOHN T. DAVY.

No. 570.—*Design for a Stove-Plate.*

What I claim, and desire to secure by letters patent, is the ornamental design of a stove-plate, substantially as described.

JOHN SABEY, JR.

No. 571.—*Design in Cook-Stoves.*

What I claim, and desire to secure by letters patent, is the ornamental design in bas-relief upon the doors B C D and F, and plates A P K and E, of the configuration and arrangement set forth.

EVERARD BOLTON.

No. 572.—*Design of Elevated Oven and Cook-Stove.*

What I claim, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove plates, as described.

N. S. VEDDER.

No. 573.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the combination of mouldings and ornaments as arranged in the cooking stove A, the whole forming an ornamental design.

SAML. D. VOSE.

No. 574.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the combination of mouldings and ornaments as arranged in the cooking stove B the whole forming an ornamental design.

SAML. D. VOSE.

No. 575.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the combination of mouldings and ornaments as arranged in the cooking stove C, the whole forming an ornamental design.

SAML. D. VOSE.

No. 576.—*Design for a Parlor Stove.*

What I claim, and desire to secure by letters patent, is the combination of mouldings and ornaments as arranged on the parlor stove E, the whole forming an ornamental design.

SAML. D. VOSE.

No. 577.—*Design for a Register Face.*

What I claim, and desire to secure by letters patent, is the new and original design for a register face, formed by the peculiar arrangement of the metallic bars, as shown in the drawing.

JAMES COWLES.

No. 578.—*Design for the Half-Plate of a Waffle-Baker.*

I claim the design for the waffle plate or mould, substantially as exhibited.

NATHL. WATERMAN.

No. 579.—*Design of Cook-Stove.*

What we claim, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove plates, as described.

JAMES J. DULLEY,
SAMUEL PIERCE.

No. 580.—*Design for a Cooking Stove.*

What I claim, and desire to have secured to me by letters patent, is the new design consisting of the flower work and ornamental figures,

composed of the raised leaves and spear heads as described, for the front, side, and back plates of a cooking stove.

JOHN MASON.

No. 581.—*Design of Cook-Stove.*

What I claim, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove, as described.

JAMES J. DULLEY.

No. 582.—*Design for a Lady's Sewing-Bird.*

What I claim, and desire to secure by letters patent, is the design and configuration of the sewing-bird at rest, as described.

JULIUS E. MERRIMAN.

No. 583.—*Design for the Plates of a Parlor Stove.*

What I claim, and desire to secure by letters patent, is the combination and arrangement of the ornamental forms and figures represented in the drawing, forming together an ornamental design.

ELIHU SMITH.

No. 584.—*Design for a Stove.*

What I claim, and desire to have secured by letters patent, is the combination and arrangement of the ornamental forms and configurations, forming an ornamental design for a stove as described.

HOSEA H. HUNTLEY.

No. 585.—*Design for a Cooking Stove.*

What I claim, and desire to have secured by letters patent, is the combination and arrangement of the ornamental forms and configurations of a cooking stove, forming an ornamental design as described.

HOSEA H. HUNTLEY.

No. 586.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the design and configuration of the mouldings and ornamental work, as described.

THOMAS BARRY.

No. 587.—*Design for a Cooking Range.*

What I claim, and desire to secure by letters patent, is the design and configuration of the moulding and ornamental work, as described.

REUBEN H. N. BATES.

No. 588.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the design and configuration of the ornaments and mouldings described.

JULIUS HOLZER.

No. 589.—*Design for a Sewing-Bird.*

What we claim, and desire to secure by letters patent, is the design of an entire bird in a sitting posture, constituting an ornamental design for a sewing-bird.

ALLEN GEROULD,
JOHN H. WARD.

No. 590.—*Design for a Statuette of Daniel Webster.*

What I claim, is the new design for a statuette of Daniel Webster, as described.

THOMAS BALL.

No. 591.—*Design for a Cooking Stove.*

What I claim, and desire to secure by letters patent, is the design and configuration of the ornaments for a cooking stove.

JOHN W. VAN CLEVE.

No. 592.—*Design in Stoves.*

What I claim, and desire to secure by letters patent, is the configuration and arrangement of the ornaments in bas-relief and mouldings on the plates A B C D and E, and door F, forming a new and ornamental design for a stove, called the "Seven-Plate Stove."

S. H. SAILOR.

No. 593.—*Design for a Cast-Iron Frame for a Milk Stool.*

What I claim, and desire to secure by letters patent, is the ornamental design and configuration of a milk stool, as described.

P. A. PALMER.

No. 594.—*Design in Cook-Stoves.*

What I claim, and desire to secure by letters patent, is the configuration and arrangement of the ornaments, in bas-relief and mouldings, on the plates A H X, doors B and C, oven door I, and foot B′, as described, forming a new and original design in cook-stoves.

FREDERICK SHULTZ.

No. 595.—*Design in Stoves.*

What we claim, and desire to secure by letters patent, is the configuration and arrangement of the mouldings and ornaments on the front, top, and base of the stove, together with the form and configuration of ornaments on the front and urn, forming a new and original design.

GARRETTSON SMITH,
HENRY BROWN.

No. 596.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the raised shield B *a*, the raised shield B′ *i*, the lance border A *b c*, the scrolls *d e*, and the borders *f g h*, forming an ornamental design for a stove.

S. W. GIBBS.

No. 597.—*Design in Stoves.*

What I claim, and desire to secure by letters patent, is the design, configuration, and arrangement of the mouldings, panels, and ornaments on the front, back, and side plates of the stove.

W. P. GRAY.

No. 598.—*Design for Bedsteads.*

What I claim, and desire to secure by letters patent, is the design, configuration, and arrangement of the several ornaments and mouldings on the posts, rails, head, foot, and side-boards and cornice, as fully set forth, forming a new and original design for bedsteads.

JOHN H. BARTH.

No. 599.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the use of the ornaments and null mouldings described.

JULIUS HOLZER.

No. 600.—*Design for Stoves.*

What I claim, and desire to secure by letters patent, is the design and configuration of the ornamental screen and standards, and the combination of the same with the ornamental base and the cylinder, as described.

GEO. H. TRYDAY.

No. 601.—*Design for Stoves.*

We claim as our invention, and desire to secure by letters patent, the design and configuration of the mouldings and ornamental work, as described.

GARRETTSON SMITH,
HENRY BROWN.

No. 602.—*Design for a Cooking Stove.*

What I claim, and desire to have secured by letters patent, is the combination and arrangement of the ornamental forms and configurations of a cooking stove, as represented and described.

HOSEA H. HUNTLEY

No. 603.—*Design in Stoves.*

We claim, and desire to secure by letters patent, the design, configuration, and arrangement of the ornaments in bas-relief and mouldings, forming a new and original design.

GARRETTSON SMITH,
HENRY BROWN.

No. 604.—*Design for Metallic Coffins.*

What I claim, and desire to secure by letters patent, is the design of the shape and configuration of the coffin, as described.

THEODORE J. GILLIES.

No. 605.—*Design for a Cooking Stove.*

What I claim, is the general ornamental design of the stove, as shown in the side and front plates *c d* and L, including the legs: and separately I claim the ornamental design of the oven door E, that of each of the front doors A B, that of the doors O, that of the door F, and that of the panel B.

N. P. RICHARDSON.

No. 606.—*Design for Furnace Register.*

What I claim, and desire to secure by letters patent, is the design, configuration, and arrangement of the ornaments in bas-relief, on the slide *a* and plate *b*.

JOSEPH A. READ.

No. 607.—*Design for a Parlor Stove.*

I not only claim the ornamental design of the blower, but that of the fire-place front.

WINSLOW AMES.

No. 608.—*Design of Parlor Stove.*

What we claim, and desire to secure by letters patent, is the ornamental design and configuration of parlor-stove plates, as described.

EZRA RIPLEY,
N. S. VEDDER.

No. 609.—*Design of Cook-Stove.*

What I claim, and desire to secure by letters patent, is the ornamental design and configuration of cook-stove plates, as described.

N. S. VEDDER.

No. 610.—*Design for an Instrument for holding Ladies' Sewing Work.*

What I claim, and desire to secure by letters patent, is the device

or design of a butterfly bending over a flower, when adapted and arranged for an instrument for holding sewing or other like work.

JOHN LANE.

No. 611.—*Design for Elevated Oven Cooking Stoves.*

I disclaim all other or further claim in the premises, beyond the design set forth.

S. F. MOORE.

No. 612.—*Design for a Cooking Stove.*

I claim the ornamental design of the side-plate of the body of the stove, and of each of the larger and smaller doors of either the front or side plates.

WINSLOW AMES.

No. 613.—*Design of Parlor Stove.*

We claim, and desire to secure by letters patent, the ornamental design and configuration of parlor-stove plates, as described.

JAMES WAGER,
VOLNEY RICHMOND,
HARVEY SMITH.

No. 614.—*Design for a Cylinder Coal-Stove.*

We claim, and desire to secure by letters patent, the design and configuration of the plates, as described.

JAMES WAGER,
VOLNEY RICHMOND,
HARVEY SMITH.

No. 615.—*Design for a Hall Stove.*

I claim, and desire to secure by letters patent, the ornamental design or pattern for a stove, substantially as described.

WILLIAM RESOR.

No. 616.—*Design for a Frame for a Foot-Stool.*

What I claim, and desire to secure by letters patent, is the new design for the frame of a foot-stool or ottoman, consisting in the ornamental figures set forth.

CHARLES ZEUNER.

No. 617.—*Design for a Frame for a Foot-Stool.*

What I claim, and desire to secure by letters patent, is the new design for the frame for the foot-stool or ottoman, consisting in the ornamental figures set forth.

CHARLES ZEUNER.

No. 618.—*Design for a Laundry Stove.*

I claim, and desire to secure by letters patent, the described ornamental pattern or design for a laundry stove.

WM. RESOR.

No. 619.—*Design for Dining-Room Stoves.*

We claim, and desire to secure by letters patent, the figures, scrolls, and mouldings, forming an ornamental design for dining-room stoves.

CONRAD HARRIS,
PAUL W. ZOINER.

No. 620.—*Design for Coal Cooking-Stoves.*

We claim, and desire to secure by letters patent, the ornamental design for a stove, as described.

CONRAD HARRIS,
PAUL W. ZOINER.

No. 621.—*Design for a Stand for Shovel and Tongs.*

What I claim, and desire to secure by letters patent, is the new design for a stand for shovel and tongs, consisting in the ornamental figures set forth.

CHARLES ZEUNER.

No. 622.—*Design for a Stand for Shovel and Tongs.*

What I claim, and desire to secure by letters patent, is the new design for a pair of shovel and tongs' stands, consisting in the ornamental figures set forth.

CHARLES ZEUNER.

No. 623.—*Design for Cannon Stove.*

I claim the ornamental design or pattern for a stove, substantially as described.

WM. RESOR.

No. 624.—*Design for Cooking Stove.*

We claim, and desire to secure by letters patent, the ornamental design for a stove, as represented in the drawings.

CONRAD HARRIS,
PAUL W. ZOINER.

No. 625.—*Design for Cooking Stoves.*

I claim, and desire to secure by letters patent, the ornamental design for a stove, as represented in the drawings.

PETER SEIBERT.

ADDITIONAL IMPROVEMENTS.

No. 104, to original Letters Patent, No. 5438.—*For improvement in Organ Pianos.*

What I claim as my invention, and desire to secure by letters patent, is the application to an organ piano of a series of strings upon a frame, or both sides of a sounding-board, which shall produce a diminuendo $>$ termination, and add volume, power, or purity to the tones made, as herein described, or in any other mode substantially the same, for the purposes set forth.

RUFUS NUTTING, 2d.

No. 105, to original Letters Patent, No. 5630.—*For improvement in Machines for separating Straw from Grain.*

Having thus fully set forth, in addition to the original *patented* specification, the importance and utility of my said additional improvements, and having referred thereto by diagrams, explanations, and letters of indication, what I designate as new and original with myself, and desire to secure by letters patent of the United States, is as follows:

First, I claim the peculiar construction of the rotary apparatus formed of concavo-convex aprons or shields *a b c d*, combined with the curved prongs *e f g h*, the said rotary apparatus, fig. 5, used in combination with the threshing-cylinder H, fig. 1, specifically as set forth.

Second, I claim setting the spout E at about an angle of 45 degrees with the horizon, and adding the escape-pipe B, to prevent the grain from flying about.

ELISHA S. SNYDER.

No. 106, additional to original, No. 9579.—*For improvement in Winnowers and Threshers.*

I claim the constructing of the suction pipe or tube *c c c*, of any desired form, with a sliding hinged flap-bottom *s s s*, fig. 2, attaching said tube to the side of the thresher or winnower, in any position, and also attaching said pipe or tube to the grain discharge or bagging-spout *f f*, having a sieve-like or reticulated bottom *q q q q q*, fig. 3, and using said attachment in combination, for the purpose of cleaning and chaffing or double winnowing grain of all kinds, with a blowing blast of air, and a suction draught or current of wind, also in combination and in one operation, and at the same time for the purpose specifically, as hereinbefore fully set forth.

I do not, however, claim inventing or originating the double cleaning of grain, but simply the peculiar combination above mentioned.

GEO. F. S. ZIMMERMAN.

DISCLAIMERS.

For improvement in making Lamp-Black.

Your petitioner, therefore, enters his disclaimer to so much of said claim as includes the process of burning lamp-black in a confined building, when such process is not carried on by the arrangement and combination of furnace and confined room, substantially as described in said letters patent.

R. S. CHILD.

For improvement in Spark-Arresters.

Your petitioners, therefore, enter their disclaimer to so much of the said claim as includes the separation of sparks by means of centrifugal force, or by means of tangential shutes, when such separation is not effected by means of the combined operation of a central chamber, a series of central tangential openings, and a larger circular chamber furnished with a series of openings J J into exterior chambers, said openings being so arranged as to extend throughout or nearly throughout the vertical extent of the walls of such larger chamber.

E. R. BENNET.
JAMES RADLEY.
J. W. HUNTER.

For Machinery for making Mouldings.

Your petitioner, therefore, hereby enters his disclaimer to all that part of the claim in the aforenamed specification, excepting to the combination of the rollers or rings, so constructed as to be adjustable and adapted to varying irregular forms of material to be operated upon, after the same has been sawed or cut as nearly as practicable to the general form of the moulding to be made, so as to act only or most strongly upon those parts of the material from which most is to be taken off, substantially as in the specification is described, with one or more cutters or planes, whether rotating or stationary, for giving the proper form or dressing to the moulding as described, for the purpose of economizing the material and facilitating the operation; which disclaimer is to operate to the extent of the interest in the said letters patent vested in your petitioner.

JOHN LAWRENCE.

For improvement in Fire-arms, and in the apparatus used therewith.

Your petitioner, therefore, hereby enters his disclaimer to that part of the claim in the before-mentioned specification which is in the following words, viz.: "I claim making the aperture through the tubes or nipples (which receive the percussion caps) conical or funnel shaped, for the purpose of freely admitting the fire from the percussion cap, and concentrating it as it enters the chamber,"—which disclaimer is to operate to the extent of the interest in said letters patent vested in your petitioner.

SAM. COLT.

For alleged improvements in Seal-Presses and Metallic Boxes.

Your petitioner, in conjunction with Platt Evens, Jr., made application for letters patent for certain alleged improvements in seal-presses and metallic boxes or bushing therefor, and that so much of said improvements as entitled your petitioner to be a joint inventor with said Evens, has been excluded from the claims under said application, and make no part of the subject of letters patent granted upon the same on the 28th day of June, 1853, whereby your petitioner, having no right or title to be considered joint inventor or joint patentee with said Evens, hereby disclaims all right, title, and interest in said invention or improvement and patent as joint inventor or patentee, and prays that this disclaimer may be entered of record in the Patent Office.

JAMES FOSTER, JR.

EXTENSIONS.

Improvement in Excavators.

What I claim is the application of power to force the scraper forward against a bank in the act of excavating, and to withdraw it at pleasure, by the aid of a barrel, chains, and other apparatus, constructed and operating substantially in the manner herein described, by which its sudden recoil will be prevented when it encounters any unusual resistance; and this I claim, whether the apparatus be arranged exactly in the manner set forth, or in any analogous way by which the same result will be attained. I claim also the general combination of the friction belt around the pulley upon the shaft K, and the apparatus for tightening the same, or of allowing it to run loose, for the purpose and in the manner described.

WM. S. OTIS.

Improvements in Steam-Boilers and Steamboats.

I claim as my invention, and desire to secure by letters patent, the manner in which I have combined and connected the common safety-valve with the apparatus which is to operate by the melting of the fusible alloy, this apparatus being constructed and operating substantially in the manner set forth; by which arrangement the safety-valve is left free to be opened by the pressure of steam, in the ordinary way, whilst it will also be opened by the safety apparatus from the influence of temperature alone, independent of pressure from the elasticity of the steam.

I lay no claim to the use of the fusible alloy to allow the escape of steam, but only to the combination in which I have used it as set forth.

Second, I claim the manner in which I have combined the float with the valves, which it is intended to open in the outside boilers of any series, so as to cause a horn to sound on one side, and a whistle on the other, or by its escape to produce two different distinctive and characteristic sounds, which shall give information when the water has descended on either side to a point as low as it can be safely allowed to descend.

I do not claim the causing of a horn, whistle, or other instrument to sound from the escape of steam, but only the combination and arrangement of the parts as described, so as to afford the desired information in the manner set forth.

I claim the manner in which I have arranged the water-level or level whose indications are governed by any other fluid adapted to the purpose, by which arrangement and combination as set forth, that is to say, the water level resting on the boilers independently of the woodwork of the boat, and extending up into the cabin, where it is made to show the level of the water in the boiler by the co-operation of the apparatus last described, namely, the apparatus for sounding a horn or a whistle, and affording by their conjoint action a knowledge of the height of water in the boilers respectively.

I do not claim the water-level alone, but only as arranged and combined by me, as described.

I claim the particular apparatus for extinguishing the fire as herein set forth, operating by means of the fusible alloy apparatus, substantially as described.

And, lastly, I claim the arrangement and application of the apparatus for preventing the careening of a steamboat at a wharf, pier, landing, or other stopping-places. I do not claim the giving motion to a vertical timber or to a sliding apparatus by means of a rack and pinion gearing, this being a well-known device, but confine my claim in this particular case to the combining and employing of this apparatus with a steamboat, by which a new and important result is attained. CADWALLADER EVANS.

Improvement in the Mode of supplying Heated Air to Furnaces.

What I claim as my invention, and desire to secure by letters patent, is the employment of a box or receptacle constructed in the manner set forth, and which is to contain a stratum of pebble stones, or of any other material which will leave interstices through which air may be forced to pass, but which will have the effect of producing pressure within the furnace, supplied with air from any suitable blowing apparatus; and in which furnace the air is to be forced into a closed ash-pit, the whole being combined and arranged substantially in the manner set forth. I also claim the mode described of forcing in with the atmospheric air a portion of that which has previously passed through the fire, by which means it is made to enter in consequence of the pressure to which it is subjected. I claim likewise the manner of shutting off the draft from the blowing apparatus by the opening of the door for feeding the fire, as set forth.

F. P. DIMPFEL.

Improvement in Cooking Stoves.

What I claim as my invention, and for which I desire to secure letters patent, is the extending of the oven under the apron or open hearth of the stove, and the combination thereof with the flues constructed as above specified, by which means I am enabled to obtain greater room for baking and other cooking purposes, and effect a greater saving of expense and fuel than in cooking stoves of the ordinary construction. DARIUS BUCK.

Improvement on Ships' Galleys for Distilling Fresh Water from Salt Water.

What I claim as my invention, and desire to secure by letters patent, is the generator of the peculiar form specified, in combination with a ship's galley, and also the constructing of a generator for distilling purposes, by making the sides of the galley double, so as to form a vessel for containing the salt water to be distilled.

ENOCH HUTCHINSON.

Improved mode of constructing Rake Teeth.

What I claim as my invention, and desire to secure by letters patent, is obtaining this elasticity more effectually for the use designated, by coiling the wire of which the teeth are made around the head of the rake, in the manner and for the purpose described.

HEZEKIAH HAYNES.

Improvement in the mode of making Boxes for Axles and Gudgeons.

What I claim as my invention, and desire to secure by letters patent, is the making of the boxes for axles and gudgeons, by the casting of hard pewter or composition metal of which tin is the basis into said boxes, they being first prepared and provided, or not, with rims or ledges, and coated with tin.

ISAAC BABBITT.

Improvement in Smut Machines.

What I claim as my invention, and wish to secure by letters patent, is the combination of the beaters with the fans, graters, and heads, constructed and operating as described.

LEONARD SMITH.

Improvement in the construction of Furnaces for Smelting Iron Ore.

What I claim as my invention, and desire to secure by letters patent, is, First, The arrangement of the fire-chambers or boshes opening into one horizontal flue above, in combination with the boiler for generating steam, and the pipes I I for heating the blast placed in said flue, the whole being constructed and operating as described. Second, The method of constructing the fire chambers by contracting them at the centre, and forming two boshes in each chamber, for causing the charge to descend gradually, so as not to obstruct the draft and prevent the ascent of the lighter substances, as before described.

AUGUST ROTH.

Improvement in the construction of Wooden or Frame Bridges.

What I claim as new, and desire to secure by letters patent, is,

First, The forming of the truss-frames of bridges by connecting and combining the string-pieces, posts, main and counter braces, and arch braces by the aid of gibs and keys, constructed as set forth, using therewith such bolts or treenails as I may deem proper.

Second, I claim the employment or use of the gibs and keys formed in the manner set forth, and passing through the string pieces and into the posts near their ends, for the purpose of trussing and straining the frame generally.

Third, I claim the manner of arranging the arch braces, so as to diminish or increase the camber of the truss-frames, by the employment of gibs and keys passing through those portions thereof which constitute the lower parts of said arch braces.

Fourth, I claim the construction and employment of a bearing or step of cast-iron, furnished with lugs or tuscums which are let into corresponding notches in the head and foot of the main braces and the posts, in the manner and for the purpose set forth.

STEPHEN H. LONG.

Improvement in the construction of Fan Blowers.

What I claim as my invention, and desire to secure by letters patent, is inclosing the vanes of the wind-wheel with circular sides or rims, between which and the outer case there is a space *i i* left, as described, and attaching a collar to said sides or rims, to admit air to the revolving vanes as shown at *d d*, said collars being made to run air-tight in the manner set forth, to prevent the escape of air from the space *i i*, the whole being constructed and arranged substantially in the manner set forth.

FR. P. DIMPFEL.

Improvement in the mode of constructing Sockets for holding Tools.

What I claim as my invention, is making the gripe with one end conical, and fitted to the outer end of the socket, and the other end provided with a screw fitted to a female screw in the other end of the socket secured in the handle, in the manner and for the purpose described; and this I claim, whether the gripe be made in two or more pieces, or in one piece and slit, all as described.

HERRICK AIKEN.

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS

VOL. 1, 1853

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS

VOL. 2, 1853

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OF THE

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FOR THE YEAR 1853.

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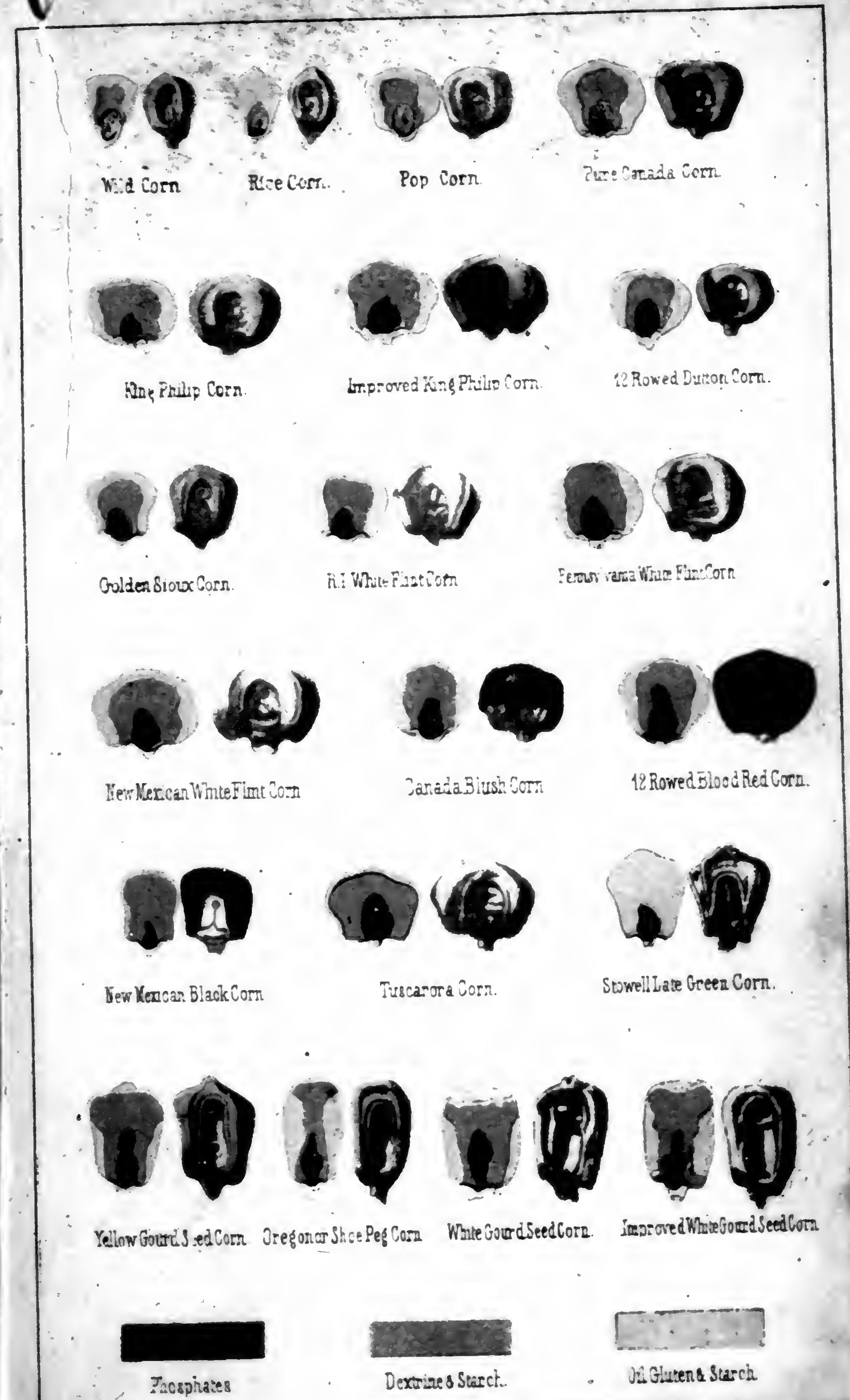

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LETTER

OF THE

COMMISSIONER OF PATENTS,

COMMUNICATING

The Agricultural portion of the Report of that Office for the year 1853.

MARCH 20, 1854.—Referred to the Committee on Patents, and ordered to be printed; and a motion to print 25,000 extra copies referred to the Committee on Printing.

MARCH 21, 1854.—*Resolved*, That there be printed by the printer of the House 100,000 extra copies of the Agricultural Report of the Commissioner of Patents, for the use of the members of the House, and 10,000 for the use of the Patent Office, together with the plates.

UNITED STATES PATENT OFFICE,
March 20, 1854.

SIR: Agreeably to the design of Congress, as indicated by the appropriation of the 3d of March, 1853, for the collection of agricultural statistics and purchase of seeds, I have the honor to submit herewith the agricultural portion of my annual report.

I am, sir, very respectfully, your obedient servant,

CHARLES MASON, *Commissioner.*

Hon. LINN BOYD,
Speaker of the House of Representatives.

PRELIMINARY REMARKS.

In the preparation of this volume, as well as in the other duties incumbent upon this Bureau, it has been the object to promote, as far as practicable, the paramount interests of the farmers and planters of the United States in the improvement of their crops and live stock; the introduction of new and valuable products; the amelioration of the exhausted and unimproved soils of the States lying along the seaboard and the Mexican gulf; in developing the agricultural resources of those bordering on the Pacific, the Mississippi and its tributaries, the Great Lakes, and the Canada frontier, thereby producing larger quantities, and of better quality, of our chief staples for export and domestic use.

In order more effectually to carry out the objects in view, various circulars have been sent to proper individuals in this country, as well as to our diplomatic and commercial agents, missionaries, officers of the navy, and other public functionaries abroad, for the purpose of disseminating and eliciting agricultural information, and for the procurement and distribution of cuttings and seeds. Through some of these agencies a species of "reciprocal exchange" of seeds, &c., has been established, and partially carried into effect, with all the principal countries of the globe.

Among the foreign products which have been more recently introduced and distributed, and which appear to be adapted for profitable cultivation, we would instance the Cuba tobacco seed from Vuelta de Abajo; the alfalfa from Chili; peas from Japan; frijoles, or turtle-soup beans, from Mexico; butter beans from Russia; duorra corn from St. Martin; cotton seed from Navigator's island and Cape Haytien; winter rape from France; and quinoa from Peru. Among those of indigenous growth, which have been selected and distributed in reference to their superior qualities, as well as to their probable adaptedness to certain parallels and localities, there may be noticed, among the corn, the jet black and the white flint varieties of New Mexico; the improved King Philip of New Hampshire; the mammoth sweet of Connecticut; the sugar corn of Pennsylvania; Stowell's late green of Ohio; the large yellow-gourd seed of Kentucky and Missouri; the Oregon of the District of Columbia; the improved white-gourd seed of Virginia; the Ward corn of North Carolina, and the Canada blush from New York;

also, the wild pea of Oregon; the purple clover, the potato, and bald barley of California; the wild plum of New Mexico; tea nuts of South Carolina; Persian walnuts of Washington and Virginia; and the fowl meadow grass of Maine.

Among the products proposed to be introduced from abroad, are rice and the soja bean of Japan, the latter of which is used for making the celebrated "Soy sauce;" wheat and barley of Australia, Chili, Mexico, the Cape of Good Hope, Teneriffe, Poland, Bavaria, the Dardanelles, Egypt, Algeria, Sicily, Majorca Iviça, and the south of Spain; spelt, vetches, lentils, and spurry of Prussia; winter flax, for autumn sowing, of Russia; furze, for prairie hedges, of England; the sainfoin of France; the carob tree, white lupin, chick pea, chufa, grass hemp, and melons of Spain, the latter of which are proverbial for their sweetness, and one variety for the property of winter keeping; the Gondar and Ifat cotton of Abyssinia, growing to the height of 8,000 feet above the sea; the Kaddack cotton of Cashmere, noted for its hardy growth; the rose apple of St. Helena; the jujube plum, pistacio nut, and sweet-acorned and cork-barked oaks of Algeria; peach-stones of New Zealand, Buenos Ayres, and Teneriffe, famous for the large size and lusciousness of the fruit; apricot stones and strawberry seed of Chili, which grow to an enormous size; the deodar cedar, walnut, Sinhara, or edible water nut, and the crocus saffron of Cashmere; and the seeds of the yerba maté or tea of Paraguay.

In connexion with this Bureau, an agricultural or industrial cabinet has been commenced, and already contains numerous varieties of seeds, insects injurious to vegetation, models, paintings of animals, &c. Among the seeds are samples of Indian corn, in the ear, from more than one hundred different localities between Maine, New Mexico, and the far West, which are regarded with interest, not only from their variety, but for their utility in serving as guides in the selection of seeds. Similar collections would also prove useful of our Cereal grains, rice, tobacco, cotton, hemp, flax, as well as the seeds and products of other plants and trees; or samples of silk, wool, cochineal, soils, natural and artificial fertilizers, and models of agricultural implements and machines.

CONTENTS.

DOMESTIC ANIMALS,

BY D J. BROWNE.

In considering the social conditions of nations long congregated and civilized, and necessarily existing under the impulses of utilitarianism, it is not surprising that man, whether possessing a permanent abode, or having emigrated to a distant land, should become attached to those animals which have proffered to him their perfect obedience, sagacity, courage, strength, and other kind offices, and should regard them with admiration, gratitude, and even affection. Such, doubtless, was the case with most of the early adventurers who sought a new home on our shores, and brought with them those animals which would render them the most assistance or protection, and subserve the best purposes for labor, pleasure, clothing, and food.

Some of the principal facts relative to the introduction, increase, breeding, and management of the domestic animals of the United States will be found under their respective heads, as follows:

HORNED CATTLE.

The first cattle brought to America from Europe were imported by Columbus in his second voyage, in 1493. He left Spain as admiral of seventeen ships, bringing a collection of trees, plants, and seeds of various kinds, a number of horses, a bull, and several cows.

The Portuguese took cattle and swine to Newfoundland and Nova Scotia in the year 1553. Thirty years after, they had multiplied to such an extent that Sir Richard Gilbert attempted to land there to obtain supplies of cattle and hogs for his crew, but was wrecked.

Cattle and other domestic animals were brought into Acadia by M. L'Escarbot, a French lawyer, in 1604, the year that country was settled. In 1608, the French extended their settlement into Canada, and soon after introduced various animals.

The first cattle introduced into Virginia was previous to 1609. In 1610, Sir Ralph Lane brought cows to that colony from the West Indies. The same year an edict was issued prohibiting the killing of domestic animals of any kind on penalty of death to the principal, burning the hand and loss of the ears to the accessary, and twenty-four hours' whipping to the concealer. In 1611, Sir Thomas Gates

brought into the same settlement one hundred cows, besides other cattle. The number of horned cattle in Virginia in 1620, was about five hundred; in 1639, thirty thousand; in 1648, only twenty thousand, including bulls, cows, and calves.

The first cattle introduced into the Plymouth colony were imported by Edward Winslow in the ship "Charity," in 1624, consisting of three heifers and a bull. From other accounts, they came in the ship "Ann," which made her first voyage in 1623. In 1626, twelve cows were sent to Cape Ann, and thirty more in 1629. In 1627, the cattle and goats of the "Plymouth Company" were divided among the colonists in a manner to remain for ten years, the old stock to be kept for common, and the new animals to be appropriated to their own use. Among them are mentioned "black heifers," "black cows," "red cows," and a "white-backed cow." In 1629, one hundred animals were imported under the direction of Francis Higginson, formerly of Leicestershire, for the "Governor and Company of Massachusetts Bay in New England," among which were sixty or seventy oxen and cows. Most of the latter arrived safe. Owing to the loss of cattle by the Indians and wolves, and the expenses of importation and keeping, the price at first was so high as to put them beyond the reach of many of the colonists. A red calf, however, soon became cheaper than a black one, on account of the greater probability of its being mistaken for a deer and killed by the wolves. In 1636, when cows were so high as to be sold from £25 to £30 each, and oxen for £40 a pair, a quart of new milk or four eggs could be bought for a penny; a pound of butter for 6*d*; and a pound of Cheshire cheese for 5*d*.

The first cattle introduced into New Hampshire were from Denmark, procured by Captain John Mason and his associates, in about the year 1631 or 1632, to stock their plantations, and to become employed in drawing lumber. These cattle were of a large size and of a yellowish color. The calves were allowed to run with their dams at pleasure. Their owners were ambitious to be distinguished by the strength and size of their oxen, on which bets and prizes were often made. This breed of cattle remained pure and unmixed near Agamenticus, in Maine, down to about the year 1820. In 1645, they had so multiplied that one hundred oxen belonging to Mason's plantation, near Portsmouth, were driven to Charlestown, Massachusetts, and there sold for £20 a head. In 1652, the number of cattle in Charlestown was four hundred. In the inventory of Piscataqua and Norridgewock, in 1635, there were two bulls, twenty-four cows, twenty-two heifers and steers, and ten calves. In 1636, one hundred and sixty cattle were driven from Newton, Massachusetts, to Hartford, Connecticut, the emigrants feeding on their milk on the way.

The first importation into New Netherland was made from the island of Texel, in Holland, by the "Dutch West India Company," in 1625, comprising one hundred and three animals, consisting of horses and cattle for breeding. In 1637, an ox in that colony was worth from $32 to $56; in 1646, the price of a cow was from $20 to $48; a bull calf, $3 20; in 1650, a milch cow, with her second or third calf, was valued at $40. At this period of settlement, the West India Company

not only furnished each tenant with land, a house, barn, and farming implements and tools, but four cows, four horses, sheep, and pigs, for the term of six years, at the expiration of which he was required to return the number of animals received. The entire increase remained with each farmer, who was bound to pay yearly $40 and 80 pounds of butter, rent for the cleared land. Afterwards the cattle belonging to the company were distributed for some years among those who had no means to purchase stock.

Cattle were introduced into the settlements on the Delaware by the "Swedish West India Company," from Sweden, in 1627.

The first cattle introduced into Carolina were brought from England, by William Sayle, in 1670, to Old Charleston, on the south side of Ashley river. General Wade Hampton and Colonel William Singleton were both engaged in importing cattle, as well as horses, before the Revolution.

The Indians on the Red river, in Louisiana, possessed cattle as early as the year 1690.

Cattle were first brought to the Savannah settlement, in Georgia, by Oglethorpe, in 1732. Others were introduced into the same colony in 1735.

In 1750, the best dairy farms in Rhode Island contained upwards of one hundred cows, annually producing 100 loads of hay, and sold 13,000 pounds of cheese, besides butter, bullocks, and calves. On one farm seventy-three cows made 10,000 pounds of butter in five months. Two acres of good land sustained one cow.

In 1750, the French of Illinois were in possession of considerable numbers of cattle, horses, and swine.

In 1783, Messrs. Goff, Ringold and Patton, of Baltimore, sent an order to England for superior cattle, for the purpose of improving the breed in the United States; and in 1785, Mr. Patten, junior, carried a bull from that importation to Clarke county, Kentucky. Mr. Patton, senior, some time afterwards followed his son, taking with him another portion of the same lot of stock. This old bull, then eighteen years old, was sold at public auction for $133 33. Mr. Harrison, a brother-in-law of Mr. Patton, also carried a short-horned bull to the same county, in 1804. This is said to have been a very fine animal, and greatly improved the stock of that region. Messrs. Hutchcroft and Welton also carried another descendant of the short-horned stock to Kentucky from the same importation.

About the year 1797, a Mr. Heaton, of Dutchess county, New York, imported from England a short-horned bull, which was afterwards hired by General Morgan Lewis and others for public use in that county.

From entering at large and minutely on the circumstances connected with the importation of all the domestic animals brought into this country since the commencement of the present century, we are prevented as much by the want of the necessary information as by the immediate object and limited length of these papers. We will, therefore, leave the subject for a future occasion, after giving a short sketch of the other animals early introduced, and the statistics of the animals and their products exported at various periods of our history.

Among the early exports of cattle and beef from this country may be noted those shipped from Savannah, in Georgia, in 1755, which consisted of 16 steers and 40 barrels of beef. In 1770, there were exported from the same place 28 steers and cows, 639 barrels of beef, and 4,985 pounds of tallow. In 1772, there were shipped from that port 136 steers and cows. The amount of beef exported from Charleston, South Carolina, in 1747–48, was 1,764 barrels, besides 130 casks of butter; in 1754, 416 barrels; from Philadelphia, in 1752, 3,431 barrels; in 1767, 609 barrels; in 1796, 6,860 barrels. The amount of beef exported from the United States in 1791 was 62,771 barrels; in 1800, 75,045 barrels; in 1810, 47,699 barrels; in 1815, 13,130 barrels.

The number, quantities, and values of horned cattle and their products, exported from the United States within the last thirty-three years, are shown by the following table:

Years.	Cattle.	Beef.	Hides.	Tallow.	Value.	Butter.	Cheese.	Value.	Tallow candles.
	Number.	Barrels.	Number.	Pounds.	Dollars.	Pounds.	Pounds.	Dollars.	Pounds.
1820–21	5,018	66,887	13,558	81,691	698,323	1,069,024	766,431	190,287	1,453,628
1821–22	3,557	97,610	15,079	63,856	844,534	1,149,783	722,548	221,041	1,564,460
1822–23	2,865	61,418	42,499	735,333	739,461	1,171,701	591,689	192,778	1,682,917
1823–24	2,759	66,074	46,166	96,261	707,299	1,386,232	953,158	204,205	2,186,177
1824–25	3,095	88,025	56,043	533,451	930,465	1,442,197	1,230,104	247,787	2,336,408
1825–26	3,427	72,886	29,841	423,610	733,430	1,176,579	735,399	207,765	2,062,225
1826–27	3,768	90,685	22,883	301,983	772,636	1,148,480	641,385	184,049	2,236,397
1827–28	1,193	66,640	39,642	422,130	719,961	1,184,329	688,548	176,354	2,348,501
1828–29	2,044	51,100	44,282	491,106	674,955	969,137	918,695	176,205	2,522,975
1829–30	4,125	46,842	50,146	533,436	717,683	899,396	688,241	142,370	2,443,045
1830–31	5,881	60,770	299,473	679,623	829,982	1,728,212	1,131,817	264,796	2,669,211
1831–32	8,123	55,507	52,110	622,522	774,087	1,501,686	1,391,853	290,820	2,498,776
1832–32	6,837	64,322	58,179	676,841	958,076	1,346,364	1,213,092	258,452	2,410,385
1833–34	6,441	46,181	60,015	771,239	755,219	1,084,960	819,567	190,099	2,950,301
1834–35	7,348	38,028	41,495	491,412	638,761	684,624	887,000	164,809	2,503,883
1835–36	4,683	50,226	30,379	443,765	699,116	361,395	486,234	114,033	2,275,943
1836–37	3,237	28,076	112,096	168,795	585,146	281,939	411,338	96,176	1,606,424
1837–38	2,826	23,491	56,762	363,036	528,231	495,108	664,660	148,191	1,820,145
1838 39	1,775	16,189	33,852	118,037	371,646	424,609	519,017	127,550	1,310,008
1839 40	4,259	19,681	112,500	273,946	623,373	1,177,639	723,217	210,749	1,710,454
1840–41	7,861	56,537	45,898	980,027	904,918	3,785,993	1,748,471	504,815	2,145,845
1841–42	9,887	48,581	58,187	7,038,092	1,212,638	2,055,133	2,456,607	388,185	1,981,602
1842–43	5,181	37,812	50,340	7,489,582	1,092,949	3,408,247	3,440,144	508,968	1,998,357
1843–44	10,822	106,474	62,658	9,915,366	1,810,551	3,251,952	7,343,145	758,829	3,086,566
1844–45	5,252	101,538	111,636	10,022,504	1,926,809	3,587,489	7,941,187	878,865	3,490,736
1845–46	3,101	149,223	143,323	10,435,696	2,474,208	3,436,660	8,675,390	1,063,087	3,718,714
1846–47	3,383	111,979	181,394	11,172,975	2,434,003	4,214,433	15,637,600	1,741,770	3,094,985
1847–48	1,919	103,719	36,145	8,004,235	1,905,341	2,751,086	12,913,305	1,361,668	3,468,593
1848–49	2,607	103,286	23,390	9,334,138	2,058,958	3,406,242	17,433,682	1,654,157	3,170,109
1849–50	1,848	95,307	71,940	5,858,459	1,605,608	3,876,175	13,020,817	1,215,463	3,587,864
1850–51	1,350	90,648	86,624	8,198,278	1,689,958	3,994,542	10,361,189	1,124,652	3,227,633
1851–52	1,078	122,259	55,421	4,767,020	1,500,429	2,222,264	6,650,420	779,391	3,612,002
1852–53	1,076	126,041	25,955	3,926,598	2,214,554	2,658,911	3,763,932	862,343	2,772,188

According to the census returns of 1840, the number of horned animals in the United States was 14,971,586; of 1850, there were 6,385,094 cows, 1,700,744 oxen, and 9,693, 069 other cattle, one year old and older, (in the aggregate, 17,778,907;) showing an increase of 2,807,321. The present number of cattle may be estimated at 20,000,000, which, at $20 each, would amount to $400,000,000.

CONDENSED CORRESPONDENCE.

Statement of JOSEPH CORNISH, *of East Granby, Hartford county, Connecticut.*

This county has long been noted for its well-matched, fine working oxen, as well as for its cows. The Devon and Durham breeds have been so long in use here, that the common cattle of the country have almost disappeared.

The cost of raising until three years old is about $25 each. The usual price of a good pair of steers is from $60 to $100. One yoke under three years old sold for $125; another yoke for $175. Heifers are worth from $25 to $40 each; new milch cows, from $35 to $75 each.

Statement of T. L. HART, *of West Cornwall, Litchfield county, Connecticut.*

It is believed by our farmers that a given quantity of food will produce more meat when fed to half-bloods, or to the first cross between the Devons and Durhams, the Devons and Herefords, or the Devons and our common stock, than when fed to any full-bloods. It has also been found that the first cross or half-blooded animals is very beneficial, often producing progeny superior in most respects to either of the parents.

The cost of raising until three years old is $30 each; and our best Devon steers, well trained, will sometimes sell as high as $125 per yoke; the usual price is $60 to $80. The price of dairy cows in the fall is $20 to $30; in the spring, about $10 to $12 more.

Statement of ANTHONY M. HIGGINS, *of Wilmington, New Castle county, Delaware.*

As near as can be ascertained, about 1,800 head of cattle—average weight when fat about 700 pounds each—have been fed in this district, and sold at from $7 to $8 per hundred. It is estimated that about 2,500 head will be required to supply the wants of our farmers. Grazing is annually increasing, as we subdivide our fields for that purpose.

This year, cattle have been ruled unusually high, generally bringing from 50 to 100 per cent. on the investment, independent of the improved quality of the manure, especially when fed on corn-meal. Our supply is obtained from the west, yet our soil and climate are well adapted to rearing full-sized animals.

I raise my own oxen, which, when broken into yoke at three years old, with ordinary keeping, generally weigh from 1,000 to 1,200 pounds live weight. They are also very extensively used by our farmers. Sometimes they sell as high as $200 for a single pair. They are worked a year or two, and then fattened for show-beef. I recommend the Devon stock for working oxen; they are noted for their docility and quick gait, and are also very fair as to milking qualities.

Statement of J. E. McClung, *of Bloomington, McLean county, Illinois.*

Cattle raising is the great business of Illinois. The Durham is preferred to any other breed. The cost of raising a three-year-old steer is from $12 to $15, and brings from $18 to $25. A good dairy cow in the spring is worth $25, and the same animal in the succeeding fall from $15 to $18.

Statement of William J. Phelps, *of Elmwood, Peoria county, Illinois.*

In feeding cattle we adopt the Ohio and Kentucky system. The corn is cut and shocked in the field, whence it is hauled as needed to the feeding lots, which are changed and alternated from day to day, the cattle being followed by three or four times the number of hogs, which are wintered in the best manner upon the excrement and waste. By remaining on the stalk, the ears are soft and are masticated with ease; the blades and stalks furnish excellent fodder, and the process of fattening is carried on as rapidly, and at much less expense than upon ground food fed in stalls.

Statement of Edwin Winship, *of Winship's Mills, Clinton county, Indiana.*

We have in this county a number of individuals who are engaged in buying cattle in small lots, and taking them to the prairies, where they collect large numbers to sell to drovers from Ohio and Pennsylvania.

These cattle are kept on the prairies in Indiana and Illinois, in the following manner: The owner selects his location for grazing early in the spring, hires a man to herd them, and furnishes him with a pony, and prepares a lot called a "pound" to put them in at night. As soon as the grass starts in the spring, he takes his cattle to the grazing ground, adjacent to some farmer on the edge of the prairie. He starts his cattle out in the prairie early in the morning by themselves. After breakfast he mounts his horse, follows them some two or three miles, and keeps them together where the grass is plenty and sweet, until noon. He then comes in to his dinner, feeds his horse, and then returns to his cattle to see if any have run astray. He remains with them until night, when he brings them in and puts them in the pound for the night.

The cost of keeping a lot of cattle in this manner during the summer, is the herdsman's wages and board, and their salt. One hundred dollars will keep four or five hundred head of cattle during the summer.

The cost of raising neat cattle here till three years old, is $3 50 per annum, or $10 50 at that age. They are worth, on the spot, from $14 to $16 each. Milch cows, with their calves, are valued at from $12 to $25.

Statement of S. B. Ward, *of Auburn, De Kalb county, Indiana.*

Our county has been settled but for a few years, and there has been but little pains taken as yet in raising stock. Cows are worth from $12 to $20 per head; oxen, from $50 to $80 a yoke; two-year-old steers, from $10 to $15 a head; three-year-olds, from $15 to $25 a head.

Statement of Samuel D. Martin, *near Pine Grove, Clarke county, Kentucky.*

The cost of raising cattle here depends much upon the treatment they receive. Stock cattle are generally fed in winter upon the stalks and fodder of the corn which have been cut up in the fall and the ear taken off. This food would be wasted upon the farm if there were no stock to eat it. The fodder, with the corn off, can be purchased at from 5 to 10 cents a shock, and one shock will sustain ten head of cattle a day, though they would do better upon more. In summer they are grazed upon the pastures. The probable cost of rearing is about 50 cents a month until they are grain fed. When they are to be fattened, a shock of corn, which contains about five bushels of grain, is given daily to every ten cattle. In this, each steer has about fifteen bushels of grain a month, which costs about $3. The benefit received by the hogs which glean after them is worth the labor of tending. Cattle are usually fed in this county upon the sod of the open pasture during winter.

The value of a bullock at maturity would depend greatly upon his size. Beef is worth here about 6 cents per pound. Most of our beef cattle are sold by weight; and if they are large and fat, 40 pounds per hundred is deducted from the gross weight; small cattle, 45 pounds. I have just sold my three-year-old Durham steers for $60 each. I have a lot of "scrubs," or unimproved cattle, which are worth $25 each, of the same age. A half-blooded Durham steer, at five years old, is worth about $20 more than a scrub at that age. The word "scrub" is used to designate our unimproved cattle, so that the first cross of Durham adds about $20 to the value of a scrub at that age.

The cost of transporting cattle to the Atlantic markets, varies much at the different seasons of the year. It is also influenced by the price of grain. With these variations the following prices may be considered as approaching very near the truth: Driven on foot to Cincinnati, and from thence by railroad to New York, takes 13 days, and costs about $13 each animal. Fed on grain, and driven on foot, 70 days to New York, early in the spring, costs about $13 each. Fed on early grass, and driven on foot, 60 days to Philadelphia, or 70 days to New York, costs from $8 to $9 each. Pastured on late grass, on foot, 60 to 70 days to Philadelphia and New York, costs from $5 to $6 each. The cost to Charleston and Savannah is about the same as to Philadelphia.

The cost to New Orleans by steamboat is about $10 each. The cost of transportation is also influenced by the stage of the river and other circumstances.

Statement of S. H. STARKS, *of Benton, Marshall county, Kentucky.*

The cost of raising cattle here until three years old, is about $7 each. Market value, from $8 to $10; milch cows, from $10 to $20 each.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

There is a great decrease in the common stock of the county, and more than a corresponding increase in number of the short-horns. The superior excellence of this breed for the dairy and the market, points it out as the one that will be the most useful and profitable to be encouraged. They come to maturity a year—some say two years—earlier, grow much larger, thrive better, and take on flesh and fat faster, and with less feed, than the common stock; a number of our best graziers will feed no other kind. Those of the most experience on this subject are certainly best prepared to give an opinion, and, so far as my information extends, they, without an exception, give a decided preference to this breed. A cross from the thorough-bred short-horns on the common stock produces a striking improvement in every respect; and the further the cross is pursued, the more perfect the animal.

The society sold a lot of yearling Durham steers this season at $30 per head, while those of the same age of the common stock could have been purchased at from $10 to $15. Yearlings of the improved breed, if well kept, will weigh 1,000 pounds. Thirty-one of them were sold a few weeks since, in an adjoining county, which averaged per head 947 pounds. At from three to four years old they will weigh, if well kept, from 2,000 to 3,000 pounds live weight.

The society have been attentively and successfully engaged in breeding various kinds of improved stock for the last 35 years, and have bred with a view to improve the milking properties, while, to say the least, they have suffered them to fall off in no other good quality; and their efforts in this respect have not been unavailing, as they now have stock that will compare with any in the world, so far as milk is concerned. No section of country is more favorable to the improvement of stock than our own. The accidents of soil, climate, and other influences that affect or modify animal economy, are all favorable to the health, vigorous growth, early maturity, and longevity of this stock. Nothing, therefore, stands in the way of improvement except the want of proper attention and judicious management.

The cost of rearing calves until three years old is $10 each; of steers, from one to two years old, $15; from two to three years old, $20. The value of a thorough-bred yearling heifer is from $50 to $100; of a Durham cow, from $100 to $400; Durham steers, at one year old, $30 a pair; at three years old, from $80 to $100. Thorough-bred bulls bear very high prices. The comparative scarcity and excellence of these cattle is what keeps up the price to its present rate. Some of the beef

steers are taken to the eastern markets, but a majority of them go to New Orleans. Cost of transportation to the southern market by the river, $10.

Statement of DANIEL FULTON, *of Bowdoinham, Lincoln county, Maine.*

We have but few full-bloods of any improved breed of cattle; but we have a mixture of the Durham, Hereford, and Devonshire breeds with our common stock. The average cost of raising a bullock, three years old, is about $20; the present price is about $25 each. We find the improved breeds best for labor and beef, but the common kinds best for milk. Average price of a cow in the fall, $18; in the spring, $30. Average amount of butter per cow in a year is 125 pounds.

Statement of SAMUEL JOHNSON, *of Jackson, Waldo county, Maine.*

The raising of neat cattle pays no better than that of horses. Steers, in their third or fourth years, may be made to earn something by labor; otherwise they would not pay the cost of raising. The average price of a yoke of oxen, four years old, is about $80. I prefer a cross of the Hereford and Durham.

Statement of GEORGE W. DRISKO, *of Jonesborough, Washington county, Maine.*

A cross of the Durham or short-horn breed on our common cattle is considered the best for labor, being tough, strong, and a general favorite with lumbermen. It is difficult to tell which breed is best for milk. I know several who boast of their cows of different breeds; still it is the honest conviction of practical observers that our old breed, in all respects, is not surpassed in the quantity of milk and butter which they afford. I have a cow of this sort from which 150 pounds of butter were made during the last seven months, besides furnishing milk for all necessary use for a family of three persons, and with only common pasture feed.

Statement of DAVID BRUMBAUGH, *of Marsh Run Mill, Washington county, Maryland.*

Cattle can be raised with profit in this county, owing to the advanced price within the last few years. Formerly, the farmers depended upon the western cattle for their supply, but now they are turning their attention to raising for themselves. The cost of raising a steer three years old is about $15, which is worth $25.

Statement of WILLIAM BACON, *of Richmond, Berkshire county, Massachusetts.*

As to the breeds of cattle most valuable in this section, we have many animals among our common stock that would be an honor to the herds of England, though the number of such are becoming more rare

every year by crossing with foreign breeds. For all points we consider the Devon as the animal best adapted for the short pastures of New England. We think so for the following reasons: They attain a fair size, and are perfectly docile; for oxen, they are strong, quick, walking off like horses; are hardy, easily kept, and readily take on flesh. It is a rare thing to see a Devonshire ox or cow low in flesh in a pasture where sheep would live. The cows may not be so great milkers as the short-horns, but their milk is decidedly richer. There is also always a market for animals of this breed at fair remunerative prices.

The Ayrshires have been introduced to some extent, and certainly possess qualities that should commend them to the notice of northern herdsmen, who have short summers and long winters. The cows are good for milk, but their quality as oxen or for beef is to us unknown.

Statement of SIMON T. ASHETON *and* ELIJAH MYRICK, *Trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

Our breed of cattle is a cross of the Durham with the best common stock, which we like as well as any full-bloods we have ever seen. They are mixed all the way, from one-fourth to seven-eighths. From one-half to three-fourths we consider a good cross, and will make an excellent stock for beauty of color and form, as well as for milk or flesh. All things considered, we prefer the Durham to any other breed. In general, they are quiet, easy to fatten, large in size, and strong in the yoke, though not so fast, perhaps, on the road as the Devon. They are also docile, tractable, and kind to each other. Of late we have introduced some of the Ayrshire blood into our stock, by which we add to the large quantity of the milk of the Durham the richer quality of the Ayrshire.

Statement of C. F. MALLORY, *of Romeo, Macomb county, Michigan.*

The short-horned or Durham breed takes the lead with us, though some prefer the Devons for work on account of their color. Crosses between the Durhams and our common stock make the best milkers.

Statement of WILLIAM S. MAYNARD, *of Ann Arbor, Washtenaw county, Michigan.*

Durham cattle, with us, are the best for fattening, and perhaps for work; and the Devons, or a cross of them or the short-horns with our common stock, make the best milkers.

The cost of making butter is 10 cents a pound, which is worth from 12½ to 20 cents per pound. Cheese costs 5 cents, and is worth from 7 to 10 cents per pound. Beef has been shipped to New York this season to good advantage. It is worth here $4 a hundred, paying a profit of 25 per cent.

Statement of J. D. YERKES, *of Northville, Wayne county, Michigan.*

The raising of neat cattle here is profitable when the requisite facilities for keeping them exist on the farm. It should be well supplied with water and good natural grass land, in order to make it a money-making business. Our common cattle, crossed with the Durhams and Devons, produce the kinds mostly kept here. For dairy purposes, some of our common cows are about equal to any improved stock in this country, and I believe that by a careful and judicious course of breeding from such specimens of our common varieties, a class of cattle might be obtained which, for good milking qualities, would stand unrivalled. For working oxen, a cross of the Durhams and our common cows is preferred. They are of large size, and well adapted to heavy work. They possess mild and peaceable tempers, and when unfit for the yoke are easily converted into beef.

Statement of THOMAS W. SAMPSON, *of Ashland Farm, Rocheport, Boone county, Missouri.*

The California trade has produced quite a revolution in the cattle trade in Missouri. They have advanced at least 200 per cent. in price, and decreased in numbers in about the same proportion. The consequence is, that the rearing of cattle is about the most profitable business our farmers can enter into. Of the common stock of the county, calves are worth at present from $5 to $8; yearlings, from $10 to $12; two-year-olds, from $15 to $18; three-year-olds, from $20 to $25; and four-year-olds, from $30 to $45 each.

Cattle are generally grazed on blue grass pasture through the spring and summer months, by such farmers as have it in sufficient quantities; others drive to the prairies in April, and have them herded on the prairie grass until about the middle or last of October. The prairie grass is very fine, and fattens equal to blue grass. The cost of herding is about 50 cents per head. Cattle are usually wintered on what we call "stock fodder," which is the corn cut up whilst it is yet green, and shocked up sixteen hills square, or two hundred and sixty-five hills of corn, and on an average about six hundred and forty stalks of fodder to the hill. The corn is shucked and the husks left on the fodder stalk. One shock a day will keep about eight head of young cattle through the winter, and is worth on an average about eight cents a shock. Counting from the first of November to the first of April, one hundred and fifty days, we have a cost of $1 50 a head for the first year, 50 cents a head for herding in summer, and 20 cents a head for incidental expenses—salt, driving out, &c. We have a cost of $2 20 for the first year; $2 50 for the second year; and $3 for the last or third year.

Our stock of cattle has been very much improved within a few years past, by the introduction of pure-blooded short-horns from England, New York, Ohio, and Kentucky; much the largest number of which have been brought from the latter State. The cattle all over the county are getting more or less mixed, and sell proportionally higher in accordance with the amount of Durham blood. We have some very fine

imported Durham bulls; no other improved breeds of cattle have been introduced in this section. Milch cows of the common stock and one-fourth Durhams are worth from \$20 to \$40, while those that are from one-half to three-fourths blooded are from \$40 to \$100. Full-blooded Durhams are worth from \$100 to \$500, according to quality, size, and appearance, pedigree, &c. I am breeding my cows, about twenty in number, this season, to three different bulls, all pure-blooded Durhams brought out from Kentucky.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

From my own experience, and from the observations of others, I am led to believe that the blooded stock of cattle is not so good for milk nor for draught steers as the common breed known here as the "Patton stock." The Durhams make the best beef, but their quality as milkers is rarely above mediocrity, while the complaint exists among many of our farmers that the bodies and feet of the steers lack that proportion for the draught that is required to give strength, durability, and capacity for extraordinary fatigue. The effect of a cross between this and the common stock is generally to improve the size of the latter, while it diminishes the milking qualities of the cross and the efficiency of the steers.

The raising of beef cattle has become an object of greatly increased gain within the last few years. Missouri being an eminently pastoral region, has capacity for raising immense herds; and though, until lately, the production of cattle was an object of very little importance to our farmers, on account of the low prices of their kind of stock, yet now a great, and, it is believed, permanent stimulus has been applied to this branch of husbandry by the markets of California on the one side, and the Atlantic States on the other, to which large numbers of our native cattle are driven annually after being wintered in Ohio and Indiana. In former years I have known cows sold as low as \$5; now, it must be a very indifferent milker, and a very small animal, that will not sell for \$25. This increase of price has caused more attention to be paid to the raising of beef cattle than any other kind. The best stocks are being imported yearly into various portions of this State; and in a few years, with our boundless prairies, and a fertile soil that bears luxuriantly the most succulent grasses, Missouri bids fair to stand among the first in the cultivation of this product of husbandry.

The cost of raising horned cattle is about \$5 a year, and their value at maturity for beef is about 5 cents per pound; ordinary and half-blood cows vary in price from \$20 to \$50; steers are worth from \$50 to \$100 per yoke.

Statement of D. C. GARTH, *of Huntsville, Randolph county, Missouri.*

Cattle raising here is found to be very profitable. The cost of rearing a bullock until three years old will not exceed \$5, and his value at that age is from \$20 to \$25. The price of a cow and calf ranges from \$20 to \$30.

Statement of ARMSTRONG O'HARA, *of Saint François county, Missouri.*

Cattle here are generally of the common breed, and can be raised at a cost of \$9 at three years old. They sell at from \$15 to \$20 a head.

Statement of LEVI BARTLETT, *of Warner, Merrimack county, New Hampshire.*

Cattle and sheep are raised more largely here than other kinds of domestic animals. The great majority of the cattle is what is usually termed "native stock," comprising a great variety as to form, color, size, and difference in cash value at a given age. As an illustration of this, one farmer will sell a pair of two-year-old steers for \$35, while, perhaps, upon the next farm, a yoke of the same age will readily sell for \$60. These differences often arise from our hap-hazard manner of breeding and lack of care in rearing and feeding from the birth of the calf until it arrives at maturity.

At our State and county fairs, there are always to be seen numerous yokes of oxen, of the "native breed," that will compare favorably with any of the imported kinds. So with many of our best milch cows; but as they have no fixed blood in their veins, their progeny cannot be depended upon in sustaining the good qualities of the mother. Hence it is a standing proverb, "that a good cow may bring a bad calf." A very few Durhams are to be found among us, the general belief being that they would require too high feeding to be profitably raised by the farmers in this northern clime. The North Devons find more favor. They are of medium size, well proportioned, and their beautiful deep-red color is a sure passport to the favor of most farmers. How they may prove here as milkers has not yet been ascertained, as it is but four years since the first Devon bull, from the herd of Mr. Hurlbert, of Connecticut, was introduced here. There are now numerous half-blood Devons among our farmers, of one, two, and three years of age, and so far they are highly prized.

The Ayrshires have been somewhat disseminated through this county. But they have, from some cause or other, failed to sustain their foreign reputation as good milkers; as they also have in Massachusetts, where some of the most choice bloods were imported a few years since by the Massachusetts Society for promoting Agriculture. The progeny of these were given in pairs to the county societies, but they failed to give satisfaction to the farmers of the old "Bay State." Reasoning from analogy, we should infer, from the similarity of the Scottish soil and climate to our own, that the change would not materially affect them. But from the disappointment experienced here in regard to their milking qualities, "it would seem that American *air* cannot compensate them for the Ayr they have left."

Our beef-cattle and sheep are conveyed to Brighton market (80 miles) by railroad—oxen at about \$1 per head, when a full car load is forwarded; dressed hogs, butter, cheese, and other farm products, at 25 cents for 100 pounds. In transporting live cattle and sheep from this to Brighton market per railroad, there is a great saving in shrinkage over the old method of "footing" it, and consequently a saving to

all parties concerned—the farmer, the drover, the butcher, and consumer.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

Among the old races of cattle which have long existed with us, some noble specimens still remain. But it is generally conceded that our best and finest breeds have been derived from animals imported from England within the last twenty years. The point, however, has not yet been settled, which is the best breed of cattle, the Devons or the Durhams. Among the most intelligent stock-growers, each breed has its firm defenders. The Devons here are derived directly from South Devon, in England. Those that pass here as Durhams are derived principally from some pure-blooded animals that were imported by Mr. Thomas Weddle about eighteen years ago. The Devon cow is a beautiful animal, but not a great milker. They are red or white, or a mixture of both, and of no other color.

Among the estimable points of this breed are the fine, thin, clear bones of the legs and head, the mellow touch of the skin, the creamy color of the muzzle and around the eyes, and the fine tapering, light-colored horns. The Durhams, on the contrary, are noted as great milkers and excellent cattle for beef.

To raise a steer or heifer to an age of three years, would cost, the

First year	$7 10
Second year	11 20
Third year	16 30
Total	34 60

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

The cost of raising neat cattle in this county until three years old will not vary far from $17 to $22. Some of our wealthy farmers have taken much pains to improve their breeds, which has proved sufficiently successful to remunerate them well for the expense.

Statement of JOHN B. YOUNG *and* JAMES DE MOTT, *of Ovid, Seneca county, New York.*

Of neat cattle we have the Devons and Durhams, or short-horns, and common breed, with mixtures of all, which have received much attention the past two years.

The cost of rearing to three years old is estimated to range from $20 to $25 each. The price of good three-year-olds, in good flesh, now ranges from $30 to $40 per head. Most of our cattle designed for market are fitted for slaughter here and taken to New York by railroad, the company charging by the car load $63, and will carry on an average fifteen head; thus making the average freight about $4 each, incidental expenses about $3, or total cost about $7 per head. Sheep and hogs are generally taken in the same way when fitted for slaughter; a car will carry about 150 of each by being put upon two floors, one above the other.

Statement of JOHN HURLBUT, *of Arkport, Steuben county, New York.*

The high price of beef and mutton has given an impetus to the raising of domestic animals, and considerable attention is being paid to the breed and quality. I would remark that there is a great difference in ordinary cattle, and we probably have as good milkers among our common cows as any that can be found among the various kinds of imported stock; and I have even known some common cattle equal to any other breed I ever saw for fattening. But it must be conceded that they are exceptions to the general rule. The best of farmers with us are introducing the Durhams, or short-horns, quite extensively. They fatten readily, and are superior to all other cattle in size and symetry.

In regard to the cost of raising neat cattle, and the expense of transporting them to market, I would remark that it depends altogether upon the manner in which they are kept. Ordinarily, the expense of raising steers until four years old is about $25 each, keeping them, of course, in the winter on corn-stalks and straw, with hay in April; and such ordinary cattle are worth, at the age of three years, about $35 each. On the other hand, if they are stabled in the winter, and kept constantly improving, they will, at four years old, readily command $60 each or more, while the cost will be increased about $15. I am fully satisfied that cattle consume one-third less fodder when comfortably stabled, than when allowed to roam unprotected over the fields. The cost of taking cattle to New York by railroad, is from $4 to $5 per head.

Statement of LEWIS G. MORRIS, *of Mount Fordham, Westchester county, New York.*

The kinds of cattle I am propagating are the Herd-Book short-horns and Devons. This breed requires a rich soil and good care. If this is complied with, they are more profitable than any other breed, as they unite milking and beef qualities to a greater extent than any other, and will mature at three years, while another breed would take five years to attain maturity. They are a Herd-Book animal, having been recorded in Coates's Herd Book since the year 1822.

The Devons in color are invariably red, with the tip of the tail white, and have long horns. They are peculiarly adapted for working oxen, as their temper, spirit, and sprightliness of action, if properly broken, will perform any farm work as quick as horses. As a dairy stock, I do not think they rank very high; but there are always exceptions to a general rule, and I have seen very good dairy stock among them. For beefing qualities, they lack early maturity; but the quality of the beef is far superior to the short-horn, and they may be kept in almost any climate, and will stand a poor farm and carelessness of treatment as well as any breed I know. If obliged to roam over a large tract of land to collect their pasture, their agility enables them to do so without worrying off their flesh. They are a pure and distinct breed, but were not a Herd-Book animal before 1851.

Statement of Santarrilla S. G. Franklin, *of Cuba, Clinton county, Ohio.*

There is not much attention paid here to the improvement of cattle, except a few crosses of the Durham with our common stock. A few days since, one man sold a lot of twenty-five steers for $1,000. The average price of neat cattle at three years old, is about $15 each.

Statement of Luther Bailey, *of the United Society of Shakers, North Union, Cuyahoga county, Ohio.*

The short-horns, or Durhams, with us, for large, fine animals and excellent fattening qualities, cannot be outdone; and for milk, with proper care in selecting, they may be as serviceable as any.

The price of thorough-bred Durham calves at six months old, varies from $50 to $100 each.

Statement of Jacob Knoop, *of Elizabeth, Miami county, Ohio.*

We have some very fine Durham cattle in this county, and from them a very valuable cross is obtained for beef; but for dairy purposes, the common stock is preferred. Milch cows are worth from $20 to $35 each, and steers two or three years old, from $40 to $60 a pair. When fattened, they bring about $5 a hundred.

Statement of P. W. Gillett, *of Astoria, Clatsop county, Oregon.*

Cattle in this Territory, especially in the interior and southern parts, amount to almost nothing. They keep fat during the whole year upon grass. The average price of beef in this county, is from 18 to 20 cents per pound. Good cows are worth from $80 to $100 a head; oxen, $150 to $225 a yoke.

Statement of William M. Macy, *of Quercus Grove, Linn county, Oregon.*

Cattle are raised here with little more care than to keep them from straying. Besides our own consumption of beef, large droves of fat cattle are taken to the mines. Milch cows are worth $75 per head. Through the milking season, the yield per cow is from 75 to 100 pounds of butter. Beef is worth 11 cents per pound. Oxen are worth $125 per yoke.

Statement of Isaac R. Evans, *of Harrisville, Butler county, Pennsylvania.*

There are but few cattle of improved breeds in this section, although the subject is becoming a great object to our farmers. They find a ready sale for any of their stock at any season. The cost of rearing until three years old is about $15 a head. The present value at that age is from $15 to $20 each.

The breaking of steers is one of the most important operations of cattle raising. My method is, to take a pair of animals two or three years old, which are in good condition, and tie them up in the barn by the horns with a strong rope, where they cannot injure themselves. I then handle them occasionally by leading them around, until they know what it is to be confined. As soon as they will lead pretty well, yoke them, and tie their tails together, to prevent them from turning their yokes; putting them in a clear yard, where they cannot go very far without turning. I drive them around a few times, in order to accustom them to travel together, a few days after which they will do to go to ordinary work in a team.

Statement of H. N. McAllister, George Buchanan, James Alexander, J. K. Shoemaker, *and* William J. Waring, *being that portion of their report which relates to cattle, to the Centre County Agricultural Society, Pennsylvania.*

Oxen are not used for labor in this county, except in the lumber districts, although many farmers might employ them advantageously.

Durham and Devonshire cattle are being introduced, and crossed upon our common breeds, with manifest advantage to farmers.

Statement of N. Linton, *of Cochransville, Chester county, Pennsylvania.*

Horned cattle have not been raised extensively in this section, until recently. Farmers have long been in the habit of feeding them for market, taking them from droves brought principally from Ohio, Virginia, and Illinois. Cattle are selling out of droves this fall at from $4 to $6 per hundred, according to quality; and fat cattle at prices varying from $6 50 to $9 per hundred; the feeders thus realizing from $15 to $35 advance on each steer. Many farmers also stall-feed cattle in the winter, with the view of disposing of their grain on the farm, and thereby greatly increasing their manure, and preventing their land from becoming exhausted by selling their corn and oats by the bushel. In this way they often get market prices for their grain, and sometimes more. But the farmer's success in feeding cattle depends on his judgment in buying. If he be able to distinguish all the good points of a steer, estimate correctly the amount of his growth, and judge accurately of his disposition to lay on fat, he will hardly fail in being successful. If he fail in these particulars, his success will most likely be accidental. Farmers in this county have also mostly bought their working oxen from Western droves. The prices this season have ranged from $100 to $200 a yoke. After these oxen have worked one or more years, they are fed for market, and sell for the highest prices. But the scarcity and high prices of stock cattle of late years have induced farmers to turn their attention more to raising calves; and young stock may be seen on almost every farm. The cost of raising young cattle until three years old, will average about $25; and they will sell for as much or more than Western stock of like quality. Fat cattle are usually sold to drovers; they buy them from the farmers, either as they stand or by weight, allowing from 54 to 56 pounds of beef to each hundred of gross weight.

Statement of JOSHUA S. KELLER, *of Orwigsburgh, Schuylkill county, Pennsylvania.*

There are few, if any, full-blooded cattle in this county; but we have some fine mixed cows, both of Devon and Durham, as well as excellent animals of the common breed. Quite a number of calves have been raised within the last few years. A bullock or heifer can be raised (two years old) for about $20 or $25. Formerly the butchers bought all the calves, especially the largest and fattest, which is fast going out of practice; for the farmer now sees his advantage in keeping the best, and killing or selling the inferior ones. Our best cows will bring from $40 to $50 each.

Statement of JOHN EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

The best and the only thorough-bred cattle we have, are the Durhams. I have a calf, that for beauty and symmetry of form cannot be excelled. Quite an improvement has also been effected by crossing our best common stock with the Durhams. It is a fact generally admitted, that more beef can be made with a given amount of food in a specific time, and of sufficient abundance, from a full-blooded Durham, or short-horn, than from any other breed. Our milking stock, containing a "strain" of the Durham blood, are also of superior quality, and are highly prized.

Statement of JOSEPH PARKER, *of West Rupert, Bennington county, Vermont.*

The expense of keeping neat cattle the first two winters, is about one and a half tons of hay to each, valued at $7 per ton; the third winter, two tons, amounting, say to $31 50. To this add thirty weeks' pasturing, the first year at 5 cents per week; the second, 10 cents; and the third year, 12½ cents per week; amounting to $8 10—making the cost at three years old, $39 60. The value of a good animal at this age is about $30. The Devon breed, here, is highly valued for labor.

Statement of H. W. LESTER, *of Rutland, Rutland county, Vermont.*

The horned cattle of Vermont are mostly of a red color, well made, of fair size, and perhaps better milkers than any foreign breed. The Devons, Herefords, and Durhams have been frequently introduced and crossed with our common stock, with decided benefit. We like the cross with the Devons best, as such cattle are superior for work, beauty, and activity.

Red, close-built, short-haired animals are often underrated in weight, while other colors are overrated. Late in September, 1852, I dried off and began to fatten two middle-sized cows—one deep red, close-haired, and fifteen years old; the other, half Durham, red and white, ten years old. They both were fed alike, and killed about the middle of December. Before they were slaughtered, they were examined by several persons considered good judges. The Durham was called good, and believed to weigh from 600 to 650 pounds. The red cow, called ordinary, was thought to weigh from 500 to 525 pounds. When killed and dressed, the red cow weighed 651 pounds, had 4 pounds more rough tallow, and the beef looked best; while the red and white, when dressed, weighed 630 pounds.

Raising and fattening three-year-old cattle, or cows, costs about $4 per hundred pounds; average weight, 600 pounds. Rearing oxen costs about $5 50 per hundred pounds; average weight, 950 pounds. Cost of conveyance to Boston market by railroad, $3 per head. Driving them on foot costs less, but wastes more.

Statement of WILLIAM SMOOT, *of Boone Court House, Virginia.*

Our cattle, like our horses, are not of the improved or imported kind; though I might remark, that we have a slight mixture of Durham, and other English blood, infused in our stock.

Cattle, at three years old, cost $9 to raise them, and are worth from $16 to $18 at that age.

Statement of RALEIGH W. DYER, *of Prillaman's, Franklin county, Virginia.*

We have but few improved cattle. We give them the range until harvest; from then until Christmas they are pastured; then fed on shucks, straw, and top-fodder until spring, when they are again let into the range. Beef is worth from 2½ to 4 cents per pound at home—from 5 to 6½ cents in market. Cows and calves are worth from $10 to $18 each; working oxen from $20 to $50, according to quality. The cost of raising I have never yet calculated.

Statement of HENRY M. PRICE, *of Nicholas Court House, Virginia.*

Cattle command the chief attention of our farmers. They are chiefly raised by "browsing," having little attention given them besides regularly salting during the summer. In winter, if kept over, they are fed with hay upon the meadows and open grass lands, which serves to enrich them without other manuring. The farmer here but seldom sells his hay, which is decidedly a wise policy. The fall before the cattle are four years old, they are usually sold and driven off to other counties to be grain-fed. The usual price is from $17 to $20.

Statement of GUSTAVUS DE NEVEN, *of Fond du Lac, Fond du Lac county, Wisconsin.*

Much attention is given in this region to the raising of neat cattle and the products of the dairy. The butter produced in Fond du Lac county is of excellent quality, and the pasturage, particularly on the prairies and openings, could support several times the stock of cattle that graze upon it. Fat beef is produced on the wild pastures, which would not unfavorably compare with the stall-fed beeves of the Eastern markets. In view of the facilities afforded by railroads, some feeders have begun to fatten for the New York market. Common cows produce, on an average, about 150 pounds of butter a year. Value through the season

13 or 14 cents per pound. The cost of raising neat cattle till three years old, is about $15 each.

Introduction of the Asiatic Buffalo, the Brahmin Ox, and the Cashmere, Scinde and Malta Goats into South Carolina, by JAMES B. DAVIS, *of Columbia.*

The want of calcareousness in nearly all of the soils of the Southern States, together with the heat of our sun, makes an inaptitude to perennial grasses for grazing animals; hence more suitable for browsing, as both tend to originate shrubbery and weeds. In 1836, having had some experience in the importation of short-horned, Devon and Ayrshire cattle into this State, I then summarily advanced an opinion, "that all cattle brought from a Northern to our Southern climate must necessarily degenerate to the peculiarities of our location, and that it would be easier to improve cattle already acclimated, *or import animals from a still warmer region.*" In my late sojourn in Asia and the East, I had reference to this observation in importing Cashmere, Scinde and Malta milking-goats, as well as the Brahmin ox, or Nagore, of India, the Asiatic buffalo, or water ox, and other animals.

The Cashmere, Persian, Angora and Circassian goats are one and the same animal, changed in some respects by altitude, though but little by latitude. They abound in all this inaccessible territory, and are the eating, milking, cheese and butter-making and clothes-making animal of the whole country. They are finely developed for the table, much disposed to fatten, very white and beautiful, with long fine wool or curly hair, yielding about 4 to 4½ pounds to the fleece. They can be easily procured by an energetic man acquainted with the peculiarities of the population, and at a cost of $4 to $6 each on the spot. I brought to the United States, in 1849, seven females and two males. They have kids only every spring, usually two at a birth. The full breeds have increased only to about thirty, from the accidental circumstance that in nearly every instance the issue has been males.

In locating these animals in different sections of South Carolina, I can see no difference between those reared here and the imported, with the exception that those reared in this State are finer and heavier fleeced than those imported.

On my arrival, I immediately procured a number of our little diminutive native female goats, and crossed them upon a Cashmere buck. Their progeny had hair very fine, but little longer than that of the does. I again crossed the females of this progeny upon the other Cashmere buck, and it was difficult to distinguish these from the *pure breed*, and the subsequent cross cannot be detected. In the spring, I contemplate effecting still another cross.

I consider this a most valuable and useful experiment, as I made an arrangement with amateurs to sell pure bucks at $100, and to exchange annually, so as to furnish them with the advantages of different crosses. In ten days all the pure breeds were taken, with a demand for many more. Even the mixed kids have been readily taken by those determined to infuse their blood with their stock. In these arrangements, however, I have located them from the top of the mountains to the seaboard, both in Carolina and Georgia. Apart from their manifest practical aptitude in all these particulars, there is this ultimate value to be considered: a Cashmere shawl is worth from $700 to $1,500. Why is this difference, except in their intrinsic value from durability as wearing apparel? I have socks which I have worn for six years, and are yet perfectly sound.

No naturalist has yet been able to assign a systematic law regulating the acclimatization of animals. The Merino sheep, whenever it has been removed, has generally changed, and in most cases for the worse. Even when first crossed upon the best Saxony sheep, it was a deterioration, but when crossed upon a coarse-wooled animal it improved the fleece; and the cross fixed both the character of the wool and the carcass. This fact is observed in many other instances, demonstrating that the constitution of animals must be connected with location to fix the characters of the wool or the carcass. In fact, the same temperature, but modified by altitude instead of latitude, does not produce the same results. On all of the table mountain and valley plains between Persia and Turkey in Asia, all the animals have fine, long, silken hair, as the Angora cat, greyhound, and rabbits, and I have seen the same in some specimens of the Koordistan horse. To a considerable extent this is the fact on the western part of South America.

In connexion with this part of the subject, I will now introduce the Thibet shawl goat, belonging to the coldest regions. I accidentally came in possession of a pair of these animals, but lost the male. I have a considerable increase from the female, bred with a Cashmere buck. The Thibet goat has, under a long, coarse hair, a coat of beautiful white wool, which, when combed, makes about a pound to a fleece. I had these specimens with me at the Zoological Gardens in London, and in comparing them with a stuffed specimen of a Rocky Mountain goat, I could not discover the slightest difference; nor do I yet see any change of the fresh cross of the Cashmere buck upon my Thibet doe; but in the third cross upon the Cashmere, we may expect a valuable experiment by changing the fine under-wool, or down, into a conjoint and uniform covering of wool.

In regard to the Scinde goat, so called from the province at the mouth of the Indus, he is a gigantic animal, with pendulant ears twenty-two inches long, is used for the table and dairy, and is very similar to the Syrian goat. The Malta milking-goat is also only for the dairy, giving about a gallon of milk in a day. It may not be uninteresting for me to state a fact observed by me in the malarious sections of the United States and Mexico. In all the similar sections of Asia and the East, they regard cow's milk as being an exciting cause to bilious fevers, as well as to liver complaints, and hence use only goat's milk. The *modus agendi* I see has been a matter under discussion by the faculty of Paris.

Having given thus much on the subject of goats, I now hasten to the cattle. In referring to the Nagore or Brahmin cattle of India, in Youat's work on British cattle, it will be perceived that they are organized to undergo the fatigues of the hottest climates known, and will carry a soldier six miles an hour for fifteen consecutive hours. I brought but one pair to the United States, and, as far as I can learn,

my crosses of them upon other cattle are the first known in this country. I crossed this bull upon Ayrshire, Devon and Durham breeds, as well as upon our common cattle. The offspring is considered, by all who have seen them, far the handsomest animal of the cow kind. They are symmetrical and active, and can keep fat when any other cow would starve. I had this half-breed crossed again upon our cattle, but am not yet sufficiently experienced to report of their milking qualities. As evidence, however, that our agriculturists confide in the appearances, my half-breeds readily sell for $1,000 a pair, and the second cross, or half Brahmin, at from $100 to $300 each. Preferring the mixed breeds to the pure, I sold to Mr. Edes, of Kentucky, the original pair for $4,000, as that State would prove a better place to breed and disseminate the stock. As Kentucky is the dependence of the South for beeves, they needed an animal that could come to us in the hot months of summer and remain healthy and sound. They have from this animal a progeny that will travel thirty miles a day in August, and the further south they go the better suited—the great desideratum to the Northern breeder and the Southern consumer.

The Asiatic buffalo, or water ox, is a large, ugly, hardy animal. The cows are good milkers, making fat and good-flavored beef, though coarse-grained, and precisely suited to seacoast marshes, where no other animal can venture, as well as to lands subject to inundation.

I am unprepared to say anything practically of my other importations, but will continue to report my experiments, and believe many of them will become matters of history.

DAIRIES.

CONDENSED CORRESPONDENCE.

Statement of T. L. HART, *of West Cornwall, Litchfield county, Connecticut.*

The average quantity of cheese per cow in this region is about 300 pounds; of butter, about 200 or 250 pounds. Much care is requisite in the amount of salt given to cows, as it has lately been found that large quantities eaten at any one time will prevent the milk from coagulating. This is a fact known to but few, and was discovered by trying good rennet upon milk which had failed to coagulate on the first trial. A second trial had the same effect, and the cheese did not come. If milk fails to coagulate, the dairy woman suspects at once that the fault is in the rennet, whereas it may be in the milk.

Butter has sold this year in New York from 17 to 25 cents per pound, and my cheese brought, in Philadelphia, from 10 to 12½ cents per pound.

Statement of ANTHONY M. HIGGINS, *of Wilmington, New Castle county, Delaware.*

A large quantity of butter is annually made in this county and sent to the neighboring cities, especially Baltimore, where it has for a long time maintained the highest reputation as to quality, bringing from 25 to 37½ cents per pound. Our dairies comprise from fifteen to seventy-five cows each. The Holstein, Durham, and Devon infusion makes an excellent grade with our common stock, as respects size and milking properties. The first named is preferred by Major Reybold, who kept a large dairy for many years, as they have larger frames, a greater depth of udder, and yield more milk; they require, however, good keeping. A son of this gentleman informs me that he has two dairies of fifty cows each, and that he annually manufactures about 15,000 pounds of butter. The stipulated price the year round is 25 cents per pound. He calculates that the net revenue from his two dairies amounts to $3,600 per annum.

Some proprietors of dairies rent their cows to a dairyman, at the rate of from $22 50 to $25 each cow per annum—the former furnishing the provender. There is not enough young stock here to keep up a supply. Western heifers are annually brought in at a cost of about $22 a head.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The dairy business, though much favored by soil and climate, has not been put forward with a view to export its products. Every farmer liberally supplies his own family with milk and butter, and has enough to spare to supply the home demand. The business, however, is receiving increased attention, and may, with proper care and management, be made a source of great profit when we have better facilities for getting to market. The Durham cows, which have been gradually increasing in number since the year 1817, are, by those most familiar or conversant with them, acknowledged to be better adapted to the dairy than those of any other breed ever introduced into this section.

The dairy cows of this society, about one hundred and fifty in number, being all Durhams—some thorough-bred, others with a slight strain of the Patton breed—are unsurpassed in the quantity and richness of their milk. They will give for the first three or four months after calving, while on grass alone, from 30 to 68 pounds of milk daily; and from experiments made in the early part of October, 18 pounds of milk will make a pound of butter. Some of these cows do not go dry during the year; others are dry a longer or shorter time, but rarely exceeding eight weeks.

We never soil our milch cows, but believe it much better to have them run at large in the pastures day and night, except in the winter season, when they are kept in the stable, tied each in her own proper stall, from five o'clock in the evening until eight in the morning. They are driven up, however, and stabled morning and evening during the balance of the year while they are milked, and then turned out to

range. From early in the spring until late in the fall they subsist on blue-grass and clover pastures, and are only fed during the remainder of the year, morning and evening, with sheaf-oats, cut fine, made wet, and mixed with meal or "ship-stuffs;" also, occasionally with slops from the kitchen, pumpkins, small potatoes cooked for the purpose, and hay at will during the night. In this way they are kept fat or in fine order from year to year.

Good dairy cows, mixed from one-half to seven-eighths Durham, are worth from $40 to $50 each; common stock, from $15 to $25. Butter is worth from 12½ to 15 cents per pound; cheese 10 cents. The price of milk, from its abundance, scarcely nominal. The Kendall churn is reputed the best of any proved by the society.

Statement of WILLIAM H. COOKE, *of Howard, Warren county, New Jersey.*

The average yield of butter per cow with us is 120 pounds, taking a number of cows together, though some of our dairymen make 160 pounds from a small number of cows extra well kept.

The average price for butter this year has been 25 cents per pound in the New York market. The value of good dairy cows is from $30 to $35 in the fall. The usual price of a two-year-old heifer is $20. Steers are about the same price.

Statement of P. W. GILLETT, *of Astoria, Clatsop county, Oregon.*

Clatsop plains are the only parts of this county which produce any considerable quantity of butter and cheese; and I must say, that where the business is properly attended to, I never saw better articles anywhere than are made here. The average price of butter here is 62½ cents per pound; cheese 50 cents.

Statement of ISAAC R. EVENS, *of Harrisville, Butler county, Pennsylvania.*

Dairy husbandry is beginning to attract the attention of a number of farmers in this section. The average product of butter is about 125 pounds to the cow; of cheese, from 250 to 275 pounds. Market value of butter, 16 cents per pound; of cheese, 8 cents per pound. The value of dairy cows in the spring is from $18 to $20; in the fall, $5 less.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

We have some of the improved breeds of cattle, so called, such as the Durham, Devonshire, and Teeswater. The Durham ranks first for the butcher. The Devons are beautiful in color, symmetrical in form, and are quite good milkers; yet our farmers seem to be satisfied with our common stock for the dairy. The cows average 150 pounds of butter, or 400 pounds of cheese, the season. Butter is worth 18 cents per pound, and cheese 8 cents. It costs $10 a head per annum to keep cows well.

Cows should be fed with meal or roots in the spring, commencing a short time before they calve, and continue until there is a full supply of

grass in the pastures. There is no animal that pays better and more promptly for being well fed than the cow. She does not ask you to "trust," but "pays down." Cows fed with hay only, will decrease in milk in four or five days after calving, and will not give so much after being turned into the summer pasture as though properly fed previously. We allow the first to calve in March; and for the dairy it is desirable to have them all come in by the first of May. We feed them with hay six or seven months. Young cattle, sheep, and colts are fed from five to six months in a year. It is deemed the better way to shelter all our animals during the winter in warm stables, and feed exclusively in the barn, only throwing into the yard the refuse that is taken from the stables. Our winters being long and cold, at least one-third is saved by feeding within doors. The hovels should be cleaned twice every day, and littered with straw or leaves from the forest, giving the cattle sufficient time to drink and exercise, and in calm, pleasant days let them spend one-half of the day in the yard.

Our farmers keep from 5 to 225 cows each. Some raise young cattle and colts, keeping sufficient cows for the use of the family; others keep cows exclusively. At least three-fourths of our income is the product of the dairy. Some kill their entire lot of calves, strip off their skins, and add the carcasses to the manure heap; others select the most perfect ones, (red is preferred for color,) and kill the rest. By selecting our best calves we are improving our breed. I have a neighbor who has taken 200 pounds of butter to the cow this year, from those of his selecting when calves. They had no extra feed. Some dairies make butter exclusively; others cheese about 100 days, and butter the rest of the season. Many employ horse-power for churning, using the old-fashioned dasher churn, which is placed in the basement of the dairy-room, where the cream and butter in warm weather are kept, and the horse outside of the building, where a band running in through the window puts the dasher in motion. The dairy-rooms, and everything used about them, are kept perfectly sweet.

It costs $15 a head to raise cattle to the age of three years. They are worth this year $25 each. Some extra matched steers are worth $80 per yoke.

HORSES, ASSES, AND MULES.

The first horses imported into America were brought to St. Domingo by Columbus in his second voyage, in 1493. The first introduction into any part of the territory at present lying within the United States, were landed at Florida by Cabeça de Vaca, in 1527, being forty-two in number, all of which soon after perished or were otherwise destroyed. The next importation, which consisted of a larger number, was also brought to Florida by Ferdinand de Soto, in 1539.

Horses were brought to Acadia by M. L'Escarbot, in 1604. In

1608, the French extended their settlement into Canada, and soon after introduced horses and various other animals.

In 1609, three ships from England landed at Jamestown, in Virginia, with many immigrants and numerous domestic animals, among which were a horse and six mares.

The first importation of horses into New Netherland was made from Holland by the "Dutch West India Company," in 1625. The whole number of animals shipped on this occasion was one hundred and three, consisting of stallions, mares, bulls, and cows, besides hogs, sheep, rabbits, and goats. The value of a horse there in 1637, was $32. In 1643 there were only twenty draught horses in the colony, and in 1646, the price of a good horse or mare was $64; of a stallion $132. In about the year 1670, horses were imported from the bishopric of Utrecht, which far excelled those brought from England.

Some twenty or thirty years before the Revolution, the steeds most prized in New York, for the saddle, were pacers. To this end the breed was propagated, and trained there with great care. "Naraganset pacers," at that period, were in such repute, that they were procured from Rhode Island at much trouble and expense.

The first importation to the colony of Massachusetts Bay was in 1629, and consisted of from forty-five to fifty-five horses and mares, many of which either died on the passage or soon after their arrival; so that only one horse and seven mares survived. Most of the animals brought to this colony, including horses, cattle, goats, coneys, and turkeys, were ordered by Francis Higginson, formerly of Leicestershire, whence some of the animals were brought.

In the vicinity of Piscataqua river, in 1635, there were thirteen mares and nine colts.

Horses existed in considerable numbers in different parts of Louisiana as early as the year 1678, and about thirty were in possession of the Indians on Red river in 1690. They were also common among the French of Illinois as early as 1750.

In 1670, horses were raised in Connecticut in sufficient numbers to be sent to the other colonies.

General Wade Hampton and Colonel William Singleton, of South Carolina, were both engaged in the importation of blood horses before the Revolution; so that prior to the year 1783, horses were so common in the vicinity of Charleston, that almost every planter raised annually one or more colts for racing—which were also considered the best in the country for the saddle or for draught, except those of Virginia.

Upon Washington's first retirement, in 1783, he became convinced of the defective nature of the working animals employed in the agriculture of the Southern States, and set about remedying the evil by the introduction of mules instead of horses, the mule being found to live longer, be less liable to diseases, and require less food, and in every respect to be more valuable and economical than the horse in agricultural labor at the South. Up to this period, scarcely any mules were to be found in the Union. A few had been imported from the West Indies, but they were of diminutive size and of little value. As soon as Washington's views on this subject were known abroad, he

received a present, from the King of Spain, of a jack and two jennies, selected from the royal stud at Madrid. The jack, called the "Royal Gift," was sixteen hands high, of a gray color, heavily made, and of a sluggish disposition. At the same time, the Marquis de Lafayette sent out a jack and jennies from the island of Malta. This jack, called the "Knight of Malta," was a superb animal, of a black color, with the form of a stag and the ferocity of a tiger. Washington availed himself of the best qualities of the two jacks by crossing the breeds, and hence obtained a favorite jack, called "Compound," which animal united the size and strength of the "Gift" with the high courage and activity of the "Knight." The jacks arrived at Mount Vernon in about the year 1788. The General bred some very superior mules from his coach mares, sending them from Philadelphia for the purpose. In a few years, the estate of Mount Vernon became stocked with mules of a superior order, rising to the height of sixteen hands, and of great power and usefulness—one wagon team of four mules selling, at the sale of the General's effects, for $800.

There were exported from Savannah, in Georgia, in 1755, forty-eight horses; in 1770, three hundred and forty-five horses and thirty mules. The number of horses exported from Portsmouth, New Hampshire, in 1790, was two hundred and seven.

The number and valuation of horses and mules exported from the United States within the last thirty-three years, are indicated in the following table:

Years.	Horses.	Mules.	Value.	Years.	Horses.	Mules.	Value.
	Number.	Number.	Dollars.		Number.	Number.	Dollars.
1820–21	853	94	$59,830	1837–38	4,418	409	$331,620
1821–22	1,182	121	93,753	1838–39	3,168	882	291,625
1822–23	1,630	438	123,373	1839–40	2,759	872	246,320
1823–24	2,711	840	213,396	1840–41	2,930	1,418	293,143
1824–25	3,861	576	283,835	1841–42	2,964	1,503	299,654
1825–26	2,931	922	47,543	1842–43	2,002	1,193	212,696
1826–27	1,666	1,067	173,629	1843–44	3,135	2,019	315,696
1827–28	1,442	1,377	185,542	1844–45	3,052	3,248	385,488
1828–29	1,985	1,299	207,858	1845–46	3,082	3,020	382,382
1829–30	2,138	695	182,244	1846–47	2,077	2,341	277,359
1830–31	2,184	1,540	218,015	1847–48	996	1,625	190,295
1831–32	1,798	1,128	164,034	1848–49	896	568	96,982
1832–33	2,040	1,011	167,330	1849–50	957	871	139,494
1833–34	2,954	1,000	233,554	1850–51	1,364	2,946	198,155
1834–35	3,616	1,100	285,028	1851–52	1,550	1,233	247,550
1835–36	4,553	875	346,689	1852–53	1,390	1,337	246,731
1836–37	5,022	764	368,094				

According to the census returns of 1840, there were in the United States 4,335,669 horses and mules; of 1850, there were 4,336,719 horses, and 559,331 asses and mules, (in the aggregate 4,896,050.) The present number, including those of cities, may be safely estimated at 5,000,000, which, at $60 each, would be worth $300,000,000.

CONDENSED CORRESPONDENCE.

Statement of James Williams, *of Bolivar, Jackson county, Alabama.*

Mules of the first quality can be raised here at a cost of $25 each at three years old. They are worth at that age from $60 to $100. What is said of mules will apply to horses, except that they are attended with a little cost and trouble in rearing.

Statement of Anthony M. Higgins, *of Wilmington, New Castle county, Delaware.*

A few years back, it was thought unprofitable to raise horses, as a larger sized animal, at less cost, could be furnished from the West. Recently, however, they have ruled so high, that farmers begin to find it necessary to raise their own stock. A good three-year-old colt, unbroken, will readily bring from $80 to $150. We have no foreign stock of recent importation. A member of the Reybold family recently returned from the Springfield Horse Show with the best specimen of the celebrated Morgan breed he could procure, without regard to price. The introduction of this horse, which is a colt, sixteen months old, of the Black Hawk breed, together with two fillies, also of the Morgan stock, may be regarded as a valuable acquisition to our State.

Statement of Hon. E. Crawford, *near Blakely, Early county, Georgia.*

Horses and mules, as well as cows, hogs, and sheep, are raised by every judicious planter and farmer in all Southwestern Georgia; and, on account of the mild climate and the abundance of the crop commonly called "crab-grass," in sufficient numbers to supply the wants of the establishment at a cheap rate.

Good horses and mules are raised by all who attempt to do so, but a large majority prefer buying animals of this sort, driven to the State in immense numbers from Tennessee, Kentucky, Ohio, and other grass-growing countries.

Statement of J. E. McClung, *of Bloomington, McLean county, Illinois.*

The raising of horses and mules with us is profitable. The cost of rearing a horse or mule till three years old, is about $30.

Statement of Edwin Winship, *of Winship's Mills, Clinton county, Ia.*

The raising of horses in this county is a profitable business. The kinds raised are well built, either for draught or for the carriage. They are generally put into the harness at two years old, when they are easily broken. They should be carefully handled and put to light work; in a short time they will become gentle, and may occasionally be worked until three years old. From this age, they will be able to pay for their keeping until four years old, when they will be ready for market.

The expense of raising a horse until three years old, (he costs $10 a year until then) is $30.

Statement of Daniel Jarrett, *of Muncietown, Delaware county, Ia.*

Horses are raised to some extent among us, and I think they have been paying better than most other kinds of stock. Good animals have been commanding from $80 to $100 each.

As I have noticed the views of a number of persons on the handling and breaking of colts, I will give mine. I first catch and restrain it before many days old, and handle it gently, which is occasionally afterwards repeated. It can as well be taught to be held and handled at three days old as at three years. As soon as it becomes a little accustomed to the bridle, it may be used for treading out grain with a steady horse until it is pretty well tired. When it has come to the proper time of drawing, gear it to a wagon with another horse, and let the draught at first be light, and increase the draught as you find it willing to draw.

Statement of Micajah Burnett, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Horses in this State, or rather in the central part, were first bred, for some thirty years, to an imported English race-horse, until there might be found animals which, for speed and endurance, could not be surpassed anywhere. The farmers, as well as the turfmen, bred to these horses; but they found they had erred, as they did not suit for the practical uses of the farm. They had too much metal, and were also too small. To remedy this evil, they imported an English draught-horse of the Flanders breed. In this they found they were on the other extreme; their progeny were too heavy for our McAdamized roads, and too slow for the plough. Another cross being necessary, they more recently imported from Canada the Norman French horse, and others from Vermont of the same breed, which have been crossed on our English race-mare, and produced a most valuable stock. These animals appear to suit for all purposes, for the saddle as well as harness. With this cross, it is presumed Kentucky may be looked to as having the most valuable horse, for all practical purposes, that can be produced.

Cost of raising colts to three years old, from $40 to $45. Value at maturity, from $70 to $150, and in some intstances more. Cost of transporting them by water to Mississippi and the New Orleans market, $10; by land to the other Southern States, something less.

Many mules are raised in this vicinity of very superior qualities; but they have not been much used in farming, owing to a general objection growing out of their "peculiar qualifications," though they are more hardy and durable than horses. Some farmers prefer them where steady work is to be done, such as hauling, &c.; and they are now coming into more general use. At the present time, they are the most

profitable stock raised in our vicinity. Mares, however, are not so apt to breed to jacks as to horses. Farmers who rear the colts, generally sell them at weaning time, or when about six months old, to the feeders and graziers. The cost of raising a mule-colt till two and a half years old, when ready for market, is $50. Value of the colt at six months old, $60; at two and a half years old, from $90 to $120. Cost of transporting them by water to the coast or the New Orleans market, from $8 to $10; by land to the Southern States, something less.

Statement of DANIEL FULTON, *Bowdoinham, Lincoln county, Maine.*

Considerable attention is paid here to raising horses, which are considered as profitable at present prices as any stock. The Messenger and Morgan breeds are considered the best in this State.

Statement of WILLIAM UPTON, JR., *of Dixmont, Penobscot county, Maine.*

The rearing of good horses has always been regarded by us, and no doubt truly so, as a profitable business. The various grades of the Messenger breed are here considered most valuable for the carriage. "Bush Messenger," owned by Hiram Reed, of Augusta, fifteen years old, light gray, took the third premium at the late National Horse Fair at Springfield, Massachusetts. Many of his colts are scattered through this State, and generally bear the distinguishing traits of their sire. They are docile, good travellers, and seldom shy.

The large Pennsylvania horses have been tried here for the purposes of heavy teaming, but have been found deficient in strength of muscle, powers of endurance, and their feet usually give out apparently from the mere weight of their bodies. They are excelled by a low, heavy-limbed French horse, brought from Canada, and deservedly popular for heavy work, as they possess great powers of endurance and thrive under hard work and coarse fare. Farmers generally here, as elsewhere, are far from taking that pains to breed from the best animals which its importance demands.

As the rearing of good blooded horses costs no more than those of indifferent kinds, not unfrequently hundreds of dollars reward a proper discrimination in this particular. The risk of rearing is such, from the various accidents to which they are peculiarly liable, that the apparent profit is considerably reduced. The cost of rearing till four years old, under favorable circumstances, may be stated at $60. They are worth at that age $100, though speed or fancy carries them far above that price, while, on the other hand, some unlucky accident may render them entirely worthless.

Statement of SAMUEL JOHNSON, *of Jackson, Waldo county, Maine.*

Colts at four months old are worth from $25 to $30 each. The cost of keeping the first two years is as high as $15 per annum; the third and fourth years, about $20 per annum. The yearly loss I will put at one out of seventeen, or about 6 per cent. To this I add the interest, which makes a colt that cost $25, stand, when four years and four months old, at $121 63; and the one that cost $30, at $129 59; the average cost being $125 61. The moderate amount of labor they should perform up to that age will barely pay the expense of breaking. The average price of horses at that age, is not over $125; consequently, they merely pay the expense of raising. One reason why the raising of horses is not more profitable, is a want of carefulness in breeding.

Statement of C. F. MALLORY, *of Romeo, Macomb county, Michigan.*

Our horses consist of a mixture of the French, Morgan, Black Hawk, and Duroc breeds, crossed on each other and our own common stock. The cost of raising a colt I estimate at $5 the first year, $10 the second year, and $25 the third year. The prices vary from $60 to $100 each. Cost of transportation to New York via railroad and steamboat, about $20 a head.

Statement of THOMAS W. SAMPSON, *of Ashland Farm, Rocheport, Boone county, Missouri.*

Horses have been raised heretofore without much regard to the particular purpose for which they were intended. If one turned out to be a good saddle or draught animal, it was more the result of accident than design, and the consequence has been that our county is filled with an assorted lot, with but few good specimens for any particular purpose; but the farmers have learned better within the last five years. Much attention has been paid to the rearing of three distinct breeds—one for the saddle, another for the harness, and a third for the draught. At the late exhibition of the Boone County Agricultural and Mechanical Society at Columbia, eleven brood mares were exhibited for the first prize, none of which were under sixteen hands high, and the majority of them from sixteen and a half to seventeen hands high. They were worth from $150 to $250 each. We have in our vicinity several stallions for draught purposes over seventeen hands high.

All the largest and best mares are bred to jacks for the purpose of raising mules, as they are considered more profitable, for various reasons—early maturity, less liability to accidents or disease, more easily and cheaply kept, and always in market at any age at remunerating prices. Mule-colts have sold the present autumn at the usual weaning time, about the 1st of September, from $45 to $70; and fancy or extra colts, from $100 to $150 each. The mule-colt which took the first prize at the late exhibition of the State Agricultural Society at Boonville, could have been sold for $150. The mule which took the first prize as the best two-year-old, was full sixteen hands high, very heavily made, and of a beautiful form. There was $250 offered for it, but refused. The animal which took the first prize for the best aged mule was seventeen hands high, and a very beautiful animal. The cost for keeping a mule from weaning time until the fall after it is two years old, when they are usually sold, is about from $25 to $30. Last year and the year before, mule-colts sold from $25 to $35 each. This

fall two-year-old mules, in lots to drovers, have sold from $85 to $110, according to quality. Aged well-trained mules for wagon or farm use, fifteen hands high, are worth from $125 to $150 each.

Statement of James L. Minor, *of Jefferson City, Cole county, Missouri.*

The cost of raising a horse is about the same as that of a mule—that is, from $18 to $20 per annum. The raising of the former, however, is not conducted on the same systematic plan as that of raising mules, but at maturity (from five to eight years of age) horses are generally purchased by buyers who select such as they can find to suit them, and then, when their number is completed, drive them in a body to the South. Less attention is paid now than formerly to the blood of this kind of stock. The thorough-bred (though in my opinion a popular error exists here) is not generally regarded as so well adapted to the draught as horses of larger and heavier frames. The additional cost of procuring a foal from a blooded horse, has had a tendency to encourage the introduction of cheaper and larger breeders for a market where lately no distinction has been made on account of pedigree.

The prices of horses vary now from $70 to $150. The average may be quoted at $100.

The raisers and buyers of mules have found the rearing and sale of these animals a very lucrative business. As a general thing, the mule raiser, unless he desires to gather a large drove, will sell his colt at weaning time, which is from the 1st to the 20th of September. The present price for foals of this age, is from $40 to $75. It sometimes happens that a colt of extraordinary size will sell for a sum exceeding this last limit, yet the prices named are those generally given. The colts are usually bought by some farmer whose occupation it is to purchase foals, and raise and break them for labor.

The preparation for mule feeding consists of large enclosures of blue-grass pastures, with a very high and strong fence, provided with a shelter from the inclemency of the weather, and food of corn, hay, or fodder, whenever the ground is covered with snow, or the intensity of the cold prevents grazing. These animals are thus kept until they are generally four years old, when they are either sold to purchasers who visit our State from Kentucky or the Southern States, or are driven by their owners to a Southern market. So few of them go to the Atlantic States by railway or canal, that I have found no one who can give me any information as to the cost of this mode of transportation.

The cost of rearing a mule is from $18 to $20 per annum, and its value at maturity varies from $80 to $120.

Statement of H. L. Brown, *of Fayette, Howard county, Missouri.*

The rearing of horses and mules is highly profitable with us. The cost of raising a horse or mule colt till three years old, might safely be put at $10 a year, which, at that age, together with the service of the horse or jack, would put the mule or horse at $40 or $50. At that age good animals will average $100. Some mule-colts have sold this fall, at weaning time, at $100 and upwards each.

Statement of D. C. Garth, *of Huntsville, Randolph county, Missouri.*

The cost of rearing mules here until they are three years old is about $25, and their value at that age is, on an average, about $85. The average price of mule-colts has been gradually increasing for the last four or five years. At present they are worth about $50 each.

Statement of Armstrong O'Hara, *of Saint François county, Missouri.*

There are few, if any, blooded or foreign horses with us. Those we have are generally from the great Mississippi valley. The cost of raising is $45 at four years old. Fair draught-horses will command from $75 to $100. Cost of transportation by steamboat to the Southern markets $10, the owner to furnish the feed.

Mules cost about the same for raising as horses, except that they are fit for market at three years old, and meet with a more ready sale.

Statement of Thomas Shourds, *of Lower Alloway's Creek, Salem county, New Jersey.*

Our present breeds of horses are crosses of the Messenger, Wind-flower, and perhaps some others, upon our old stock. The Norman breed is also beginning to be introduced into this vicinity.

The cost of rearing a colt till three years old is about $50, and if the stock is good and properly cared for, a good animal will command $100.

Horses and mules are raised in this county to a considerable extent, but not in sufficient numbers for our own use, particularly the latter. They are hardy animals, easily reared and kept, and might be supported the first three years for about $40 each, or $80 a pair, which, if I am correct, would be much more profitable than horses.

Statement of Gershom Wiborn, *of Victor, Ontario county, New York.*

The horses raised here are almost as various in breed as they are in color. We have crosses of the heavy English draught-horse and the light English courser; the heavy-necked French horse and the wild Indian pony. For heavy labor, the crosses of the English draught-horse are preferred, while for the road, lighter horses are found to be the best.

The expense of raising a colt until it is three years old, according to the present prices of hay and pasturing, is as follows:

First year, fifty-two weeks, at 30 cents per week....	$16 60
Second year, fifty-two weeks, at 40 cents per week....	20 80
Third year, fifty-two weeks, at 50 cents per week....	26 00
Total expense..................................	63 40

Statement of Joshua Harris, *of Welche's Mills, Cabarras county, North Carolina.*

Little attention is paid here to the raising of stock of any kind. Horses and mules are brought in by drovers from Kentucky and Tennessee, and command high prices. Good horses sell for from $100 to $125; mules from $100 to $150 each.

Statement of Santarbilli S. G. Franklin, *of Cuba, Clinton county, Ohio.*

Horses are not generally raised here for market, except a few fine ones, good draught animals for the farm being the main object. For rearing a colt until three years old, it costs from $10 to $12 a year. Their average value at that age is $50.

Statement of Jacob Knoop, *of Elizabeth, Miami county, Ohio.*

The present high prices obtained for horses has also induced many of our farmers to engage in raising good horses and mules. A good four-year-old horse brings from $120 to $150, and mules, at two or three years old, are worth about $100 each. The expenses of driving them to the Atlantic markets are about $10 a head. The cost of raising horses till ready for market about $60; mules about $50.

Statement of William M. Macy, *of Quercus Grove, Linn county, Oregon.*

Horses succeed well here. Those Yankee bred are worth from $150 to $200 each. The Indian horses and Spanish mules are used in doing the drudgery of the country, and in packing to the mines.

Statement of H. N. McAllister, George Buchanan, James Alexander, J. K. Shoemaker, *and* William J. Waring, *being that portion of their report which relates to horses, to the Centre county Agricultural Society, Pennsylvania.*

The horses used and most needed are heavy draught, and this class of horses is brought to great perfection here. The quick draught and saddle horse has been from time to time improved by the introduction of stock from neighboring States. In 1834, the late Henry F. Tammany, of this county, purchased at the sale by government, at Washington, "Abder Haman," one of the stallions presented by the Emperor of Morocco to General Jackson, then President of the United States. This horse was kept here about three years, and though too small and light for this region, when combined with the larger breeds his progeny have proved valuable for the saddle and quick draught.

Horses now bring here from $100 to $150 each.

Mules are much used about our iron works. They are preferred, because of their being less liable to disease, hardier, and longer lived than horses. Many of the carters, however, have an aversion to them, and it is difficult to find one who does not prefer driving a team of horses. They are not raised here, but are brought from Kentucky, and cost from $100 to $130 each.

Statement of M. F. Myers, *of Kingston, Luzerne county, Pennsylvania.*

Our horses are tolerably well bred animals, being crossed and re-crossed by the different blooded stallions which have made their appearance among us from time to time for the last twenty years. When well matched, they will command from $350 to $600 a pair. There were a number of pairs sold last spring in my neighborhood for that price. The cost of rearing a good colt I do not think will exceed $50 or $60 until three years old. He will then command $100, and will pay his way, if judiciously managed, until he is fit for market.

Statement of Joshua S. Keller, *of Orwigsburgh, Schuylkill county, Pennsylvania.*

Horses can be raised with us to some advantage. I saw colts of two years old sold for $100; and in one instance, a stallion colt, two and a half years old, sold for $230. They are of the greatest value for the different branches of industry in our district, although a large number of mules are employed in the mining operations, in teams, and some on farms. A horse that is well shaped, works well, and is faultless, is very seldom sold for less than $100, and from that to $230.

The cost of rearing a colt may be estimated from $35 to $45 a year, till he becomes two or two and a half years old; after that, he will cost from $50 to $80, or more, according as he is kept; at that age some labor can be obtained from him. Many of our farmers labor under great disadvantages for the want of servants who know how to treat a horse; hence we see so many ruined before they are half raised.

Statement of H. D. Maize, *of New Berlin, Union county, Pennsylvania.*

The animals which can be raised to the best advantage in this section of the country, I think, are horses. The cost of raising a colt until he is four years old will vary with different persons and the circumstances under which he is raised, ranging probably from $60 to $75, and his value at that age here will be from $125 to $150. I speak of a serviceable, good horse. The cost of transporting him to Philadelphia, on foot, may be about $5. As there are no imported blood-horses in this vicinity, except the breed most common in this State, I can only say they have been the only ones used for labor.

Statement of John Eichar, *of Greensburgh, Westmoreland county, Pennsylvania.*

We have but very few thorough-bred horses in this county. The only stock of importance is that from the "John Marshall," which was sired by the celebrated blood-horse "Gohanna," out of "Lady Alfred."

The cost of rearing colts of the first class for heavy draught, at three years old, is about $42, which will bring at that age, upon an average, $100.

Mules are not raised to much extent in this county, although quite a number are used on the canals and at the furnaces, where they are considered superior to horses for bad roads and rough usage. They

are mostly brought from Kentucky, where they are more profitably raised than horses. One gentleman in that State sold, last spring, one hundred head of three-year-old mules for $15,000, one third more than could be obtained for horse-colts of the same age. They are a hardy race of animals, and can be reared with less care and expense than horses.

Statement of JOSEPH PARKER, *of West Rupert, Bennington county, Vermont.*

The expense of keeping a colt the first winter is from 1½ to 2 tons of hay, valued at $7 per ton; the second winter 2 tons; the third winter 2½ tons, amounting say to $42. To this add the pasturing, thirty weeks each season—the first year at 10 cents per week; the second 15 cents; and the third 20 cents per week, amounting to $13 50; making the cost of rearing, at three years old, $55 50. The average value of a horse here at three years old, is about $75. The Morgan horse is regarded by us as the most suitable for labor.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

Most of our farmers keep a pair of horses; one, and sometimes both of which are breeding mares. They often do the entire work of the farm, while others share the work with oxen. It costs $40 to raise a colt to the age of three years, worth from $50 to $150 each. We are improving our breed of horses more than any other stock that we raise. Our best ones are of the Morgan and Black Hawk breeds.

Statement of H. W. LESTER, *of Rutland, Rutland county, Vermont.*

The breeds of horses the most esteemed here are the Morgans and Black Hawks, which are generally sold at home from $100 to $150 each. The cost of raising varies from $30 to $100 per annum. This variation in the cost may seem at first a little wide; at the lower price, however, a colt may be kept on hay and grass with but little attention, except foddering in winter; the higher price is often fully expended when the colt is kept up through the year. The care of him requires half a man's time; he is fed with the warm new milk of a good cow during the year, with a number of baked sweet-cakes daily, besides hay and oats, and is well groomed. Horses reared in this way are from 13 to 15½ hands high; weigh from 900 to 1,200 pounds; are docile, very active, great travellers, and for speed and bottom are not to be beat.

Statement of WILLIAM SMOOT, *of Boone Court House, Virginia.*

Our horses are generally of the "scrub" variety, with a very little imported blood in them. They are generally raised more for farm use than otherwise. We feed them only in winter, which costs about $10 a head; the rest of the year they graze on our pastures, requiring nothing more than a little salt.

The cost of raising a colt until three years old does not exceed $40. They sometimes sell at that age for $75.

SHEEP.

The first sheep introduced into any part of the present territory of the United States were brought from England to Jamestown, in Virginia, by the "London Company," in 1609. In 1648, the number of sheep in that colony had increased to three thousand. In 1657, sheep, as well as mares, were forbidden to be exported. In the early part of the last century, they throve well and bore good fleeces; but wool raising was suffered to decline, owing to the losses sustained by tearing off the wool by bushes and briers.

The first sheep imported into New Netherland were brought from Holland, by the "Dutch West India Company," in 1625; others were brought from Zealand and Texel to Rensselaer's Wick in 1630. But little progress was made in sheep raising on the Hudson for many years, in consequence of the ravages committed by dogs and wolves. In 1643, there were not over sixteen sheep in the colony; in 1650, they were so scarce that an animal bearing a ewe was worth from $8 to $10.

Sheep were introduced into the plantations on Massachusetts Bay prior to 1633, as mention is made of keeping them on the islands in the harbor to protect them from the Indians and wolves. By the inventory of Piscataqua and Norridgewock, in 1635, that settlement contained ninety-two sheep. In 1652, the increase had been so great in the vicinity of Boston, that Charlestown numbered four hundred alone. Sheep were introduced into Nantucket in 1660, at the time of its first settlement by the proprietors. A prosperous business has ever since been carried on there in wool raising. The average number of sheep sustained on the island is about seven thousand. Before the Revolution, considerable quantities of wool were exported to France. In 1790, the number of sheep exported from Piscataqua was two hundred and sixty-one.

Although the honor of first introducing Merino sheep into the United States from Spain has generally been accredited to Hon. David Humphreys, late minister to the Court of Madrid, it will appear from the following extract of a letter from William Foster, dated at Boston, November 23, 1853, that they were brought to this country nine years before

"In April, 1793, on returning from Cadiz, where I had been passing several years, I brought out an original painting by Murillo, and three Merino sheep—two ewes and a ram; the export of which at that time was severely prohibited, and attended with much difficulty and risk. We had a long passage, (seventy-five days,) and the sheep were in a dying condition. Fortunately, there was on board a Frenchman, that had been with the Spanish shepherds, who cured them by administering injections.

"Being about to leave this country for France, soon after my arrival in Boston, I presented these sheep to Mr. Andrew Craigie, of Cambridge, who, not knowing their value at that time, 'simply ate them,' as he told me years after, when I met him at an auction buying a Merino ram for $1,000."

The following table shows the number, quantity, and valuation of sheep and wool exported from the United States within the last thirty-three years:

Years.	Sheep.	Value.	Wool.	Value.	Total.	Years.	Sheep.	Value.	Wool.	Value.	Total.
	Number.	Dollars.	Pounds.	Dollars.	Dollars.		Number.	Dollars.	Pounds.	Dollars.	Dollars.
1820–21	11,117	22,175	....	....	22,175	1837–38	6,696	20,462	....	....	20,462
1821–22	6,368	12,276	....	....	12,276	1838–39	6,084	15,960	....	....	15,960
1822–23	6,680	15,029	....	....	15,029	1839–40	14,558	30,696	....	....	30,696
1823–24	7,421	14,938	....	....	14,938	1840–41	14,639	35,767	....	....	35,767
1824–25	9,681	20,027	....	....	20,027	1841–42	19,557	38,892	....	....	38,892
1825–26	8,695	17,693	....	....	17,693	1842–43	13,600	29,061	....	....	29,061
1826–27	8,745	13,586	....	....	13,586	1843–44	12,980	27,884	....	....	27,884
1827–28	5,545	7,499	....	....	7,499	1844–45	6,464	23,948	....	....	23,948
1828–29	6,646	10,644	....	....	10,644	1845–46	9,254	30,303	668,386	203,996	233,999
1829–30	15,460	22,110	....	....	22,110	1846–47	10,533	29,100	378,440	89,460	118,560
1830–31	8,262	14,499	....	....	14,499	1847–48	6,231	20,823	....	....	20,823
1831–32	12,260	22,385	....	....	22,385	1848–49	4,195	16,305	....	....	16,305
1832–33	11,821	21,464	....	....	21,464	1849–50	3,945	15,753	35,898	22,778	38,531
1833–34	16,654	29,002	....	....	29,002	1850–51	4,357	18,875	....	....	18,875
1834–35	19,145	36,566	....	....	36,566	1851–52	2,968	16,291	55,550	14,308	30,599
1835–36	6,342	18,548	....	....	18,548	1852–53	3,669	17,808	216,472	26,567	44,375
1836–37	3,460	16,852	....	....	16,852						

According to the census of 1840, there were in the United States 19,311,374 sheep; of 1850, 21,723,220, one year old or older. The present number of sheep in the Union, exclusive of lambs, may be estimated at 23,000,000, which, at $2 each, would amount to $46,000,000.

CONDENSED CORRESPONDENCE.

Statement of T. L. Hart, *of West Cornwall, Litchfield county, Connecticut.*

I bought my farm in 1835, and stocked it with sheep, and with fair prospects of success. My first clip of wool sold for 65 cents per pound, and the fleeces averaged over three pounds each. This, together with the price of the lambs, which was $1 75, afforded a fair remuneration. My sheep cost me $3 per head, and I spared no pains in improving my flock, by selling off the poorest and buying better, until I had added about 25 per cent. to their value. At that time, between this place and Poughkeepsie, a distance of forty miles, there were many more thousands of sheep than at present.

About this period Congress began to reduce the tariff, and then the price of wool began to recede from year to year, until I sold my last clip, from a part of the same flock, at 29 cents per pound—wool of better quality than the first clip, which sold for 65 cents. As wool could not be sold for money, except at a ruinous sacrifice, I disposed of my flock for 75 cents to $1 per head—some of the same sheep that cost me $3 each—a ruinous sacrifice, both on my flock and on wool. I have since turned my attention in part to rearing improved sheep, for breeding purposes. I have selected the Cotswold, which I think the best, both for supplying the market with mutton and coarser grades of cloth. My success has thus far

exceeded my expectations. The demand for this kind of sheep has been such, that they sell for very remunerating prices in various parts of the county. From present appearances, the demand is likely to increase on the supply, the finer grades of sheep having gone out of this part of the country. The markets depend mainly upon the coarser grades of sheep for a supply. I have this year exhibited at the Litchfield Agricultural Society a Cotswold sheep and her three lambs, (all at one birth,) the weight of which, at six months old, was 312 pounds, or 104 pounds each. They were brought up by the same dam, without extra feed. Last year the same sheep produced two lambs, which, at the same age, weighed 126 pounds each. The usual weight of my lambs at that age is from 80 to 120 pounds.

Since raising coarse sheep, I have never failed of producing more lambs than I have sheep—say thirty-five lambs to thirty sheep. My wool this year sold for 34 cents per pound. The weight of fleece varies according to keeping, from four to ten pounds a fleece. It is sufficient in a large flock to keep them well enough to make their fleeces weigh over seven pounds each.

Statement of Anthony M. Higgins, *of Wilmington, New Castle county, Delaware.*

Not less than 15,000 head of sheep have been purchased by our farmers this season from the West, at prices ranging from $2 50 to $6 a head. The wethers are designed for feeding during the winter; the ewes for their lambs the summer after. Fat sheep, through the winter, rule from $4 50 to $8 each. Ewes are deemed by many the most profitable, as the lambs readily bring from $3 to $3 25 each. Wool is worth $1 50 per fleece. The manure and advance on a ewe's own carcass will contribute considerably towards defraying the expense of her keeping. It is estimated that one acre of clover will keep five ewes and their lambs.

Mr. Reybold, of Delaware City, says in a note to me: "We have imported regularly every two years two rams and six or more ewes of the Cotswold or New Oxfordshire stock, and I now have some eighty very superior full-blooded ewes. We find universally that a cross with our common Western sheep, which are generally half or quarter-blooded Merinos, will add 100 per cent. both to wool and carcass. The wool generally commands about the same price as half-blooded Merino wool.

"I have found the average yield from the progeny of my imported sheep to be, for bucks and wethers from 15 to 18 pounds, and for ewes 10 to 12 pounds, to the fleece of well-washed wool.

"My full-blooded bucks, at one year old, command from $50 to $100 each, according to quality; the ewes from $25 to $40 each. I have found no difficulty in disposing of my sheep, as fast as they become ready for the market, at the above-named prices. The cost of rearing I believe to be about the same as that of our common breed. The value of the stock at maturity, for mutton, must greatly depend upon the condition of the animals when put into market. I had a small lot

of wethers in February last weighing, when dressed, as follows: 269½, 213, 203, 201, 181, and 160½ pounds each. I have another lot now on hand, which, by February next, will make quite as good, if not a better average than the above."

Statement of EDWIN WINSHIP, *of Winship's Mills, Clinton county, Indiana.*

The breeding of sheep is receiving increased attention with us every year. Many of our farmers think it more profitable than raising corn. Quite a number of them keep flocks sufficiently large to produce wool for family use. The wool is generally sold to the agents of the manufacturing establishments in the Eastern States.

Wool-growing would be more profitable if sheep could be protected from the ravages of dogs; but these animals are so plenty, and so mischievous, that it is difficult to obtain indemnity for their ravages, and some have almost abandoned the business from this cause.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

In this vicinity sheep are not raised in very great numbers, though they do well and are considered profitable, every farmer having his flock. This society has tried most of the improved breeds, and is now making trial of the French Merinos, which promise to do well, on account of their thick and heavy fleeces, &c. A cross from the Merino or Saxony on the Cotswold or Bakewell, produces a sheep with fine long wool, excellent for worsted. Average weight of fleece of Saxons, from 2½ to 3 pounds; of Spanish Merinos, from 3½ to 4 pounds. Other large and coarse-wooled sheep yield heavier fleeces.

Price of wool, from 35 to 40 cents per pound; but little difference made in price between coarse and fine. The number of lambs raised per annum is nearly equal to the number of ewes. Cost of keeping per head per annum, from 50 to 75 cents each.

Statement of WILLIAM UPTON, JR., *of Dixmont, Penobscot county, Maine.*

The rearing of these animals, for many years neglected or but little attended to, is now beginning to attract considerable attention from farmers of this vicinity, as both wool and mutton have considerably advanced in price, and have become quite an article of transport to Brighton market. They are also largely consumed in our nearer market at Bangor. Lambs six or seven months old are worth each $2, though for several years back $1 25 was about the average price for them. Cost of freight to Brighton market, 25 cents each.

An essential service has been rendered to this section by Mr. Charles Perly, of Woodstock, New Brunswick, who, several years since, imported from England into that province some large coarse-wooled sheep, said to be the pure Dishley. They are well adapted to this

region, though there is an objection to the full bloods of this importation, as their wool grows from eight to ten inches long, and parting on the back, which peculiarly exposes the animal to the vicissitudes of our cold New England storms. Some of the rams of this breed have sheared at one clip 17 pounds of clean wool. The various grades of this breed of sheep have been driven by hundreds for several years past from Aroostook county, adjoining New Brunswick, into other parts of the State, and, when crossed with our common stock, are considered very valuable for their hardiness, large quantity and superior quality of mutton, and for the heavy yield of wool they produce.

The price of wool here usually varies from 25 to 40 cents per pound; but this year it is worth from 40 to 46 cents per pound.

Statement of SAMUEL JOHNSON, *of Jackson, Waldo county, Maine.*

Sheep, in order to make them most profitable, should be wintered chiefly on corn or beans. I give each of my sheep about a gill of corn per day, or three-fifths of a bushel during the winter. This, with a trifling amount of hay or straw, will keep them in excellent condition, and there need be scarcely a kernel of corn nor a straw of fodder wasted. The average cost of keeping sheep in this way is about $1 a year, and the net profit is about 100 per cent. per annum. The average yield of wool is about four pounds to a sheep. The average price of lambs is about $2, when from three to four months old.

On the Thorndike farm, in this town, there were formerly kept large numbers of sheep, a part of which were imported from Saxony and Spain. The Saxons first deteriorated in our extremely changeable and severe climate, and even the Spanish Merinos did not flourish well. The French Merinos we have never tried. The coarser-wooled breeds are now getting into general use.

Statement of GEORGE W. DRISKO, *of Jonesborough, Washington county, Maine.*

The principal cost of raising sheep here is their keeping through the winter season, which cannot be reckoned higher than $1 a head. Add 50 cents for incidental expenses; the cost of keeping per head for one year is $1 50. Twenty-five Merino and Saxon bloods will shear 75 pounds of wool, worth, at present prices, $26 25. If well kept and in good condition, they will increase their flock in the ratio of 90 per cent. Twenty-two lambs are worth in August $44. At $4 per pair, with the cost of keeping, at the end of one year twenty-five sheep will cost $87 50, while their income for the same period amounts to $70 25, realizing a profitable investment.

Sheep, in this climate, should have a place under cover, where they can pass in and out at pleasure, especially during storms at any season of the year. The refuse straw of the barn should occasionally be spread in the pen, thereby being easily converted into manure.

Statement of Horatio N. Andrus, *of Brandywine, Prince George county, Maryland.*

In 1847, I commenced driving Spanish Merinos, mostly from Vermont, to Virginia, between which and the fall of 1852 I sold upwards of 13,000 for wool-growing purposes. Finding it a profitable business, I established a sheep farm, where I now reside, in the autumn of the following year. I have now on my place 1,000 Spanish Merinos, consisting of about 600 old ewes and 400 lambs, among which are about 20 bucks. The committee on sheep at the agricultural fair, in this county, last fall, awarded me their premium on ewes.

To show that sheep raising in this section of the Union is a profitable business, I would state that my clip in Virginia, of 1850, from 200 ewes, brought, on an average, $1 60 each fleece. They also produced 200 lambs, which sold for $2 62½ each. The cost of keeping, exclusive of superintendence, was about 25 cents a head, feeding each on a gill of corn a day, and this for only ninety days. The rest of the year they took care of themselves.

From a safe calculation, I have arrived at the conclusion, that if 3,000 Spanish Merinos were allowed to multiply for ten years, selling off the old ewes, fat wethers, &c., using the proceeds for the purchase of breeding-ewes to replace those sold, the net profit arising from the sale of the wool, and the value of the whole flock, at the end of that period would amount to the enormous sum of $1,800,000!

Statement of C. F. Mallory, *of Romeo, Macomb county, Michigan.*

The pure-blooded French and Spanish Merinos are the kinds most preferred, and crosses of the Bakewells, Leicestershires, and South Downs, with our common sheep. The grade of wool here is good, and yearly improving. Many of our wool-growers get their best animals from Vermont. For mutton, the Bakewells and other English sheep are preferred. The cost of raising wool is from 20 to 30 cents a pound.

Statement of J. D. Yerkes, *of Northville, Wayne county, Michigan.*

Sheep at present are the most profitable stock kept on our farms. The high price of wool and mutton makes this branch of husbandry a very lucrative business. It is necessary that considerable judgment be exercised in selecting animals to breed from. I believe the Spanish Merinos combine more points of excellence than any other variety which has been introduced into this State. They are of medium size, possessing a strong and vigorous constitution, and carrying a fine and even fleece, very compact on the animal, which enables it to endure our changeable climate with less care and attention than the more open-wooled varieties.

Statement of William S. Maynard, *of Ann Arbor, Washtenaw county, Michigan.*

Great attention has been paid here of late to the improvement of sheep, especially to enlarge their size and increase the wool, in which

we have been very successful. Several Paular and Spanish Merinos have been brought from Vermont, and some imported—one French Merino buck, the fleece of which at a year old weighed 32 pounds. By a very little care I have increased the average weight of wool on my sheep in four years from 2¾ to 4¼ pounds, which at the last year's price, 55 cents, is quite an item in regard to profits.

The cost of growing wool is from 14 to 20 cents per pound, and the average price for the last three years has been 40 cents.

Statement of Thomas W. Sampson, *of Ashland farm, Rocheport, Boone county, Missouri.*

Every farmer with us has his flock of sheep; but, as a general thing, they are kept only in sufficient numbers to furnish wool for family use. We have some very large flocks, however, numbering from 300 to 3,000 each, among which are several of the improved breeds, as the French and Spanish Merinos, Saxons, Cotswolds, Leicestershires, South Downs, &c.; and this improvement in our stock is showing itself very rapidly, both in the size of the carcass and in the quantity and quality of the fleece. The French Merinos are not generally so much esteemed as the Cotswolds and the South Downs.

Statement of James L. Minor, *of Jefferson City, Cole county, Missouri.*

The prices of sheep and their product have been so low until lately, that the efforts at improvement by some of our enterprising farmers have met with small encouragement. With the increased demand for wool, and the consequent demand for sheep, has been renewed the spirit of improved sheep-husbandry. Some very fine specimens of French and Spanish Merinos, and of Cotswolds, were exhibited at our recent State fair, and their owners are anticipating golden returns for the labor and care bestowed on these valuable animals. With us the Merinos are preferred for their fine wool, and the Cotswolds for carcass and wool combined.

The cost of rearing a common sheep is about 40 cents a year, and its value at maturity is about $2. Wool, at present, is worth from 30 to 50 cents per pound.

Statement of H. L. Brown, *of Fayette, Howard county, Missouri.*

Wool-growing is peculiarly adapted to our location, where land is cheap and labor high; yet but little attention has been paid to it with us. In some of the adjoining counties, many have gone largely into the business, importing the finest stock for that purpose.

Statement of Armstrong O'Hara, *of Saint François county, Missouri.*

No sheep, except the common kind, are raised here. They cost $1 at a year old, and generally sell at $1 50 a head. Their wool is usually sold to be manufactured into cloth and other materials, which are sold for the use of the iron and lead establishments in our section.

Statement of Levi Bartlett, *of Warner, Merrimack county, New Hampshire.*

Of sheep, we have, in goodly numbers, the Saxon, Merino, and the "old sort," with a medley of all grades and qualities. Wool-growing and lamb-raising have been a good business for our farmers for a year or two past. They have found a ready cash sale, and good prices, for their wool, mutton, sheep, and lambs.

Statement of Gershom Wiborn, *of Victor, Ontario county, New York.*

The sheep of this county are of almost every grade, from the finest Saxony blood to the coarsest of our native stock. There is at present quite an effort being made to improve our breeds of sheep, but these efforts are made in every different direction. Some are trying to get their sheep up to a larger size, so as to make them more profitable for mutton; while others are crossing with finer grades, in order to produce better wool. There have been some bucks sold here for prices varying from $60 to $200 each.

Formerly, wool-growers entertained the idea that to grow fine wool they must keep small sheep; but now they find that by selecting from the best flocks the largest and finest bucks and ewes, they can improve both the size of their sheep and the quality of their wool. A neighbor of mine has sheared from ten sheep, of his own raising, 100 pounds of fine wool, which he has sold for $50 the past season. Another neighbor has a buck of the French Merino breed, which weighs about 200 pounds, and shears 11¾ pounds of fine wool. A sheep that is large, and has fine wool, is longer lived, and is always hardier and more easily wintered, than a small one.

Statement of John B. Young *and* James De Mott, *of Ovid, Seneca county, New York.*

The improvement of our sheep has advanced somewhat, but not equal to that of cattle. The preference is given to the Merino.

Price of wool the past season has ranged from 45 to 50 cents per pound, according to grade; and the average price of good store sheep, from one to three years old, $2 75; if fit for the butcher, $4.

Statement of Lewis G. Morris, *of Mount Fordham, Westchester county, New York.*

The only kind of sheep I raise is the South Down. This variety is what is known in England as the fine mutton sheep, the quality of which is so famous, the lean and fat being well mixed. The wool is of a medium quality, and will always find a ready sale at paying prices. They mature early, keep easy, stand almost any climate, and the ewes are great milkers, which advance their lambs rapidly.

Statement of Joshua Harris, *of Welche's Mills, Cabarras county, North Carolina.*

There is little or no attention paid to the raising of sheep in this region. The devouring dogs have been so destructive on them that many farmers have abandoned the business, and buy their woolen goods for winter apparel at the North.

Statement of Jacob Knoop, *of Elizabeth, Miami county, Ohio.*

More attention is now paid here to raising wool than formerly. We have many small flocks of very fine Saxony and Merino sheep, which are worth from $2 50 to $3 a head. We have recently introduced some of the French Merinos, which are considered an excellent cross by increasing the size of the sheep. Wool is worth with us 50 cents per pound.

Statement of William M. Macy, *of Quercus Grove, Linn county, Oregon.*

Sheep need no care save guarding against the wolves. The ewes bring two lambs usually, and twice a year. Wool is worth 25 cents per pound. Our clothing comes from the East; but we save the wool. Sheep are worth $10 per head.

Statement of H. A. Case, *of Troy, Bradford county, Pennsylvania.*

Sheep husbandry is beginning to attract that attention here it so well deserves. The high price of wool; the great value of sheep in keeping down briers and other foul stuff, and in renovating the land, together with the advanced price of mutton, all conspire to increase its importance; so that the desire to engage in this branch of rural economy is becoming general. With us it is as yet in its infancy. The Merino, crossed with our common breeds, is the material of which our flocks are mostly composed.

The average price of wool for the past ten years is 28 cents per pound; price in 1853, 41 cents.

Statement of N. Linton, *Cochransville, Chester county, Pennsylvania.*

Wethers are bought out of droves and fattened here for market; and ewes with us are almost always raised with profit, each, with proper care, producing, on an average, one lamb a year, which will sell for from $2 to $3 each at six months old. Each ewe yields from three to five pounds of wool per annum; which, when washed, sells for 40 cents per pound. When fat, they will often sell for more than the first cost, which is sometimes $6 a head.

Statement of John Eichar, *of Greensburgh, Westmoreland county, Pennsylvania.*

The rearing of sheep has been neglected with us. The small Spanish Merino and the common stock of the county are the only ones

raised, with the exception of a few Cotswolds, South Downs, and French Merinos, which have lately been introduced.

The average price of common wool here is 45 cents; of Merino 60 cents.

Statement of E. F. GILBERT, *of Matagorda, Matagorda county, Texas.*

Some attempts have recently been made to grow sheep on the coast ranges on the western side of our bay; and although we had had some grounds for sanguine hope of its practicability from previous experiments, we regret to learn, recently, from those who engaged in the business, that it does not succeed well. The sheep sicken and die in large numbers—whether from disease contracted in the low altitude, or from deleterious gases of the locality, is not known. On the opposite or peninsular side of the bay, which is more elevated, they appear to succeed better.

With regard to the price of the different grades of sheep in Texas, we are scarcely enabled to give a definite answer. In this county there are not more than 4,000 or 5,000 altogether, and I know of none for sale. They are principally crosses of the Merino and South Down with the Mexican, and may probably be estimated worth $2 50 per head. In the neighborhood of San Antonio, Mexican sheep can be purchased at $1 and $1 25 per head, perhaps less just now, as I understand that large droves have recently passed over the Rio Grande into Texas. Some few of the improved breeds have recently been imported into the State by stock-raisers. Sheep of this description would bring a good price in Texas, and emigrants designing to engage in the business here should bring a stock to commence with. Merinos, for several reasons, are considered best suited to our climate. They possess strength of lungs and limbs, and, being originally from a warm temperature, are easily acclimatized. Practical experience has established the fact that sheep are not necessarily inhabitants of the snow-clad regions, but, on the contrary, are found to improve in vigor and wool in the lower latitudes. Thus, every advantage considered, the prairies of Western Texas present the best facilities for sheep-raising of any part of the world.

Statement of JOSEPH PARKER, *of West Rupert, Bennington county, Vermont.*

The yearly expense of keeping a sheep here is about $1 30; and the average product in wool of each per annum, at 50 to 65 cents per pound, is about $2. The cost of transportation to market by railroad is 10 cents per 100 pounds.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

Our dairymen keep sheep only sufficient for family use. They are a mixture of the common breed of the country and Spanish Merinos, with a strain of the English intermixed. I undertook, some years since, to improve the breed of my sheep, which consisted of three-fourths Merino, with a cross by an imported Yorkshire ram. Some of the progeny had the large, symmetrical form of the sire, with his long, thin wool, while others were the *fac simile* of the dam. In process of time the size of the sheep increased, but they did not grow that fine silky fleece. In the fall of 1852, I killed two three-year-old and one yearling sheep, and took from the three 82 pounds of tallow. Where but few sheep are kept, our common and English breeds are most profitable. There are also a few valuable flocks of fine-wooled sheep kept in this county.

Statement of H. W. LESTER, *of Rutland, Rutland county, Vermont.*

Of sheep, the Spanish Merinos are the best and most profitable, with a common chance. In large flocks, fleece wool washed on the sheep can be raised for 40 cents per pound. It is carried to Boston market by railroad for about $7 per ton.

Statement of HENRY M. PRICE, *of Nicholas Court House, Virginia.*

No country in the world is better adapted to the successful raising of sheep than this county; and I am pleased to say that more and more attention is paid to them, and the flocks are gradually enlarging. All that is wanting, is for men of energy, enterprise, industry, capital, and experience in breeds by crossing, to settle among us, to render wool our chief staple, and the amount annually sold greater than that from any other county in the Union. I have seen no region in which they seem to thrive so well, with so little attention.

Statement of GUSTAVUS DE NEVEN, *of Fond du Lac, Fond du Lac county, Wisconsin.*

Sufficient attention has not been paid with us to the rearing of sheep; and it is somewhat singular that but few of our farmers as yet own a good flock of them. It is, however, unquestionable that few branches of husbandry would reward the farmer so well as the raising of wool. Sheep thrive admirably on the prairies, or on our wood-land openings. The fleeces are quite heavy, and the mutton unsurpassed. When it is considered, too, that the price of transportation to an Eastern market is lighter on wool, in proportion to its value, than any other Western product, it is surprising that our farmers do not engage more extensively in this branch. One of the causes, perhaps the only cause, has been that sheep have been difficult to procure. Few droves have as yet been brought here, although, when so brought, they have sold very rapidly, and would now command good prices. Wool, this fall, has been worth about 50 cents per pound.

Statement of PHILANDER JUDSON, *of Liberty, Kenosha county, Wisconsin.*

Wool-growing, with us, is receiving increased attention. The great mass of sheep are grades between the common and the Saxony and Merino, though there are a few flocks where may be found animals of pure Saxony and Merino breeds. The cost a head of keeping sheep through the year is 50 cents; weight of wool a head, from 2½ to 5

pounds—many flocks not averaging more than the former, but some as high as the latter figure. From grade sheep, 3¼ pounds I think near the general average. The improvement in the price of wool the past season has stimulated wool-growers in the right direction. Many of the pure and mixed French and Spanish Merinos have been introduced into this section, principally from Vermont—no doubt, ultimately, much to the benefit of the producer.

The price of wool, the last clip, in Kenosha, was from 35 to 50 cents per pound.

SWINE.

The first swine introduced into America were probably brought from Spain to Hispaniola, by Columbus, in his second voyage, in 1493; for, as a portion of his cargoes consisted of horses, cattle, seeds, plants, &c., it is not likely that he would have omitted so common an animal as the hog.

The first person, so far as we know, who imported swine into what now constitutes a part of the United States, was Ferdinand De Soto, in 1538. He brought them from Cuba to Florida with a cargo of horses, among which were thirteen sows, the progeny of the latter soon increasing to several hundred.

The Portuguese took cattle and swine to Nova Scotia and Newfoundland in the year 1553. Thirty years after, they had multiplied in such abundance that Sir Richard Gilbert, in attempting to land on that island to obtain supplies of cattle and hogs for his crew, was wrecked. Swine and other domestic animals were brought to Acadia by L'Escarbot, in 1604, the year that country was settled. In 1608, the French extended their settlement into Canada, and soon after introduced various animals, among which, probably, there were swine.

In 1591, the British ship "Henry May" was wrecked on Bermuda, at which time the surviving crew found that island swarming with wild black hogs, though not a single human being was living there. It is supposed that these swine were the descendants from those which had belonged to some vessel that had been cast away there many years before, as several Spanish and Dutch wrecks were found on the shore.

The first swine introduced into Virginia was by the "London Company," in 1609. They consisted of six hundred in number, and multiplied so rapidly in the colony, that in 1627 the people were obliged to palisade Jamestown to prevent being overrun by them. In 1627, the Indians near the settlement fed upon hogs that had become wild in the forest, without number, instead of game. Every family in Virginia, at that time, who had not an abundance of tame hogs and poultry, was considered very poor. In 1733, which was a good meat year, one planter in Virginia salted down 3,000 barrels of pork.

On the authority of Captain John Smith, of Virginia, swine were first introduced into the colony of Massachusetts Bay in 1624. They are mentioned as thriving on fowl meadow-grass in 1629, which grew wild in that vicinity, and was also relished by the horses, cows, and goats. In 1650, the price of a yearling sow was from $4 80 to $5 60.

The first importation into New Netherland was made from Holland, in 1625, by the "Dutch West India Company." In 1644, the price of a yearling sow in that colony was from $8 to $10. In 1671, hogs fattened well there in the woods, but those fed on Indian corn made sweeter pork.

Hogs were abundant on the Illinois river prior to 1750.

The first swine of which we can find any reliable account as having made much improvement in the breeds in the United States, was a pair of pigs sent by the Duke of Bedford to General Washington, by a Mr. Parkinson, an English farmer, who came to this country towards the close of the last century. He leased a farm in the vicinity of Baltimore, in Maryland, where he resided for some time. Instead of delivering these pigs to Washington, he dishonestly sold them. They were generally called the "Woburn" or "Bedford" breed; but in some districts in this country, they were known by the name of the "Parkinson hog." This breed originated at Woburn, the estate of the Duke of Bedford, produced by a cross of a Chinese boar on the large English hog. When bred in perfection, they were splendid animals, being fine in their points, of a deep round carcass, with short legs and thin hair. They kept easily and matured early, weighing, at twelve to twenty months, from 300 to 700 pounds, having light offal, and meat of the first quality. Their color was white, broken more or less with dark-blue or ash-colored spots. At one period, they were widely diffused in Maryland and the border counties of Virginia, as well as in Delaware and Pennsylvania; but it is believed that the purity of the breed no longer exists, either in England or this country. General Ridgely, of Maryland, bred these hogs in perfection. He sent a pair to Hon. Timothy Pickering, of Salem, Massachusetts, the descendants of which and their crosses, were extensively propagated in this as well as the adjoining States.

The amount of pork exported from Charleston, South Carolina, in 1747–48, was 3,114 barrels; in 1754, 1,560 barrels; from Philadelphia, in 1752, 4,812 barrels; in 1767, 6,647 barrels; in 1796, 12,029 barrels, besides 1,082,690 pounds of ham; from Savannah, in 1755, 20 barrels; in 1760, 8 barrels; in 1770, 521 barrels. The annual amount exported from Virginia for several years preceding the Revolution, was about 4,000 barrels.

The total exports of pork from the United States in 1791, was 27,781 barrels; in 1800, 55,467 barrels; in 1810, 37,209 barrels; in 1815, 9,073 barrels.

The following table shows the number of swine and the quantities of pork, bacon, and ham, with their valuations, exported from the United States for the last thirty-three years:

Years.	Hogs.	Pork.	Bacon & hams.	Lard.	Value.
	Number.	Barrels.	Pounds.	Pounds.	Dollars.
1820-21.......	7,885	66,647	1,607,506	3,996,561	1,354,116
1821-22.......	9,798	68,352	1,142,945	4,137,814	1,357,899
1822-23.......	11,436	55,529	1,637,157	6,067,071	1,291,322
1823-24.......	8,838	67,229	1,409,199	5,053,182	1,489,051
1824-25.......	4,525	85,709	1,896,359	5,483,048	1,842,679
1825-26.......	6,939	88,994	1,836,133	7,231,643	1,892,429
1826-27.......	18,441	73,813	1,864,956	6,927,084	1,555,698
1827-28.......	16,171	53,836	1,837,920	7,493,319	1,495,830
1828-29.......	10,779	59,539	2,305,405	7,154,742	1,493,629
1829-30.......	22,294	45,645	2,154,986	6,001,417	1,315,245
1830-31.......	14,690	51,263	1,477,446	6,963,516	1,501,644
1831-32.......	5,266	88,625	1,810,830	7,756,782	1,928,196
1832-33.......	6,819	105,870	1,786,637	7,655,198	2,151,558
1833-34.......	3,338	82,691	1,520,638	9,050,342	1,796,001
1834-35.......	3,930	61,827	1,492,027	10,637,490	1,776,732
1835-36.......	1,231	22,550	1,398,475	6,493,878	1,383,344
1836-37.......	1,110	24,583	965,935	6,388,174	1,299,796
1837-38.......	366	31,356	1,194,890	7,209,478	1,312,346
1838-39.......	772	41,301	1,445,527	7,723,834	1,777,230
1839-40.......	4,854	66,281	1,643,397	7,418,847	1,894,894
1840-41.......	7,901	133,290	2,794,517	10,597,654	2,621,537
1841-42.......	5,564	180,032	2,518,841	20,102,397	2,629,403
1842-43.......	7,162	80,310	2,422,067	24,534,217	2,120,020
1843-44.......	9,615	161,629	3,886,976	25,746,355	3,236,479
1844-45.......	6,384	161,609	2,719,360	20,060,993	2,991,284
1845-46.......	7,437	190,422	3,006,630	21,843,164	3,883,884
1846-47.......	3,274	206,190	17,921,471	37,611,161	6,630,842
1847-48.......	4,750	248,269	33,551,034	49,625,539	9,003,272
1848-49.......	1,121	253,486	56,060,822	37,446,761	9,245,885
1849-50.......	881	881,841	41,014,528	54,925,546	7,550,287
1850-51.......	1,030	165,206	18,027,302	19,683,082	4,368,015
1851-52.......	185	83,382	5,746,816	21,281,951	3,765,470
1852-53.......	22	129,881	18,390,027	24,435,014	6,202,324

According to the census returns of 1840, there were in the United States 26,301,293 swine; of 1850, there were 30,354,213; showing an increase of 4,052,920. The present number may be estimated at 32,000,000; which, at $5 each, would be worth $160,000,000.

CONDENSED CORRESPONDENCE.

Statement of T. L. HART, *of West Cornwall, Litchfield county, Connecticut.*

It is a question, I believe, not yet settled to the satisfaction of farmers, whether corn ground or fed raw to swine will make more pork than when cooked. Ten bushels judiciously fed, according to my experience, will make 100 pounds of pork.

Statement of J. E. McCLUNG, *of Bloomington, McLean county, Illinois.*

The Berkshire and Irish grazier are the best breeds of hogs grown among us. The cheapest manner of raising pork is a rotation of clover, oats, and rye fields, to graze upon through the summer. The best manner to fatten is, to grind their grain, and let the meal undergo a partial fermentation in tubs prepared for the purpose.

Statement of WILLIAM J. PHELPS, *of Elmwood, Peoria county, Illinois.*

Hogs with us in the spring are turned into a clover field, with plenty of salt, and light feeding of corn, where they remain until about the 10th of July, when they are turned into a field of oats to keep themselves. These last them a month or six weeks, when the feeding on corn commences. First, and for a time, it is cut and hauled to them while the stalk is green and juicy, and both stalk and ear are eaten with a high relish. During all this time the animal has been growing thriftily, developing in size, bone, and stamina; and is in the best condition, as the corn ripens and hardens, to lay on fat with rapidity. The closing period of feeding in November and December upon ripe grain gives to the flesh the purest and most desirable character. Thus, with comparatively little labor, at a cost of about eight or ten bushels of corn, or its equivalent in other food, for every 100 pounds, we produce pork in the open fields, with temporary shelter towards the close, and find it remunerative even at the lowest rates. Hogs properly cared for in this way, will weigh at twenty months old from 200 to 400 pounds.

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Statement of WILLIAM S. PAYNE, *of Rushville, Rush county, Indiana.*

Pork-raising in this county is carried on extensively. Some farmers fatten from 500 to 3,000 hogs in a year. There have been a good many foreign hogs introduced among us, but, after being here a few years, they have lost their original identity, and are now scarcely known by any other name than "hog."

The question might be asked, How does one man fatten 3,000 hogs at one time? I answer, he turns them into a field of standing corn about the 1st of September; and when they devour the contents of that field they are turned into another, and so on until they are considered fat enough for market, which takes eighty or ninety days. This is what we call "hogging down corn." One hundred acres of good corn, say fifty bushels to the acre, will fatten about 350 hogs.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

There is some diversity of opinion as to the comparative value of the different breeds of hogs; the Berkshire, Irish grazier, and Woburn, however, are considered the best. They require but little further attention or feeding to keep them fat or in good order, than to let them run on blue-grass and clover pasture; giving them during the winter

an ear or two of corn morning and evening, or its equivalent in something else.

When it is considered that hogs can be employed to advantage in gleaning the fields after harvest, and in eating much offal which otherwise would be lost, in connexion with present prices, the conclusion must be that they are very profitable stock. They can be raised at a net cost of $2 25 per hundred. When about eighteen or twenty months old, they are fattened for market; and it is estimated that, during the time or process of fattening, one bushel of corn will make ten pounds of pork. If the corn were ground and cooked, it would go from 25 to 30 per cent. further.

For packing, hogs must weigh over 220 pounds, live weight; but the general average commonly in market is over 300 pounds, worth from $3 50 to $4 per hundred. Small hogs for family pork are worth from 50 to 75 cents per hundred less.

Statement of WILLIAM UPTON, JR., *of Dixmont, Penobscot county, Maine.*

Of hogs, various breeds have been introduced at times with good success—such as the Berkshire, Bedford, Newbury White; and more recently the Suffolk has made his appearance. These various kinds are crossed in every imaginable way, so that the long-nosed, slab-sided racer, formerly predominant here, has gradually given place to more compact, valuable breeds; and the average weight now at eighteen months old is not far from 350 pounds, and not unfrequently, with superior feed, go up to 600 pounds. They are usually kept in close pens, and fed with slops from the house, refuse of the dairy, and decayed potatoes—of which we are sorry to say there is no lack this year—till it is designed to fatten, when they are fed with Indian meal, prepared by grinding the corn and cobs together without shelling. This is usually mixed with hot boiled potatoes and skimmed milk, and given to them warm.

For the last four or five years, round hogs have been worth in Bangor, our nearest market, 8½ cents per pound. Pork is largely imported into this part of the State to supply the heavy lumbering operations carried on here. It will be readily perceived, from what has been said of the method of feeding, that any statement of the cost of production of this article must be mere conjecture. All we can say about it is, that, kept in suitable quantities to eat the refuse of the house, dairy, &c., they are profitable; further than this, with corn from 75 cents to $1 per bushel, they are decidedly unprofitable.

Statement of W. T. G. MORTON, *of West Needham, Norfolk county, Massachusetts.*

My herd of swine are entirely of the pure Suffolk breed. It consists of thirty-seven sows, twenty-five of which are now (December 31) with pigs, and six boars, two of them in active service. My oldest boar, "Prince Albert," at fifteen months old, took the first premium, last season, (1853,) at the Norfolk county Agricultural Society.

In point of economy, I have found by experience that this breed of hogs is much easier kept, and takes on fat faster, and at less expense, than any other known. There is much less waste in cutting them up for the barrel, and the pork is sweeter, more delicate, and is considered far better for family use, than that of any other breed. They are of a white color, very perfect in all of their points, being of a medium size, with deep, full chests, round bodies, thick hams, and short legs. They are docile, thrifty, and mature early; weighing, at twelve to eighteen months old, from 200 to 450, and occasionally as high as 500 pounds. I commence fattening my swine in October, and slaughter at about Christmas.

I have found no difficulty in breeding these hogs; on the contrary, I have been successful in producing three consecutive litters.

Statement of THOMAS W. SAMPSON, *of Ashland Farm, Rocheport, Boone county, Missouri.*

Hogs are raised in this county with but little trouble. They are fattened entirely on corn, except where we have what is called a "mast year;" then they get fat in the woods on acorns; but the meat is not fit for exportation, nor scarcely for home use, as the flesh is very oily and soft. The Berkshire and Irish grazier are the only improved breeds we have had among us. The Berkshires are too small, and the Irish too slow in maturing. A cross between the two is the best hog we have for all purposes.

Our hogs are kept only in what is called good living order until they are put up to fatten, which is about the 1st of October, when they are fed on all the corn they will eat until slaughtering time, or about the 1st of December. A considerable number of large lots of fine hogs are also fattened and sold to packers.

Pork is worth, on an average, about $3 per hundred.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Hogs are generally killed here at about eighteen months or two years old. They are usually permitted to run in the woods and around the stables and farm until about three months before killing time, when they are put up in a pen, where new corn is thrown to them *ad libitum*, until they are fat enough to be slaughtered. In this condition they are either put up by the farmers, after a sufficient supply is retained for their domestic consumption, in the hope of a bacon speculation in the spring of the next year, or sold to some pork-house in the vicinity. The opinion prevails that no hog can be profitably kept more than one winter. Presuming that he is killed at eighteen or twenty months old, a hog will consume, in that time, about four barrels of corn. At this age, and with this quantity of food, he will weigh from 160 to 200 pounds. Corn is worth here, generally, $1 per barrel, so that the estimate of the cost of production and profit of pork is easily made:

175 pounds (average) of pork, at 4 cents	$7 00
Cost of food	4 00
Profit	3 00

Statement of W. M. JACKSON, *of Fayette, Howard county, Missouri.*

I have tried the Byfield, the Irish, and the Berkshire, all of which are thrifty and do well. The Irish I object to on account of his large bone, and consequent size. I consider them not so profitable hogs as either of the other kinds. They do not take on flesh so young as the others; and the sooner hogs can be made to weigh 200 pounds, the more the profit; and those which are made to weigh 200 pounds at ten or twelve months old, are certainly much better meat than those which are kept so poor as only to weigh 200 pounds at two years old. The meat of a young hog fattened at that age, is certainly more tender, has thinner rind and less gristle, and consequently is better tasted, and is worth more. A hog twelve months old, say the 1st of September, which will weigh 175 pounds, will take on flesh at the rate of two pounds a day; and five bushels of good sound new corn will make an increase or average gain of 75 pounds on hogs of the above description; or, 3⅔ pounds of corn, supposing the corn to weigh 55 pounds to the bushel, will make one of pork. I make this statement from an actual experiment which I know to be correct. I have never tried grinding the grain, nor cooking it in any way, for hogs; and I feel confident, from observation and experience in fattening hogs, that there is no preparation that can be made by grinding and cooking that will fatten them faster than green corn in the field, just after the milky stage, and so well calculated to prevent the exhaustion of the land. I have raised eight successive crops of corn on the same field and fed it down with hogs, and I am sure that the last was the heaviest corn I have ever noticed. By this process of feeding, my pigs and shoats all get fat, and are easily wintered.

Statement of D. C. GARTH, *of Huntsville, Randolph county, Missouri.*

Hogs are raised here mainly for home consumption, and very few are driven or carried to market. Enough are annually slaughtered, however, to produce a surplus of bacon and lard, which constitute a portion of our commercial commodities.

Statement of ARMSTRONG O'HARA, *of St. François county, Missouri.*

Every farmer here raises his own pork, and the surplus is sold in our home trade. Pork, to raise it here on corn, will cost $3 per hundred, and sells at $4.

Statement of LEVI BARTLETT, *of Warner, Merrimack county, New Hampshire.*

Of swine, we have good, bad, and indifferent, resulting from neglect of any systematic course of breeding. Among our farmers and mechanics we frequently find specimens of hogs that will compare favorably, in every respect, with the Suffolk, or in fact with any other breed. But these good points in individuals cannot be depended upon in all the pigs of the same litter, or even in the progeny of these almost faultless grunters. Some of their pigs may be extremely good, some indifferently so, and others decidedly bad—looking as if their "base, ignoble blood had crept through land-sharks ever since the flood." Where the "kith and kin" are so nearly allied, why such a difference? Simply because there has been no systematic course of breeding pursued among us long enough to "fix" any peculiarity of "blood." It is a general law of nature for "like to beget like;" and by a long and judicious course of breeding, a race of cattle, sheep, or swine can be produced, the progeny of which will almost as nearly resemble each other as do a brood of our native quails or partridges. In England, where the true principles of breeding have been pursued with the greatest care for a long series of years, they have several very valuable and distinctly-marked varieties of hogs, each of which, when kept pure, preserving its identity generation after generation. Among some of the most valuable breeds are the Middlesex, the Woburn, the improved Essex, and the Suffolk. The latter have been more largely introduced into this section of the country than any of the other kinds; and for the farmers and mechanics of New Hampshire they are thought to be, or the half-bloods, a much better breed than the mixed varieties now so generally kept; for the Suffolks are not large, coarse, bony hogs, but attain maturity at an early age, and may be always in a condition to kill from the time they are a month old. They readily weigh from 200 to 300 pounds at six to ten months old, and a proportionate weight at twelve months. The pork is so much esteemed, that it generally commands from a cent to two cents a pound extra in the Boston market.

Statement of WILLIAM H. COOKE, *of Howard, Warren county, New York.*

Our best breed of hogs is the Berkshire, crossed with our common stock. The cheapest method of raising pork is, to have the pigs come early in the spring, forcing them, by good feeding, from the commencement, and at eight months old they will weigh about 300 pounds. This can be done by keeping one pig to each cow, and mixing a little Indian meal or ground rye with the buttermilk or whey.

The price of pork thus raised is about 7 cents per pound.

Statement of LEWIS G. MORRIS, *of Mount Fordham, Westchester county, New York.*

The three kinds of swine propagated by me are the improved Suffolk, Essex, and Berkshire. The modern Suffolk is a valuable and popular breed. Its origin was a cross of the ancient breed of Suffolk (England) with the Chinese and Berkshire. Youatt says: "On the whole, there are few better breeds in the kingdom than the improved Suffolk." Martin says, "This breed stands first;" and Rahm says, "Suffolk pigs are, perhaps, on the whole, the most popular breed in England." It differs from the Essex, in making more fat and less lean, being better adapted to barreling, and not so good for baconing, or as fresh pork. The Suffolks attain maturity at an early age, and may always be in condition to kill from the time they are a month old. Their usual weight is from 200 to 300 pounds at six to ten months old,

and a proportionate weight at twelve months. The carcasses command a considerable extra price over the common hogs of the country, partly on account of the greater weight in proportion to the bone, but chiefly from the pork being of better quality and flavor.

The improved Essex is one of the most valuable breeds of swine. It was originated by the late Lord Western, and has latterly been extensively known in the hands of W. Fisher Hobbs, who was Lord W.'s bailiff, and had facilities for obtaining his best stock. It has probably carried more prizes at the shows of the Smithfield Club, within the last ten years, than any other breed. It was derived from a cross with the Neapolitan, and inherits the black color of that race, with more size, finer symmetry, and much better constitution. Stephens, author of the "Book of the Farm," and the "Farmer's Guide," well describes their characteristics as follows: "As to the breed which shows the greatest disposition to fatten, together with a due proportion of lean, I never saw one equal to that which was originated by Lord Western, in Essex. They were exceedingly gentle; indisposed to travel far; could attain, if kept on, to a great weight; and so compact in form, and small of bone and offal, that they invariably yielded a greater weight of pork than was judged of before being slaughtered, and more delicious ham was never cured than they afforded." In regard to color, it may be observed that, in this case, it is not even "skin-deep," being confined to the outer or scarf-skin; and the carcasses, dressed by the ordinary mode of scalding, are quite white. The meat is of very superior quality, the fat being firm, and the lean white, fine-grained and rich flavored. The animals are not subject to cutaneous diseases. Their skins are almost always smooth and healthy, even when exposed to the sun. Few of the breed have as yet been slaughtered in this country. Their dressed weight in England is 250 to 400 pounds at twelve to eighteen months old.

The Berkshires, black and white, possess more size than either of the above named breeds, with much more bristles or hair. The meat has more muscle, or lean, and by some is thought to be better adapted for bacon and hams.

Statement of JOSHUA HARRIS, *of Welche's Mills, Cabarras county, North Carolina.*

Every farmer here tries to raise his own pork, but very often fails, and has to buy from the drovers.

Statement of JACOB KNOOP, *of Elizabeth, Miami county, Ohio.*

We have several breeds of excellent hogs, such as the "Liecester," the "Berkshire," the "grazier," and the "Warren county" or "Shaker," the latter of which is raised in Union village by a long and judicious crossing of our best kinds. With good feed and care, they will weigh from 300 to 400 pounds each, at sixteen months old, or from 200 to 250 pounds at eleven months old.

The price of pork varies from \$3 75 to \$4 25 per hundred, which will not remunerate the farmer for his labor and corn.

Statement of WILLIAM M. MACY, *of Quercus Grove, Linn county, Oregon.*

Hogs do well here, and are not fed at any season of the year. They live on a root growing in the lowlands, known as "cameros," resembling an onion. The oak yields a fine crop of acorns, upon which they also feed.

Statement of PETER GROSS, *of Schnecksville, Lehigh county, Pennsylvania.*

Pork raising for the market is not generally a profitable business with us. The best breeds raised are a mixture of the Berkshire and our common stock. But few hogs are raised and fattened except those required for family use. Our cheapest method of raising is to swill the hogs liberally during the summer, and let them glean the stubble-fields and run at large in the orchards. In the fall, when corn begins to harden, we commence feeding them moderately until about the 1st of November, after which they should have all they will eat until the latter part of December. When slaughtered at sixteen months old, they will average about 250 to 300 pounds each in weight.

Pork, at present, is worth \$7 per hundred.

Statement of JOSHUA S. KELLER, *of Orwigsburg, Schuylkill county, Pennsylvania.*

There are some good breeds of hogs in this county, among which are the Suffolks, of which I possess a pair. They are unquestionably the best breed we have, possessing a fine bone, neat appearance, and fatten readily at any age. They come to maturity at from twelve to fifteen months old, at which age they weigh from 250 to 350 pounds. I am well satisfied 50 per cent. can be saved in keeping this breed.

Statement of JOHN S. EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

But little attention has been given to this branch of agriculture in Western Pennsylvania, although the demand for pork, for several years, has been good, and prices have run high. The course usually adopted by most farmers in this section, is to keep their hogs until they are from eighteen to twenty-two months old, and then slaughter or sell them. During their first winter, they are fed just sufficient to keep them alive. The second summer they have the run of a clover-field, and in the fall they are allowed the range of the orchard and woods. Six weeks before killing time, they are penned up and provided with as much corn, in the ear, as they can destroy, and they certainly will "destroy" the third of what is given them. At the end of six weeks, they are killed or sold, averaging in weight about 250 pounds dressed. This pork costs us, counting all expenses, 10 cents per pound; which is certainly not a very profitable business when it can be bought for 5 cents.

Decidedly the best way of fattening hogs, is to get a corn and cob-crusher, and a vegetable boiler to steam the corn after it has been crushed. This plan is far better than shelling the corn and drawing it from one to five miles to a mill, giving the miller one-tenth of the grist,

and then drawing it home. We have tried the Berkshire, the Irish grazier, and most of the ordinary kinds, none of which have given satisfaction. The Berkshire and common breeds are too small; the grazier requires too long a period to come to maturity. I am now breeding from a cross of the Berkshire and grazier, which are called "improved graziers." They combine the early maturity and easy fattening properties of the Berkshire, with the great size of the grazier. From this cross, I can have pigs farrowed the 1st of March, which will weigh, with ordinary care, 200 pounds by Christmas; thus avoiding the expense of feeding over winter, which is the great drawback in raising swine. Pork made in this way will cost a third less than it does in the case first mentioned.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

All of our dairymen make pork to sell. Our hogs, eighteen months old, when dressed, weigh from 300 to 500 pounds; pigs from 200 to 300 pounds each. At least four-fifths of our pork is made from the refuse of the dairy. Some confine their hogs in pens, keeping charcoal by them; others have a small yard attached, for them to root and wallow in. In the latter part of the dairy season, as the slops decrease, the deficiency is supplied by potatoes, apples, pumpkins, and corn-meal. Cows which are kept for butter will make 60 pounds of pork each in a season; when kept for cheese, 40 pounds. The Suffolk breed is generally preferred, as they mature younger.

Statement of WILLIAM SMOOT, *of Boone Court House, Virginia.*

The Berkshire and grazier, mixed with our "scrub" hogs, constitute our best breed. They do better on clover, running at large, than when confined.

Pork is worth from 4 to 5 cents per pound, but will not pay costs for less than 3 cents.

Statement of RALEIGH W. DYER, *of Prillaman's, Franklin county, Virginia.*

We only raise meat for our own use, not yet deeming it so profitable for sale as other things. We have the Virginia, the Berkshire, and the Irish grazier, both pure and mixed. Our hogs take the range during the year, being called up once or twice daily and fed on slops, corn, pumpkins, &c. They are fattened on the same food, being closely penned about two months. They are slaughtered in December and January, their average weight being about 140 pounds. They are worth in pork 5, and in bacon 12½ cents per pound. The cost of rearing and fattening is supposed to be about 4½ cents per pound.

Statement of HENRY M. PRICE, *of Nicholas Court House, Virginia.*

But little attention, as yet, is paid here to the breeds of swine, though our common stock makes fair pork. They are usually "mast" fed. No surplus pork nor bacon of much consequence is raised.

ETHERIZATION OF ANIMALS.

BY CHARLES T. JACKSON, M. D., OF BOSTON, MASS.

In the winter of 1841–42, I discovered that the nerves of sensation could be temporarily paralyzed to all sensation by the pulmonary inhalation of the vapor of pure sulphuric ether (oxide of ethyle) mixed with air, and that while the human body was thus affected, any surgical operation could be performed upon the etherized patient without producing any pain. In 1846, I caused this discovery to be practically exemplified, by applying it in surgical operations, both in this country and in Europe, where it was also used by my directions. I also indicated its use in preventing all sensation of pain in domestic animals, upon which surgical operations were to be performed, either for the cure of diseases, or for rendering them more serviceable to man.

In many cases, fractured or dislocated limbs of valuable animals could be cured if they were rendered manageable during the operation, so that the proper adjustments might be made, and the dressings applied. This may readily be accomplished by rendering the animal insensible to pain, and unconscious by the administration of ether vapor. Severe surgical operations—such as the division of nerves, the application of actual cautery, the removal of tumors, and the castration of domestic animals—may also be rendered entirely painless by this method. The means is easy, safe, and efficient, and any intelligent person can administer the ether as I shall describe.

We may make use of pure washed sulphuric ether, or of a mixture of it with chloroform, the mixture being preferable on account of its greater power and concentration, while pure chloroform is dangerous and ought not to be employed alone, its vapor being so dense as to be with difficulty removed from the lungs in case an overdose is administered, while sulphuric ether vapor is light, and is easily removed. The mixed vapors also act more kindly, on account of the slightly stimulating property of the ether overcoming the deadly sedative effect of pure chloroform. In actual practice, I have never known of a single fatal accident from the administration of the vapor, nor of this mixture, provided air was also admitted into the lungs, mingled with the vapor so as to sustain the functions of life as required for respiration. No unpleasant accident has ever happened under my hands from the administration of either of these anæsthetic agents, though my experience has been most extensive, and my observations have been made on persons of all ages and temperaments. I have found that a mixture of four or five measures of pure sulphuric ether, and of one measure of pure chloroform, produced the best effects upon man and upon animals.

In the more usual surgical operations upon animals, particularly in that of castration of the bull, stallion, hog, and ram, we should always

apply the ether vapor by the lungs. There is no danger in administering the ether to any animal that has sensible perspiration; but to those which do not sweat, we must apply it more cautiously; thus the ram and bull will bear a very high dose without the least danger to life, while the *cat* is readily killed by a full dose of chloroform. I have not seen death produced by the use of pure ether vapor mixed with air, in any case, nor in any animal, and yet I can conceive how an animal having no free perspiration should retain for a longer time the absorbed vapor of that liquid, as well as of chloroform. Dogs have a perspiration mainly from the tongue, and hence they do not get rid of the absorbed vapor so readily as those animals having a free cutaneous perspiration, and are therefore more likely to suffer ill effects from retained chloroform. All animals excrete the absorbed vapor by the skin, lungs, and kidneys, in their perspiration, breath, and urine; and thus, after the effects of the anæsthetic agent is over, the system clears itself very soon of all traces of it by the above named channels.

In administering ether and chloroform to animals, I make use of a wire muzzle, or basket, which is fastened round the nose and mouth, and fixed in its place by proper straps. On the horse or ox, a headstall is all that is required to fix the wire basket in its proper position. Into this basket I first put a very coarse open-textured sponge, which has been soaked in water so as to soften and swell it, and then it is squeezed dry. The basket and sponge being put in the proper position, I take this mixture—pure sulphuric ether, one pint; pure chloroform, one gill—and mix them in a bottle; then I pour upon the sponge, from time to time as needed, this fluid, an ounce at a time; renewing it as it evaporates. The animal breathes it freely into the lungs, and soon gently falls down in a deep sleep of insensibility and unconsciousness, and is entirely passive, so that any operation may be performed, and without any struggle of the animal, or any signs of pain. A very refractory horse may, by this means, be made to submit to the farrier in being shod, and will soon learn to submit afterwards, and probably without the repetition of the ether.

The apparatus for etherizing a bull, will, of course, be fitted to the form of his nose, and should be in other respects like that for the horse. He will bear the ether perfectly well in full doses.

The hog I have not seen under etherization, but I doubt not he will readily come under its influence; but I do not think he will bear so well a high dose as a horse or an ox.

Sheep bear it perfectly well; at least they do the breathing of pure ether. I do not know how chloroform may affect them, and should be a little more careful in the administration of that agent. It is probable, however, that the admixture of chloroform with ether will prove safe and efficient. Sheep have been operated upon under ether in England successfully, since the publication of my discovery.

It must be kept in view, that air must be freely admitted in administering all anæsthetical agents; then there is little if any danger to be feared.

In this hasty sketch of the method of etherizing animals, I have avoided many details which might prove entertaining to the reader, and an array of cases that might have been required at the time I first

made this curious discovery known to the world, but which are now unnecessary, since the public know that the effects have been produced in hundreds of thousands of cases in Europe, Asia, and America in all lands where I have made known this means of alleviating suffering.

IMPORTATION OF CAMELS.

The introduction of the camel, to be employed as a beast of burden in those portions of the Western hemisphere where there are broad prairies and elevated plains nearly destitute of water, and offering but a scanty supply of herbage, of an indifferent quality, has long been viewed as a matter of much national importance, particularly since the establishment of the overland routes, requiring mingled mountain and desert service, between the Atlantic States and California or Oregon. Several dromedaries and camels have been introduced from time to time for the object in view; but owing to the want of a proper knowledge of the habits and management of the animals, the attempt has generally proved unsuccessful. Thus, camels were brought from Guinea to Virginia, in 1701, and the enterprise failed. In numerous instances, dromedaries have been introduced into the West Indies and various parts of South America, and have been employed with partial success on the scorching plains, difficult to be crossed by means of any other animal.

At the last session of Congress, a bill was offered and discussed for an appropriation for the accomplishment of the object in question, and it is hoped that further action in the matter will sooner or later take place. Here we would simply remark, that, from the nature of the country, and the necessity of communicating with Oregon and California by beasts of burden, the demands for camels would be increased rather than diminished by the construction of any possible railroad to the Pacific.

The following comments upon the habits, management, diseases, and peculiarities of the camel and dromedary, are principally condensed from a manuscript by General Harlan, of Cochransville, Chester county, Pennsylvania, who resided nineteen years in the East, during a part of which period he was actively involved in the military operations of Dost Mahomed, Amur of Cabul, and Rungeet Sing, Prince of Punjaub, prior to the conquest of Cabul by the British. As general of the staff of the former, he commanded a division of the army of Cabul, destined to the invasion of Bulkh, a part of ancient Bactria. On this expedition he was accompanied by a caravan of sixteen hundred camels, of northern stock, in addition to four hundred attached to his own command. Being compelled to cross the highest range of the Indian Caucasus, and to superintend his own commissariat, he enjoyed the most ample opportunity for becoming practically familiar with the capacities of the northern or Bactrian camel, as he had been previously with those of the dromedary of the plains. He was also able to estimate the relative

value of the cross resulting from their admixture, and known as the "Booghdee" by the Affghans and other northern tribes.

Of the dromedary of the plains, (*Camelus dromedarius,*) General Harlan remarks, that, when selected for burden, he is loaded with ease and safety, and will carry, on an average, four hundred pounds in a level country. On long journeys his daily march is about eighteen miles, and his rate about two and a half miles per hour. The more delicate-blooded and highly trained animals bear much the same relation to their laboring compeers that the racer holds to the dray-horse. They are used exclusively by couriers and express-riders. Their ordinary day's journey is sixty miles; but a fine specimen will travel one hundred miles daily, for several days in succession. His utmost speed is about ten miles an hour.*

The dromedary has seven callosities, upon which he throws the weight of his body, both in kneeling down and rising up. There is one on the breast, two on each of the fore-legs, and one on each of the hind-legs. He sleeps always with his knees bent under his body, with his breast upon the ground, and kneels to receive his load, resting meanwhile on these callosities, which protect the skin from injury by his weight. In the whole structure of this "ship of the desert," there is a most especial adaptation to its arid region, and to those services which man there requires of it, and without which the intercourse of mankind in the East would have been confined to small spots where abundance reigned. The commodities of one part of Asia could not have been exchanged for those of another; commerce, the great moving principle in the extension of civilization, would have been unknown; and knowledge would have been limited to particular districts, and would there have been of the most stunted and feeble growth. The camel's feet are formed to tread lightly on a dry and shifting soil. Its nostrils have the capacity of closing to exclude the sand when the whirlwind scatters it over the desert. Unlike the "iron camel" of America, it is provided with a peculiar apparatus for retaining water in its stomach, so that it can march from well to well without great inconvenience, although they be some hundred miles apart, while its steam-breathed rival refuses to labor without a half hour's draught. Patient under his duties, he kneels at the command of his driver, and rises cheerfully with his load. He requires no whip nor spur during his monotonous march, but when fatigued his driver sings him some cheering snatch of his Arabian melodies, and the creature, evidently delighted with the musical sounds, toils forward, with a brisker step, till the hour of rest arrives, when he again kneels to be disburdened for a little while; and if the stock of food be not exhausted, he is further rewarded with a few mouthfuls of the barley-cake which he carries for the sustenance of his master and himself.

The dromedary of the plains is very ill-adapted to mountain travel-

* The Asiatics and Africans do not apply the term *dromedary* to all of this species, but merely to a light and very swift breed of it, and which is used for riding. As a dromedary, or swift camel, may be of either of the two species, the practice of compilers always calling the one-humped camel the dromedary, creates confusion, especially in reading travels where the word is discriminately used. The Hebrews call the camel *gamal*; the Arabs, *djemal*; but a swift camel, or dromedary, they call *el heris.*—D. J. B.

ling, having but feeble power in climbing, and still less in descending a steep. His chief usefulness is confined to sandy soils; for, when the ground is wet and slippery, as it is usually in clay ground, his hind-feet are exceedingly apt to slide apart and rupture or sprain the ligaments of the pubis, the thighs being very deficient in adductive power, and the legs being very long. This accident is usually fatal; and if it occurs on a journey, the animal is generally killed or left to starve. As a preventive, the hind-legs are hoppled above the gamble-joint, by means of a cord, when travelling over treacherous ground. When thrown down or swamped in mire, the dromedary makes no attempt to rise. The elephant or the horse will roll upon the side on such occasions, and will await or assist the efforts made to relieve him, but the dromedary resigns himself to despair. He is a very noisy creature, and is constantly roaring and braying while being handled and loaded by his driver. Indeed, the slightest disturbance calls forth his obstreperous lamentations.

The Bactrian camel (*Camelus bactrianus*) is a stouter-limbed, heavier-bodied, and much more bulky animal than the dromedary of the plains. He might be useful as a beast of burden, but for the great size of his two humps, and their peculiar position, which render it impossible to adapt such a saddle to his irregular back as would accommodate a respectable load, for much weight upon the back between the humps is inadmissible. The hump in all the camel family is intolerant of pressure, and their burdens are borne upon the shoulders and hips—chiefly the former. This species is, therefore, seldom used, even for light carriage, yet is invaluable as the parent of a hybrid race, formed by crossing the male Bactrian camel with the female dromedary of the plains. This is the "Booghdee" of which we have already spoken. Consequently, the blood of the Bactrian camel is extensively diffused among the dromedaries of the mountains and plains of Central Asia, Syria, and Egypt.

The Booghdee, or cross just mentioned, bears much resemblance to the male parent in general figure, being short-limbed, heavy-bodied, and possessed of great muscular power; but he inherits from his mother the peculiarity of the single hump, and becomes merged into a dromedary. He is not employed by couriers, or express-riders, his speed not being remarkably great.

The average load for a Booghdee, is 600 pounds when traversing plains, and 400 pounds on ordinary mountain roads. His greatest advantage over the ordinary dromedaries, as a mountain carrier, arises from the strength and complete development of the claw which forms the termination of each toe in the camel tribe. In this particular the animal follows his paternal parent; for this appendage is feeble and short in the dromedary of the plains, rendering him less secure in treading among rocks and on wet ground. Moreover, the strength and length of the claw decline rapidly in the mixed race, as the blood of the Bactrian camel becomes less dominant in the progeny. In the true Booghdee it is so strong, that he is nearly as sure-footed as the horse. The comparative shortness of his hinder extremities, also, secures him from disablement by the sliding apart of the thighs; and, being bred among the mountains of the north, his constitution is adapted to colder regions, without unfitting him for labor under the burning sun of the

plains. He is a much quieter animal than the Indian dromedary, and makes scarcely any noise on the march.

The very difficult incursion to Bulkh, 360 miles distant, over the snow-clad summits of the Indian Caucasus, and the return thence to Cabul, in the winter season, was accomplished by General Harlan with the loss of but one camel, and even that one was killed by an accident unconnected with disease or fatigue, though the campaign lasted seven months. His animals were all of the northern varieties, chiefly Booghdees. On the other hand, the British army of the Indus, on its march to Cabul, under Lord Keen, in 1838 and 1839, employed exclusively the dromedaries of the plains of Industan. On the return of General Harlan to India, over the route of one division of this army, he found the line of march literally strewn with the bleaching bones of this unfortunate train; and he learned, from the verbal report of the British fiscal agent at Calmul, that in the other division, accompanied by 35,000 camels, "the result was still more disastrous."

It is obvious, then, that the dromedary of the plains is the proper animal for express-riding on the sands or saline dust of the Great basin, and perhaps in some parts of Middle California; but that he would be useless for all other purposes, except for breeding in the prairie and other regions of the West, where not only arid deserts, but also snow-clad mountains, require to be traversed. The introduction and rearing of the Booghdee should be regarded as the great national object, the importation of the Bactrian camel and the dromedary of the plains being incidentally necessary for the production and preservation of that invaluable race.

All who are acquainted with the history of the improvement of animals by crossing breeds, are aware of the impossibility of preserving the value of mixed stock when the parents differ widely in character, if the plan of breeding "in and in" be pursued. In order, then, to effect the successful domestication of the Booghdee, or mountain dromedary, with us, it will be requisite to supply ourselves with several pairs of the dromedary of the plains for the sake of a supply of females, and a like number of Bactrian camels for the sake of males, although the female of neither race is of much value for burden. It would be likewise desirable to secure a few high-blooded courier dromedaries for the purposes of speed alone.

No sufficient supply of either tribe of camels, except the dromedary of the plains, can be obtained in Lower India; and better specimens even of this class—better, because stronger and more capable of endurance—can be procured nearer home, in the neighborhood of the Mediterranean, especially in Arabia. The Bactrian camel, of the best quality, can only be found in Central Asia, in countries where no one—unfamiliar with the East—dare venture to go, and where even such an adept should be armed with all the means of protection obtainable from the Russian and Persian courts.

It appears probable, then, that Smyrna would be the proper port for the shipment of the necessary supply of these animals. But, in any case, whoever may be employed to carry out the design, he will find his exertions of little avail, unless he is thoroughly acquainted not only with the habits and qualities of the several varieties, but also with the

language and social condition of the people and modes of dealing in those demi-savage regions where his mission must be performed; for no dependence whatever could be placed in local agents. Experiments upon the introduction of animals foreign to the country and climate are extremely liable to failure, in the first instance, from the difficulty of finding agents who are fully acquainted with the economy, habits, diseases, and wants of living beings originally formed by Providence to inhabit another hemisphere; and discouragement from this cause may well prevent the success of the enterprise under notice, unless government is able to secure the advice and assistance of some one thoroughly acquainted with the climates of Northern India and the United States, and also with the varieties, the mode of breeding, and the physical management of camels and dromedaries.

From what has been stated above in this connection, it will be perceived that the capacity for labor of the Booghdee or Bactrian dromedary approximates to three times that of the horse, when loaded upon the back. For draught he is of little use, though sometimes employed in Asia for the light ploughing, or rather scratching of the earth in vogue there, as well as for some other similar duties. In soft sands, or on river mud, he is much less liable to sink or become mired, in consequence of the great size and compressibility of the spongy ball beneath the foot. In this respect he has the advantage of even the dromedary of the plains, because his greater bulk and weight are compensated by at least a proportional enlargement of all parts of his extremities.

The Booghdee wades in safety, streams deep enough to reach the belly; but when the bottom is treacherous, or the water deeper, a boat is necessary for his transportation, as he is no swimmer. The greatest drawback to his usefulness, is his liability to become jammed in descending long and rapid declivities. This species of lameness results from the continued pressure of the weight of the animal and the load upon the shoulders; but it is a curious fact in his economy, that the consequent weakness may be invariably removed in a few hours, by administering, by the mouth, about two pounds of *gour*, a kind of inspissated molasses; this quantity being about equivalent to half a gallon of the ordinary article, of which the animal is very fond.

The Booghdee is ready for full service when four years old, and is considered old at twelve years of age. In comparing him with the horse, as to relative value, it is proper to observe that he is more subject to disease, though, in this respect, he has vastly the advantage of the dromedary of the plains, which frequently die in great numbers, without apparent cause, especially during the rainy season. One form of fatal affection in all the camel tribe is a species of epilepsy, or other convulsion, which frequently occurs during the rains. Through confinement, inattention, and want of cleanliness in their treatment, these animals become liable to a peculiar mange when preparing to shed their coats; and this complaint, when neglected, often produces death.

The female camel goes with young between eleven and twelve months, bearing only one foal at a birth.

The original price of beasts of burden is a matter of secondary consideration in calculations of economy, when compared with their maintenance; nor is of much more moment in comparison with the expense

of introducing animals from distant countries. But, as the prices of camels and dromedaries in the East may excite some interest in those who contemplate their introduction, it may not be amiss to mention that a good Bactrian camel is worth, in Central Asia, about $50; a dromedary of the plains, adapted to breeding, for the purpose of increasing the stock of Booghdees, may be had in India at an average price of $30, but would probably be found much dearer in Syria; and the value of superior courier dromedaries in Beloochistan, the centre of their excellence, varies from $125 to $350, according to the perfection of their points. A Booghdee of superior quality is worth at least $50 on the borders of Persia. I speak here of the males only; for the females, of all the varieties, are worth less than half these prices, though capable of bearing about half a load when not engaged in the care of their young.

In food, these animals are almost as omnivorous as the goat. The interior of their lips and mouth is studded with very numerous, long, and hard spicula, pointing backward toward the throat, and retaining the masses of tough and coarse herbage which they masticate with avidity, and, indeed, with a voracity almost insatiable. These spines, with the lining membrane which covers them, are so callous that they bid defiance even to stout woody thorns. The camel or dromedary will sieze a strong branch of the acacia tree in its large mouth, pressing it back nearly to the commissure of the lips, and then dragging it between the teeth, to the very tip of the last twig, he will appropriate all the leaves, in spite of the acute prickles for which the tree is remarkable. He is fond of the saline or alkaline vegetables of deserts, and especially so of the wild sage. There is probably no plant in the Great basin, or about its margin, that would not be received by him as a luxury. He is such a gormandizer in browsing that he often surcharges himself, and disturbed digestion then renders his breath exceedingly offensive. The ordinary food of these animals, therefore, costs almost nothing, and may be obtained most cheaply, or even gratuitously, precisely in places where that of the horse is most expensive. On long and rapid journeys, the Europeans in Asia give their camels grain, but the natives are not in that habit, except when nothing but dry fodder is accessible, as in the winter season at the north; and it is the opinion of General Harlan that they thrive better without it, when green food can be obtained in sufficient quantity. Quantity, rather than highly nutritive properties, seems to be the chief requisite in the diet of these creatures. When grain is given, it is usual to provide them with two messes daily, and the animals are allowed plenty of time for browsing in the afternoon; but in forced marches, which are sometimes extended to thirty miles in a day, though the rapidity of the gait is never increased, the fodder is brought to them at a later hour. It is proper also to remark, that the animals should not be disturbed after their principal meal until the process of digestion is completed, and the t me of this accomplishment may be ascertained by the grating of their teeth at the appropriate moment. This sound is called by their drivers "naish zudden," and until it is heard they pertinaciously refuse to move with their charge; experience having taught them that the precaution is necessary to the

health of their quadruped friends, for whom they entertain a strong brotherly regard.

The quantity of grain for a mess (if any be given) during a march is five pounds in the morning; and it is repeated in the evening, with the addition of ten pounds of dry fodder. When on a halt, the fodder also is divided between the messes. In warm climates it is customary to commence the march about daylight; and when circumstances do not require great haste, the animals are generally turned out to browse at the end of the day's journey—usually about noon—by which means the evening supply of grain is saved.

Of course, these remarks do not apply to the courier dromedary when travelling at speed. His food, on such occasions, should be, if possible, about eight pounds of unbolted flour, and two pounds of *gour*, or a quart of molasses, at each feed, with dry fodder at night. A considerable amount of *ghee* (an oil of butter) is given to these rapid pacers, as it generally improves their wind. In this country lard, or any good animal oil, might probably be substituted with advantage.

With regard to water, the camel requires it but once each day for comfort, but should be permitted to drink it at will. whenever it is accessible. The Syrian stock is accustomed to the bitter water of deserts, and their progeny also should be reared in the midst of such difficulties as they will be expected to contend with in after life. Their singular power of resisting the consequences of the abstraction of water may be improved to a great extent by training and be brought to a degree of perfection probably sufficient for the longest necessary journey through the wilderness of Western America, without wasting power by carrying a supply of an article so ponderous.

One of the great advantages of rearing the Booghdee and the Bactrian camel in this country would be found in the value of the long wool of the head, neck, breast, hump, and shoulders, forming a fleece probably quite equal to that of four sheep, which is annually shorn, and employed in forming tissues, approaching in softness the wool of Thibet, and surpassing in silky smoothness and fineness the most delicate flannel. The proceeds of this article alone would nearly or quite repay the cost of maintaining the animal, especially in the far West. As the saddle for the Booghdee is always so constructed as to avoid pressure on the hump, this wool is not destroyed by its attrition when the animal is on duty. The reason why this very valuable pile has not heretofore attracted the attention of European and American manufacturers may be inferred from the fact that little is known here of any animal of the camel family, except the dromedary of the plains, or Indian dromedary, which does not produce it. The camel's-hair shawl, so called, is not formed of the hair of the camel at all, but, as is well known, it is woven from the pile of the goat of Thibet. Its erroneous title was probably derived from the great reputation of the wool now under notice, which commands a very high price in the East, though of course much inferior in fineness to that of the goat. It is used exclusively in the manufacture of cloths and shawls for the consumption of the nobles.

We offer these somewhat extended details to show that the idea of the domestication of the camel tribe in the United States is a subject

of great importance in various ways, that it is surrounded with difficulties not likely to be foreseen by careless thinkers, and that the failure of the design, through any defect of plan, would be a national misfortune. To import the stock without a proper selection and management of the animals, both before and after their arrival, by committing the affair to some highly intelligent person, already fully acquainted with their habits, wants, and treatment, would be fatal to success. Even the importation of Arabic or Syrian drivers would only increase the expense to a great extent, without furnishing an effective remedy for the evil; for a knowledge of the climate and resources of both East and West is not less necessary than an acquaintance with the languages of both regions, to enable any one to accomplish the object with certainty and despatch. The foregoing facts have been corroborated from frequent conversations with Hon. Caleb Lyon, of Lyonsdale, New York, who passed some time in the East, and had ample opportunities for verifying their truth.

THE STRIPED GOPHER, OR PRAIRIE GROUND SQUIRREL, OF WISCONSIN.

BY P. R. HOY, M. D., OF RACINE.

The striped gopher (*Spermophilus tridecemlineatus* of Mitchell) is a beautiful little animal, about the size of the "chipmuck," (*Tamias lysteri*,) found abundantly throughout most of the ravines and "oak openings" of Wisconsin and Northern Illinois; also in many parts of Iowa. The ears are short and rounded; the tail, slender and hairy, about half the length of the body; the body is of a dark-brown above, longitudinally marked with alternate stripes and rows of spots of a light fawn color, which correspond nearly with the color of the belly and sides. The lighter lines on the upper part may be distinguished by the brown intervals between, which are occupied by the single rows of light spots, which are generally indistinct on the anterior half of the body.

For the last seven or eight years I have made the habits of this interesting little animal a special study. Some years since, a lad announced that he had brought me a pair of striped gophers, two deer-mice, and some two or three meadow-mice, all of which he had in a box together. He had, also, two flying-squirrels, tied up in a sack. On opening the box, to my surprise and the boy's great disappointment, we found no mice. It was impossible for them to have escaped. What had become of them? On a closer examination, we found a part of the skins of the mice. The gophers had dined on them! Here, then, was something new. I then put the gophers and flyings-quirrels into one cage, and in less than two hours I found that they, too, had been massacred and their brains eaten out by the blood-thirsty little gophers. At this discovery, I felt almost inclined to examine their teeth, to assure myself that I had not caught a "weasel asleep." This accidental circumstance led me with renewed interest to experiment and closely watch the habits of this much abused friend of the agriculturist. This striped Spermophile is decidedly the most carnivorous hibernating rodent of which I have any knowledge. When a squirrel or other small animal is put into a cage with one of these, it will, in a moment, be all animation and activity, darting at the intruder, inflicting a wound and flying back with such rapidity as to leave but little chance for defence. As soon as it has disabled its antagonist, it seizes it by the back of the neck and instantly kills it. During these combats, the gopher utters a low snarling growl, and emits a musteline odor. After killing, they remove the upper part of the skull, suck the blood, and eat out the brains. The carcass is then devoured as occasion requires; but if an abundant supply is at hand, they only eat the brains, resembling in this respect the weasel.

So strong is their appetite for flesh, that the female will kill and eat her own offspring if animal food cannot otherwise be obtained. Such was the case with one I had; although I supplied her bountifully with water and grain, she regularly, every three or four days, took one of her own young out of the nest and sacrificed to her carnivorous appetite.

These animals select dry situations for their burrows, such as a dry knoll, an embankment, or sod fence, in the open prairie or meadow, their favorite haunts. They dislike to be disturbed by the plough, and usually abandon fields that are annually cultivated. Their burrows are shallow and are never extensive. A bucketful of water will generally force them out of their holes, in which manner they are readily destroyed.

Our little animals lay up no winter store of provisions, but retire to their burrows by the first of November, and there remain perfectly torpid (hibernating) until the frost is quite out of the ground in the spring. They bring forth six or eight young at a single litter, about the 1st of June. At birth the young are extremely imperfect, having no hair until twenty days old, and their eyes do not open in less than thirty days after birth. The adult animals utter a shrill chatter when alarmed, and glide through the grass with such celerity as to elude pursuit. They feed upon wheat, rye, oats, barley, and Indian corn, but prefer grasshoppers and mice to either, and they not unfrequently eat snakes and young birds. They never eat any kind of roots, fruits, nor green vegetables; never cut down nor gnaw young trees; in fact, they will not gnaw out of a cage constructed of soft wooden slats. The only injury I know them to do the farmers, is pulling up a little newly planted corn in the spring, and for this one offence they are condemned without mercy, without inquiring whether they do not subserve some useful purpose in the economy of nature which more than compensates for the damage done the corn crop. I am satisfied that when the case of "Benefits *versus* Injuries" is properly investigated, the agricultural interests will promptly decide that the "striped Spermophile" is an advantage to the country, and is deserving of protection rather than destruction from the hands of the farmer. They keep in check the meadow-mice (Arvicola) and other small quadrupeds. Ground squirrels cannot inhabit the same locality. I have one case in point: Mr. Taws, an energetic and intelligent farmer of this county, (Racine,) bid

up a liberal premium for all striped gophers killed on his premises; and so successful were his efforts to exterminate them, that in one or two years not one was to be found on his farm, where they were formerly abundant; but, as the gopher diminished, the meadow-mice increased, and in two or three years he found his farm infested with these to such an extent as to be highly injurious. His stacks of grain and hay were cut and greatly damaged; his fruit-trees girdled and barked; his potatoes eaten in the hill, &c. Mr. Taws was unable to account for the circumstance of his farm being the only one in the neighborhood where the mice were at all troublesome. However, when I acquainted him with the habits of the striped gopher, he was no longer in doubt as to the true cause. He went home and forbid a gopher being killed on his premises, and invited back as friends what he had before persecuted as enemies; and now, on his farm the mice are rapidly diminishing and will soon be harmless.

Would not the striped Spermophile exterminate the (*Geomys bursarium*) Western gopher? This is a question of considerable interest. From what I know of the habits of our animal, I should judge that it would destroy the pouched gopher. Still it may not be so; for their flesh may be so unsavory as not to be tempting, or the Geomys may be "too much game" to be conquered so easily. I now know of no one locality where the two animals abound, yet there may be such west of the Mississippi. If there are no such localities, it would be well worth the trial to introduce the striped Spermophile to exterminate the Geomys.

IMPORTATION OF SKY-LARKS.

BY JOHN GORGAS, OF WILMINGTON, DELAWARE.

I imported last year from Liverpool two lots of sky-larks, both of which arrived in safety and good health. The first lot, twenty in number, arrived on the 20th of February, (1853,) and were kept confined until the 19th of March, when they were liberated. The other lot, twenty-two in number, arrived on the 18th of April, and were set free the next day. The last lot were only twenty-two days from the time they were trapped in England, until they were turned loose in Delaware. The first lot were about a month longer on their passage.

I ordered only such birds as had been reared wild in the nest, as their instinct of self-preservation would not be likely to be so blunted by familiarization as to render them incapable of getting their own living, nor to shun their natural enemies.

I feel a strong hope that the experiment will succeed, as the birds may now be seen (July 24) ascending to the sky, warbling their beautiful melodies as cheerfully as they do in "merry England;" and there is little doubt but they will propagate with us, and be useful in destroying myriads of insects and their larvæ, like many of our native birds. I think the severity of our climate will present no difficulty in their

increase, as they are found all over Europe, from Siberia to Spain. They migrate from the more northerly regions of the Continent before winter, to the lower districts; but only partially so from many places in England and Scotland, where the climate is probably as severe as that of Delaware and many parts of the West.

My importation, consisting of forty-two birds—about an equal number of males and females—cost me, including all expenses, $60.

NOTE.—Mr. Thomas S. Woodcock, of Manchester, in England, liberated a lot of larks, blackbirds, thrushes, and goldfinches, in Greenwood Cemetery, near New York, in the spring of 1853, having brought them to this country the previous fall. Another lot, just imported by Hon. J. H. Peters, of Charleston, South Carolina, was set at liberty in the city of Washington; but the success of these enterprises thus far is unknown. D. J. B.

ON THE IMPORTATION AND PROTECTION OF USEFUL BIRDS.

BY H. L. WOLFORD, OF WOOSTER, WAYNE COUNTY, OHIO.

In addition to the importation and crossing of the best breeds of domestic animals by government, as well as by individual enterprise, I would also introduce and *familiarize* some of those necessary beings in nature's household, "the birds," on account of their usefulness to agriculture, and their faculties of ornamenting and enlivening the mute air and other creations around us.

It is a matter worthy of inquiry, whether any of the feathered tribes are of more injury to agriculture than benefit, notwithstanding some of them are persecuted with great energy, by enumerating only their depredations, but entirely concealing their usefulness. If some of them should even prove to be injurious, so that their extermination ought to be recommended, it cannot be denied that there are numerous others, the increase of which should be fostered and protected as well as new varieties of such imported from abroad.

The only birds, perhaps, generally injurious to agriculture, are the different species of hawks and owls; because they not only commit their depredations on the poultry-yard, but likewise destroy innumerable other birds and their nests, which would otherwise be of great benefit; so that their extermination should be encouraged, notwithstanding they may at the same time be very active consumers of nuisances, such as rats, mice, insects, &c. Nor are those quite so injurious as generally represented—the different species of blackbirds and crows—which should consequently not be condemned with that perseverance as has been done heretofore. If we enumerate their many useful occupations, and balance them against the damages such as the farmer

experiences from them, the result will certainly be in their favor. The chief depredations they commit are on young corn, which they often pull from the ground after planting; and even that they often do with the good intent of devouring worms which they extract with the young plant, as the grains thus extracted are often found lying unharmed close by. The best mode of preventing such depredations is, to pay a boy a small sum per day to watch the cornfields for one or two weeks, which will only amount to a dollar or two for five or twenty acres, and then the farmer will receive the assistance of those useful birds gratis for the balance of the year, as they will protect his premises against other nuisances—as mice, worms, and snails.

Now, if even such birds are of advantage, how much more beneficial must others be which cannot be accused of doing any harm at all; whose sole occupation is to serve as protectors against insects, and who charm nature with their beauty, and entertain us with their melodious notes. How would our horticulturists fare if they had not their assistance to protect their gardens and fruit-trees from the ravages of insects, myriads of which are destroyed daily by a single bird? How much more devastation would be experienced from insects, and how much more would man and beast have to suffer from them, if Providence had not wisely stored nature's household with these varied means to counteract their nefarious ravages and increase. What a blessing, for instance, to man and animals are the swallows. Just look at them: how busily they are engaged from the earliest dawn till late at night around houses and stables; how untiringly they roam over pasture-fields and highways to consume millions of troublesome flies. And, alas, instead of being rewarded with gratitude for these services by apportioning them a house among us, more than one-half of their skilfully constructed nests are destroyed by ruthless boys for mere pastime, or else to exhibit a larger amount of destructive power.

Our fruit-trees and gardens are, in a similar manner, protected by various other birds; so that every noxious insect, from the smallest to the largest, finds an active destroying enemy in one or the other of the feathery tribes. But when we observe the rapid progress with which civilization and agriculture spread over this vast continent, it will be found that the increase of these friends of man cannot keep pace, and many inconveniences from their scarcity must be the result.

In the statistical reports of Europe there is hardly ever such an occurrence mentioned as a failure of crops in consequence of locusts or grasshoppers, the curculio, grub-worm, Hessian fly, or wevil, because their fields and gardens are provided with an adequate amount of birds, which prevent the accumulation of these pests. The greatest want is experienced on our wide-extending prairies and grain-fields, of such birds as keep them clean from insects. Since the wild turkey, the prairie-hen, partridge, and others, have almost been annihilated by the hunter, our fields are nearly destitute of any guard against insects; and it becomes a matter of great importance to substitute others in their place which would be less apt to attract the attention of the sportsman's gun. As such, I would recommend the "sky-lark" of the Old World, which is everywhere highly esteemed, and regarded as one of the most precious luxuries in nature's household, on account of being

the most delightful song-bird that can be found, which enlivens mute nature, from morning till night, with its most charmingly sweet notes.

As the sky-lark confines itself altogether to open fields, and never will even alight on trees or shrubs, its usefulness is entirely concentrated on grain-fields and meadows. Any climate seems to agree with them, as they make the farthest north, as well as the south, their home; and are compelled only by the coldest winters to migrate for one or two months to more temperate districts—similar, in that respect, to our blue-bird. During the colder seasons they live on grass and grass-seeds, but in spring and summer they feed entirely on insects and worms.

The male sky-larks are the most active song-birds known. From morning till night they will surround the ploughman or the reaper, comforting and shortening his weary hours with their musical entertainments. At almost any time in the day they can be seen ascending perpendicularly to the sky, higher and higher, until quite out of sight, cheerfully singing their merry hymns of praise. In this manner they will soar around in the sky for hours at a time, continually warbling their merry songs, until they gradually descend in the same manner to their "sweet home" and family on earth.

What a great addition it would be to our free country, if an importation of these birds could be made, to ornament and enliven our farms and silent prairies, which seem now only to want the merry bustle of these denizens of the air. Millions of these birds are annually caught on the Continent of Europe, and used as a delicacy for the tables of the rich, notwithstanding they weigh only half an ounce when dressed. I have often attended night excursions in Saxony, where hundreds of them were captured with drop-nets in a single night. Would it not be much better if these same birds, which are destined to enrich the tables of European aristocracy, were imported alive to this continent and be set at liberty, to benefit and ornament our common free country, and constitute living monuments to future generations of progressive agriculture and taste? With an expense of a few thousand dollars, enough could be imported, so that several hundred could be distributed to each of the different States, which when set at liberty at suitable places, and at proper times, would easily accommodate themselves to our climate, and sufficiently multiply, in a short time, to spread over our whole domain.

There are quite a number of other birds, the importation and naturalizing of which would be desirable. For instance, the robin redbreast; also the blackcap, the song-thrush, the blackbird, the quail, and many others, all of which live on insects during the summer, and are excellent singing-birds.

The best time for the importation of these birds would be during the months of October and November, because they are at that time prepared for migrating to a warmer climate, and collect in large flocks for the purpose; and because they can be obtained at that time in great numbers by those whose sole occupation is to catch them for market. After they have been kept in large rooms until they gradually get used to confinement, they may be shipped in cages by ocean steamers, and after their arrival, set at liberty in the Southern or mid-

dle States the same fall. Those destined for the Northern States would have to be wintered in large rooms, to be set free early the next spring.

Appropriations for such purposes, in my estimation, should be made by the national government, because States, as well as private individuals, cannot be expected to incur the expenses attending such an enterprise; and it would be doubtful whether these birds would all remain in the places where they might be liberated, as some of them would be likely to migrate to districts more suitable to their habits and increase.

POULTRY AND EGGS.

CONDENSED CORRESPONDENCE.

Statement of JOHN EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

Considerable attention has been given of late to the raising of fine fowls. Several foreign breeds have been imported, a few of which possess real merit. Persons unacquainted with the statistics of the country, have no idea of the immense value of poultry and eggs in the United States. The value of poultry in 1840, was estimated at $12,-176,170; and, owing to the introduction of foreign fowls, and the high prices which have been paid for them, together with the actual increase of the common fowls, the value of poultry, at the present time, cannot be far from $20,000,000. In one day, from Cincinnati, Ohio, there were shipped 500 barrels containing 564,000 eggs. It is estimated that the city of New York alone expends yearly $1,500,000 in the purchase of eggs; and at the Astor House, it is said they require a supply of 1,000 eggs a day for five days in the week, and on Saturdays 2,500.

BEES.

It remains an undecided question, so far as we know, whether the common domestic bee is a native of this country or not. The Indians called this insect "the white man's fly," from which it would seem that they were unacquainted with it before the arrival of the Europeans. It may be remarked, however, that wild bees of the same species were common in the woods of Illinois, at the time that country was settled by the English, prior to 1819.

The earliest mention of bees in this country, that we can find, is that of George Pelton, of Virginia, who possessed a good stock in 1648. They are also noticed by Beverley as being common in that colony previous to 1722.

According to Ulloa, bees were carried from Florida to Cuba by the Spaniards in 1764.

The amount of beeswax and myrtleberry wax exported from Savannah, Georgia, in 1755, was 969 pounds; in 1760, 3,910 pounds; in 1770, 4,058 pounds. The amount of beeswax exported from Philadelphia in 1767, was 35 barrels; in 1771, 29,261 pounds.

The quantity and valuation of wax of domestic production, exported from the United States within the last thirty-three years, are indicated by the following table:

Years.	Wax.	Value.	Years.	Wax.	Value.	Years.	Wax.	Value.
	Pounds.	Dollars.		Pounds.	Dollars.		Pounds.	Dollars.
1820-21......	241,909	85,654	1831-32......	258,559	62,444	1842-43......	475,727	137,532
1821-22......	238,795	93,199	1832-33......	783,843	178,748	1843-44......	963,031	278,039
1822-23......	325,116	112,574	1833-34......	364,674	88,803	1844-45......	814,499	234,794
1823-24......	306,738	107,451	1834-35......	375,061	93,919	1845-46......	542,250	162,790
1824-25......	219,884	85,599	1835-36......	311,807	91,676	1846-47......	627,013	161,527
1825-26......	473,899	206,001	1836-37......	311,909	91,168	1847-48......	529,691	134,577
1826-27......	386,767	123,354	1837-38......	241,819	67,181	1848-49......	536,056	121,790
1827-28......	496,530	134,866	1838-39......	238,320	68,981	1849-50......	514,096	118,055
1828-29......	532,499	139,939	1839-40	207,923	59,685	1850-51......	415,923	122,835
1829-30......	581,901	153,066	1840-41......	254,068	74,120	1851-52......	396,368	91,499
1830-31......	430,929	114,017	1841-42......	331,856	103,626	1852-53......	376,693	113,602

According to the census returns of 1840, the amount of wax produced in the Union was 628,303½ pounds; in 1850, beeswax and honey, 14,853,790 pounds.

CONDENSED CORRESPONDENCE.

Statement of MILO WALTON, *of Amity, Aroostook county, Maine.*

When I moved here, some two years since, there was not known to be a swarm of bees in the county; and to my inquiries, why they were not kept by farmers, I was told that it was too cold, and that all the bees which had been brought here had frozen to death. During the first winter of my residence, the mercury in the thermometer ranged very low, and in one instance it was frozen, from which I was led to believe that it was too cold for these insects. However, the following spring I discovered some bees on flowers, which, on tracing to the woods, I found occupied, as a tenement, a large hollow pine tree. In August of that year I cut down the tree and took therefrom several hundred pounds of honey, which, to appearance, had been in that situation six or eight years. This was a convincing argument that all bees did not freeze, if the mercury did.

After taking the honey, I put the bees carefully into a hive, first placing in a few pieces of brood-comb, and then carried them home and put them into a dry dark cellar, providing them with honey suffi-

cient to last them till spring. As soon as the snow was off the ground, I removed them out of doors and found them in good condition, having consumed but a small part of the honey I had left them. I immediately procured a few more swarms, which have prospered beyond my sanguine expectations, paying more than 100 per cent. per annum on the sum invested.

This county is quite new, and the soil fertile in honey-producing plants, especially the red raspberry and the white clover. The latter, I believe, yields the largest amount of honey, of the best quality, of any plant known.

Last spring, when I took my bees from the cellar, I had forty-eight swarms, since which time they have increased to one hundred swarms. During the last summer they have yielded me over 2,000 pounds of excellent honey in boxes, besides leaving a sufficient quantity for the winter support of the bees. At the present time there are about three hundred swarms in this county, including my own.

The kind of hive I prefer, is a box 12 inches square at the base, and 14 inches high, with a glass light in the rear, 10 inches by 12, having a small door to darken the interior when not under observation. Near the top of the hive is a chamber 7 inches deep, in which are placed two small drawers, or boxes, to contain the surplus honey deposited by the bees.

Statement of WILLIAM S. MAYNARD, *of Ann Arbor, Washtenaw county, Michigan.*

Were others as fond of watching the cheerful labor of thousands as myself, far more attention would be paid to raising bees than there is at present in this land of flowers. No care is required but hiving, and destroying the bee-moth, which otherwise is very destructive here. It is necessary to be much with them, so that they may become well acquainted, otherwise their stings will prove troublesome. In taking their honey, I find the use of chloroform beneficial to keep them quiet.

The cost of raising honey, at fair wages, is from 3 to 6 cents a pound. The market price is from 10 to 15 cents.

Statement of J. P. ROUNSVILLE, *of Rounsville, Alleghany county, New York.*

If proper attention is given to these little workers, they are found quite profitable. But, for the want of space, I can give only a few particulars of my experience in this business. The time of the year in which bees most commonly swarm here, is from the middle of June to the 20th of July. If none swarm before the 20th of June, it may be safely calculated that the season will be quite poor for making honey. Occasionally a swarm is cast, which, upon coming out, will lose its queen; and, as a consequence, after remaining unsettled a short time, will be inclined to return to the parent hive. Under such circumstances I frequently remove the old hive, and place an empty one in its stead, and into this they will return without delay. The queen must then be found, if possible, which has probably dropped, on account of weakness, but a few feet from the hive, where she will be surrounded by a handful of attendants. But if she is not to be found, by setting up among them a piece of brood-comb well stored with larvæ, they will frequently go to work among themselves and form a new queen. If this last attempt fail, they will seek out the old hive, which must not be kept long from its original place, as a good share of workers, being out after honey, upon returning loaded, will not be able to find their home, and will be lost. About the 15th of August, if there are any swarms that do not weigh 25 pounds, exclusive of the hive, they will scarcely be able to winter, and therefore had better be taken up. In the spring, all those which do not weigh over six pounds should be fed.

I have found the most favorable location for the hives to be in an open field, without a house, and the hives placed about two rods apart. For the purpose of breeding bees, the old-fashioned straw hive is as good as any, or those made of thick, rough boards, of a capacity of about a bushel. I never put a new swarm into a hive having old comb in it, although it may be clean.

SILK.

The culture and manufacture of silk in the British North American colonies date back to the first settlement of Virginia. James I, who was anxious to promote this branch of industry, several times urged the "London Company" to encourage the growth of mulberry trees, and addressed a letter to them on the subject in 1622, conveying strict injunctions that they should use every exertion for this purpose, and stimulated the colonists to apply themselves diligently and promptly to the breeding of silkworms and the establishment of silk works, bestowing their labors rather in producing this rich commodity than to the growth of tobacco—an article to which his Majesty had recorded and published his violent aversion. The company, thus incited, showed much zeal in their endeavors to accomplish the King's wishes. A considerable number of mulberry trees were planted; but little silk was produced, owing to difficulties involved by their dissolution soon after. In about the year 1651, the rearing of silkworms again became a subject of interest in Virginia, and premiums were offered for its encouragement; but it does not appear that the business was ever prosecuted to much extent.

The silk culture was introduced into Louisiana, in 1718, by the "Company of the West."

In the infant settlement of Georgia, in 1732, a piece of ground belonging to government was allotted as a nursery plantation for white mulberry trees, and the attention of some of the settlers was soon engaged in rearing silkworms. In 1726, a quantity of raw silk was raised in that colony, which was manufactured into a piece of stuff, and presented to the Queen.

In 1749, an act of Parliament was passed for encouraging the growth of silk in Georgia and Carolina, exempting the producer from the pay-

ment of duties on importation into London. A bounty was also offered for the production of silk, and a man named Ortolengi, from Italy, was employed to instruct the colonists in the Italian mode of management. A few years before the Revolution, considerable quantities of raw material began to be raised, which was said to be equal in some cases to the best Piedmont silk, and worked with less waste than the Chinese article.

In Carolina, the culture was undertaken by the small farmers. In 1766, the House of Assembly of this province voted the sum of £1,000 towards the establishment of a silk filature at Charleston, under the direction of Mr. Gilbert.

In Connecticut, attention was first directed to the rearing of silkworms in 1760. Dr. Aspinwall, of Mansfield, from motives of patriotism, used his best exertions to introduce this important branch of rural economy. He succeeded in forming extensive nurseries of the mulberry at New Haven, Long Island, Pennsylvania, and other places. Half an ounce of mulberry seeds was sent to each parish in the colony, with such directions as his knowledge of the business enabled him to impart. In 1783, the legislature of Connecticut passed an act granting a bounty on mulberry trees and raw silk. It may be here stated, to the honor of Connecticut, that she is the only State in the Union which has continued the business without suspension, and probably has produced more silk, from the time of her commencement up to the year 1830, than all the other States.

In the year 1769, on the recommendation of Dr. Franklin, through the American Philosophical Society, a filature of raw silk was established in Philadelphia by private subscription, and placed under the direction of an intelligent and skilful Frenchman, who, it is said, produced samples of reeled silk not inferior in quality to the best from France and Italy. In 1771, the managers purchased 2,300 pounds of cocoons—all the product of Pennsylvania, New Jersey, and Delaware. The enterprise was interrupted by the Revolution. A similar undertaking was again attempted in Philadelphia in 1830, under the supervision of M. J. D'Homergue, and cocoons were brought in abundance to the establishment from various parts of the country, and so continued for some time afterwards; but, for want of capital, the enterprise failed.

A manufacture for making bolting-cloth of Georgia silk was established at Wilmington, in Delaware, prior to 1796. In about the year 1831, the project of rearing silkworms, and establishing filatures of silk, was renewed in various parts of the Union; and the subject was deemed to be of so much importance, that it not only attracted the attention of Congress, but afterwards received encouragement from the legislatures of several States, by bounties offered for all the raw silk produced within their limits for certain periods of time. The business soon began to be prosecuted with extreme ardor, and continued for several years, resulting in the establishment of several nurseries of mulberry trees, and ending in the downfall of the famous "Morus Multicaulis speculation," in 1845.

The amount of raw silk exported from Georgia in 1750, was 118 pounds; in 1775, 138 pounds; in 1760, 558 pounds; in 1766, more than 20,000 pounds; in 1770, 290 pounds; from South Carolina, in

1772, 455 pounds. In the year 1765, there were raised on Silk Hope plantation, in South Carolina, 630 pounds of cocoons; in Mansfield, Connecticut, in 1793, 265 pounds of raw silk; in 1827, 2,430 pounds; in 1831, 10,000 pounds; in Connecticut, in 1844, 176,210 pounds; in the United States, the same year, 396,790 pounds.

According to the census returns of 1840, the amount of silk cocoons raised in the United States was 61,552½ pounds; of 1850, silk and silk cocoons 10,843 pounds. From the above, it is obvious that the production of cocoons has decreased, since 1840, 46,789 pounds; and since 1844, 382,027 pounds.

FERTILIZERS.

CONDENSED CORRESPONDENCE

Statement of George P. Fisher, *of Dover, Kent county, Delaware.*

Our most approved plan of manuring is to cover as much of the corn-field, in the spring, as we can, with barn-yard manure; and then to sow guano, at the rate of 300 pounds to the acre, on the residue of the field, turning it under deep with the plough. If the corn-field is a clover sward it should be turned in the fall and well limed, and the manuring done in the spring as above, except that the spring ploughing should not be more than four inches deep. The wheat field is generally all manured with guano. Bone-dust is used only to a limited extent, in consequence of its great scarcity. Phosphate of lime was used by a few of our farmers last spring for corn, and the result was even better than that obtained from Peruvian guano. Poudrette was tried here several years ago, but totally failed. I tried one experiment, on a small scale, with two barrels; taking a piece of very poor land and manuring it for corn in the hill, with a handful of poudrette, according to the directions. Until the time for making the ear, the effect of the poudrette could be discovered as far as the corn could be seen, but it made no ear at all.

For the benefit of others who might possibly try a similar experiment, I will here give the result of one tried by myself in the year 1850. In the spring of that year, having a poor field of thirty-six acres which I wished to put up very rapidly, I sowed it with oats for turning under with the plough in July, and again in September. A part of the oat crop looked so tempting at harvest, that I cut them and turned in the residue and the stubble of that part I had cut. A very fine crop of green oats came on about the last of September. I then applied six tons of guano on the whole field, and also sowed my seed-wheat, turning it under at one ploughing, together with the guano and the green oats. I expected I should harvest some 600 or 700 bushels; but, to my great surprise and grief, as soon as the wheat came through the ground

it was attacked by myriads of little green lice—almost precisely similar to those which infest the roots of corn sometimes in the spring—and they never left it till that part where the oats had not been cut was entirely destroyed, and there was not a fourth of a crop of wheat on the stubble ground.

Statement of ANTHONY M. HIGGINS, *of St. George's, New Castle county, Delaware.*

In about the year 1830, lime began to be introduced, against much skepticism as to its utility. It is now universally used, and may be regarded by our farmers as the principal element in the success already attained. It is deposited by lime boats, from the Schuylkill, along the banks of the Delaware and other inlets, in vast quantities, at a cost of from 12½ to 14 cents per bushel of stone or quick-lime. No farmer has occasion to haul his lime further than five or six miles from a landing.

Statement of JOHN M. LESLEY, *of Danville, Vermilion county, Illinois.*

There is no guano, lime, nor bone-dust in use here, that I am aware of. In fact there is no manure used but muck and straw, which are spread as evenly as possible on the thin portions of the soil, where, after remaining for a while, they are ploughed under and left to rot. Wherever manure is used freely, the crops produced are in proportion to the amount applied.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

In gardening, when the earth is every year deeply ploughed and frequently stirred and exposed to the rays of the sun and action of the air, the use of well-rotted manure is indispensable to the keeping up of the fertility of the soil. And even in field crops, let the rotation be what it may, where the land is to be ploughed and worked every year, an exhaustion will take place, which can only be supplied by the application of manure; thus, in a rotation of six years, allowing three years to clover and the next three to other crops, our experience goes to establish the fact that, under this system of management, properly and judiciously carried out, the land will improve in its fertility and productiveness.

Statement of WILLIAM UPTON, JR., *of Dixmont, Penobscot county, Maine.*

But little manure is used here as yet, excepting that of the domestic animals kept on the farm; though plaster, lime, and swamp muck are somewhat used. The latter is applied by many in the natural state, with apparently little benefit resulting, though it is valuable, even in that state, as a manure for potatoes in the hill; indeed, it is almost the only manure that can be safely used for that crop since the rot has prevailed.

Statement of F. C. CLOPPER, *of Woodlands, Middlebrook, Montgomery county, Maryland.*

The article of guano has become indispensably necessary to the production of remunerating crops of wheat and corn on our worn out fields. It is therefore of great importance to us that there should at all times be an ample supply in the market, of the best quality, and at the lowest price at which it can be afforded. Peruvian guano, which is generally preferred, as I understand, is under the sole control of the government of Peru, or her agents, and therefore is no more nor less than an odious monopoly. Governments, like individuals, are prompted to action by motives of interest. Now, it is to the interest of us farmers to procure the article as cheap as we can; but, at the same time, it is of equal importance that it should be pure and unadulterated. In this particular, it strikes me that we are more likely to get it unadulterated under the present system, than if it were open to an indiscriminate scramble at the islands, as it is for the interest of those furnishing the article that its character should be maintained. The slightest deterioration would diminish the demand for it. Yet, at the same time, it is equally evident, that if the government price were reduced from $46 per ton to $35, they could readily dispose of double the quantity that has ever reached our shores in any one season. It is, therefore, worthy of their consideration, whether their interest would not be promoted by such a reduction.

Pure Peruvian guano, at the present price, is cheaper to the farmers, and more desirable in this section of country, than to have an unlimited amount of barn-yard manure placed at their disposal gratuitously, provided they have to transport and apply it at one mile distant; time, labor, and expense of teams, making the difference. Not that I would discourage the use of stable or barn-yard manure, for it is invaluable as a permanent renovator; but the use of guano will furnish the means to increase the quantity, and therefore enhance the value of that article.

Statement of DAVID BRUMBAUGH, *of Marsh Run Mill, Washington county, Maryland.*

The main source of manure in this county is the barn-yard, where the straw, corn-stalks, and refuse of all kinds are collected; but a very great defect is often found in the location of such yards, being on the side of a steep hill, where much of the liquid portion of the manure is entirely washed away and lost.

Guano has been used in small quantities, principally on wheat, and, I think, with good effect. It is rapidly gaining favor with the farmers on what is called "Salisbury Ridge." It has almost a magic influence, increasing the crop two-fold, if not more. Some seasons, on the best land in the county, I do not think the effect so great, as the straw is increased too much for the quantity of the grain.

I have frequently used as a fertilizer on my land what is called "pond mud," being one among the many materials which nature has provided for the use of the husbandman in the labor of permanently enriching his soil. It is found in many localities along running streams.

Statement of WILLIAM BACON, *of Richmond, Berkshire county, Massachusetts.*

The super-phosphate of lime is a new article among our farmers; but an establishment for its manufacture has been got up in our neighborhood the last season; and from the limited experiments made within the short time it has been in market, it promises to rank among the most effectual of fertilizers. For turnips it is highly valuable, sown on when they first come up. It is fatal to all the insect tribes, both above and below ground, which are often so injurious in their ravages on the crop, and gives a cleanly and luxuriant growth, that cannot be realized from any other manure. It is also valuable for all crops on which I have seen its application; but as the supply of it can never be equal to the wants of all, it is best to give it to those which are most benefited by it.

Lime is extremely valuable for lands which have acquired too much acidity, whether they rest on a limestone formation or not. But the extreme high price it bears, from 25 to 30 cents per bushel, forbids the use of it to any considerable extent. The refuse of the kilns is readily bought up at cheap rates, and usually applied to land in compost with swamp or pond muck, or turf from the highway, which, when thoroughly worked, is productive of great benefit as a top-dressing on grass lands, and frequently ploughed crops. The ashes from these kilns, like house ashes, are in high demand for the compost heap, or immediate application to the land, where their effects are strongly marked and long visible. They are obtained at from 8 to 10 cents a bushel.

Gypsum is used in good quantities both on grass and ploughed lands, on such soils as are found adapted to it. On any land that will produce clover or winter grain, its effects are highly beneficial, but greatest when applied with yard or compost manure. It seems desirable to have some decomposable substance to act with it, in order to realize the greatest benefit. Hence the good effect of manure in some form in connexion with it. If sown upon grass lands, it cannot be done too early in the season, provided a calm atmosphere favor the operation. Indeed, I have sown in autumn, in order to realize its effects fully the following year on meadows. On spring grain it should be sown as soon as the first leaf is plainly formed. In the experience of some farmers, if sown and harrowed in with the grain it is most beneficial. So we see that no certain rule can be adopted for its application, and that the observation and judgment of each farmer must direct for his own premises. I have found that where we have manured corn in the hill, a gill of plaster with the manure was worth a third more than when applied after the corn was up, yet the reverse of this might be the case in other experiments. I have also found that a sprinkling of plaster thrown over our manure once a month through the winter, added greatly to the value of the increase, and gave it greater action the following season.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

We have never used manures to any great extent in Missouri, except what is obtained from the barn-yard and stable. The farmers of one of the best wheat-growing counties of the State are in the habit of raising their grain from the same lands for a series of years, without much depreciation of product, and the manure they apply is the straw that comes from the preceding crop. Clover is the best and most generally used fertilizer among us. It is usually sown in the proportion of from one to two gallons an acre on wheat, or with oats in the spring. It does not succeed well when sown in the fall.

Statement of A. G. COMINGS, *of Mason, Hillsborough county, New Hampshire.*

Guano, super-phosphate of lime, plaster, &c., are having a greatly increased use among our farmers. The beneficial effects following the use of these manures are found to depend upon the manner of their being applied.

In manuring a kitchen garden, three divisions of the ground should be made, as follows: No. 1, should be for onions, carrots, tomatoes, celery, and all plants and vegetables that require much ammonia. An application of guano or hog manure should be made to this division of the ground. More vegetable or carbonaceous matter than guano contains should be applied.

No. 2, besides a supply of old vegetable matter in the soil, should have a mixture of guano and super-phosphate for the production of potatoes, peas, beans, beets, corn, &c.

No. 3, for cabbages, turnips, &c., should have no hog manure nor guano, although a small quantity would do no injury to turnips; but much ammonia in the manure for cabbages and turnips would make them club-rooted. Super-phosphate of lime for this division of the garden will show an effect most highly gratifying, with vegetable matter in sufficient quantity.

The above suggestions on manures for different divisions of a kitchen garden, and the plants to be cultivated in those several divisions, are made from experiments which I have directed and seen. I have embraced in the list of vegetables and plants several which are cultivated as field crops.

I have proved both guano and super-phosphate to be valuable for Indian corn, but find the best effect from mixing them in equal quantities. I have, the past season, applied the mixture to a field of corn, about 100 pounds of each to the acre, with a light dressing of compost, made of vegetable matter with animal excrements, spread and ploughed in. The mixture of guano and super-phosphate was applied in the hill. The effect was decidedly good. I also applied the same mixture to a piece of ground, sowing broadcast and ploughing in, for Tuscarora corn, without any other manure. It appeared very beautiful, and where there was a good supply of old vegetable matter in the soil, it continued exceedingly fine; where there was but little old vegetable matter in the soil, it failed to fill the kernel well. I selected another piece of ground for the super-phosphate alone, where the soil was in good condition in every other respect than being nearly destitute of old vegetable matter. The color of the corn while growing was healthy in appearance, and there was a fair growth of stalks, but not enough corn

to be worth the harvesting. Not a single well-formed ear could I find in the field. This was as I anticipated. There must be, I think, a full supply of carbonaceous food for every plant to mature its seed. Super-phosphate alone will not produce corn where there is little or no vegetable matter in the soil.

I also applied super-phosphate to a field where I planted corn for fodder. One row was left without any. The ground had been lightly manured with compost and then ploughed. To ascertain the exact difference caused by it, I cut up thirteen stalks of the fairest in the neglected row, and as many near by them in a row to which the super-phosphate had been applied, and found the difference as thirteen and a half to one, by weight, in favor of the super-phosphate. The difference in height was four to one and a half in favor of it.

In this county, I have known no use to be made of super-phosphate before the past season. It has proved itself a valuable manure; but for plants bearing seed, it is by no means sufficient alone. I have not found it successful by itself except in one case. I had a small spot of ground which was mostly made by throwing out subsoil, so that very little vegetable matter could have been in it. With no other manure, I raised the best Savoy cabbages that I ever saw.

In the use of plaster, our farmers have had but little experience. Most of them who have tried it heretofore, have applied it to corn and potatoes in the hill. The advantage of it when thus used has been very little. When it has been applied to the surface of the ground, especially where manure had been applied which contained much ammonia, its value has been unquestionable.

Salt has for some years been used more or less, by many of our farmers. It has been applied to the potato crop with evident profit. When sown upon the land, as much as six bushels to the acre has been employed; when applied directly in the hill, a smaller quantity. Potatoes have generally been more free from disease where it has been used. It has also been used with good success for other crops, especially cabbages. I have sown it broadcast among grain. About one and a half or two bushels to the acre on wheat or oats, after they are well up, will, on most soils, produce an excellent effect.

Statement of Levi Bartlett, *of Warner, Merrimack county, New Hampshire.*

Manures made from the farm stock are most in use with us. But many of our enterprising farmers have recently been adding much to the improvement of their soils, and increase of crops, by composting animal manures with swamp or pond muck. Guano, bone-dust, and other similar fertilizers, have not been used here to any great extent. Gypsum is freely used—sometimes with very good results; at others, it has no visible effect.

I will relate an experiment I made in the use of guano, and the fine bone-dust from a button factory, in growing potatoes, several years since. The soil upon which the potatoes were planted (one and a half acres) was mostly a light sandy loam, which had long been pastured with cows—perhaps fifty years. I began planting upon one end of the field, and dropped a teaspoonful of guano in each hill of ten rows, then left several rows without manuring; next ten rows received a tablespoonful of bone-dust in each hill; other rows were again left unmanured; thus alternating, until the field was planted. In a few days after, the tops appeared; the dark-green, broad leaves told plainly where the guano and bone-dust had been applied to the hills, and the difference was very apparent all through the season. At the time of harvesting, it was found that the crop where the guano and bone-dust had been used, was just double that of the unmanured rows; and it took no longer to dig a bushel from the manured, than it did to dig half a bushel from the unmanured hills.

Theory would account for the favorable action of the guano and bone-dust, upon the supposition, that from the long time the land had been grazed by milch cows, it had become deficient in phosphate of lime and ammonia; and that these important ingredients were supplied by the guano and bone-dust, in a concentrated and available form for the crop. The practical result in this case would seem to sustain theory.

Early in September, I sowed a field with winter-wheat, upon which I applied per acre at the rate of 300 pounds of Peruvian guano. The wheat now (October 25th) is looking finely—much better than other fields where no guano was used.

In the season of 1851, I used upon various crops a few hundred pounds of mineral phosphate of lime from New Jersey. When applied in its raw state, it had no perceptible effect. A portion of the mineral treated with sulphuric acid, changing it to the more soluble super-phosphate, had a very marked effect on the cabbage and turnip tribe of plants.

Last spring, I received from Professor Horsford, of Cambridge, Massachusetts, a few pounds of artificially prepared manure, to be applied upon field crops at the rate of 160 pounds per acre—one pound to the square rod. Upon the wheat and oat crop it had a decidedly good effect, increasing the growth of the grain very perceptibly, and hastening the maturity of the crop. I also tried it on various other crops, in proportions according to printed directions accompanying the package. It was used on land planted with turnips, carrots, squashes, potatoes, &c.; but, unfortunately, drought, bugs, grasshoppers, and the carelessness of my hired hand, destroyed all comparative results.

Statement of Samuel Webber, *of Charlestown, Sullivan county, New Hampshire.*

Stable and barn-yard manure is our great dependence in maintaining our crops. With some, it is composted with muck, and in a few instances, very improperly, with wood-ashes or lime. Gypsum is occasionally employed, and sometimes ashes alone. All admit that barn-yard or stable manure is good, but do not agree as to the best mode of applying it. Some prefer it in a long, or green state; others fermented, or partially decomposed; while a third class use it in a rotten state. Some use gypsum with good effect—others not; and all coincide in the excellence of ashes, when applied to Indian corn.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

In this cold climate we have to feed our stock during the winter months, and until late in the spring. Horses, cattle, sheep, and hogs are housed and fed. The horses are most carefully stabled, and our cattle, sheep, and hogs afforded an excellent shelter. The hay, straw, and other feed are thus converted into manure, and left in the barn-yards until thoroughly rotted and fit for use. It is then carried and spread upon the land as a fertilizer.

Those farmers who give any attention to the improvement of the soil, increase the amount of manure by having a compost heap, which is made as follows: Draw up swamp muck, put it in a heap, add to it lime, barn-yard manure, and other convenient perishable materials. In a year's time, it is fitted for use, and pays well, affording a large profit on the outlay. Bone-dust and shell-lime are used also as fertilizers, and those who employ them are highly pleased with the results. Lime and plaster are both used as fertilizers—the latter by all. Corn, when planted, is rolled in plaster, and the young plant is covered with it. It is likewise sown on grass and clover fields, with the best effect.

Statement of LUTHER BAILEY, *of the United Society of Shakers, North Union, Cuyahoga county, Ohio.*

Barn-yard or stable manure is the only kind used here. In order to increase the quantity as much as possible, our yards are abundantly supplied with muck and litter, such as straw, saw-dust, turners' shavings, and any rubbish or filth that may accumulate about the premises; also muck from the woods or swamps, the wash from creeks, or anything of like character, are hauled from time to time into the yards. The stables are well supplied with straw, saw-dust, or turners' shavings. This litter, both in the yards and stables, by absorbing the more liquid parts, by retaining and preventing the escape of ammonia, furnishes an abundant supply of rich manure. The best mode of applying it is to spread on the surface and harrow it in. Our experience proves this to be much better than ploughing it under for any crop.

Statement of N. LINTON, *of Cochransville, Chester county, Pennsylvania.*

The manures mostly used here are those of the barn-yard, lime, gypsum, and guano. Barn-yard manure and lime are our main dependence. The former is usually applied to oat-stubble, and sometimes to clover-seed, for wheat. In some instances, also, it is ploughed under for corn. Lime is mostly spread on the sod, at the rate of 30 to 60 bushels to the acre, once in each course of crops; but it is often scattered on corn ground, just previous to planting. Many farmers think it the best way to apply it to wheat-stubble shortly after the grain is harvested; but, in whatever way it is put on, it is the basis of successful husbandry in this vicinity. Nearly all our land for miles around was formerly worn out old fields, which would produce nothing; but the application of lime unlocked the hidden treasures of the soil, and rendered available, as food for plants, the inert organic matter which it contained. This, accompanied by judicious cultivation, and a proper rotation of crops, has entirely changed the appearance of our neighborhood. Scarcely an old field is now to be found. Guano has been used to some extent of late. It is mostly employed for wheat, and ploughed in at the rate of 300 pounds to the acre. Its effects are generally considered renovating, and its use is greatly extending. Gypsum is applied on the young grass in the spring, when it is just starting. About one bushel to the acre is the quantity usually put on, and its effects are often very good, while at others it is not perceptible.

Statement of M. F. MYERS, *of Kingston, Luzerne county, Pennsylvania.*

We use mostly stable manure, together with turning under clover as a renovator. Lime and coal-ashes are used to some extent, and with good results, on clayey soil. I will here give you my experience with lime on a heavy, clayey loam. I applied 100 bushels to the acre on a corn-stubble, and planted again in corn, but saw very little benefit to the crop. I then ploughed and sowed with oats, in 1851, together with clover and Timothy. For the two past seasons, I have mowed the finest of grass. One year ago, I top-dressed part of my meadow with 100 bushels of lime to the acre, with like results. The coal-ashes were managed in the same way, and with the same success.

Statement of JOSHUA S. KELLER, *of Orwigsburgh, Schuylkill county, Pennsylvania.*

As fertilizers, we chiefly use barn-yard manure. Guano and other concentrated fertilizers are used to a limited extent. I have made use of guano on corn and turnips; in the former crop it did not pay, but in the latter it was attended with good results. As to the mode of application, I hold that all manures ought to be covered from two to four inches deep, if every possible benefit is to be obtained from them.

The cheapest way to improve land in this and the adjoining counties is by lime. It is not considered as a direct fertilizer to our grain crops, except in a small degree in furnishing food to the plants, but as a kind of stimulant or decomposer to the almost exhausted organic remains, as well as some animal matter, the effect of which creates a nourishment favorable to grass; and fine clover is thus produced, which, after growing up for a few years, ought to be turned under when fully ripe, with a good plough. Let those who advocate the green state do so to their hearts' content; I have the experience of both the dead-ripe and the young-green, and would by no means suffer the latter if I could prevent it. The best way to apply lime is on the top of a sod, one or more years before it is ploughed under. The quantity depends on the kind of soil and after-treatment. Heavy clay can bear 100 or more bushels to the acre, while on light soils from 50 to 80 bushels will answer very well.

Statement of JOHN EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

The only fertilizers in general use with us are lime, plaster, or gypsum, and barn-yard manure. Air-slacked lime and barn-yard manure are applied to land intended for wheat, oats, or corn, and are generally, though improperly, spread upon the ground after it has been ploughed. Plaster is principally used in the spring on our grass lands, at the rate of a bushel to an acre, which will increase the yield of hay about one third. Fifty bushels of lime and twenty-four horse-loads of barn-yard manure to an acre, renewed every three years, are generally applied for corn, oats, and wheat, which usually increases the yield 25 per cent., and the soil will be in good condition for the two following crops.

Statement of STEPHEN H. SMITH, *of Lonsdale, Providence county, Rhode Island.*

In all my applications of guano to grain crops, it has proved a valuable manure. Ten dollars' worth of Peruvian guano to the acre, well applied, will give an increase of 20 bushels of corn, or 12 bushels of rye. I apply it pulverized and mixed with soil, sowing it broadcast, on a deep furrow, and harrow it in. On a field that is ploughed deep, I apply it by ploughing it under three or four inches deep. It is preferable to use it very early in the spring, before the rainy season is past. If left until May or June, it will not diffuse its fertilizing properties through the soil. A portion will be lost from concentration, while another part will be evaporated by the summer's heat.

I have had the best success when the guano was made on winter rye, sown early in September, and stocked down to grass at the same time. A field of twenty-four acres, from which 300 bushels of spring rye had been taken the season before, was sown about the 1st of September with 10 pounds of clover, one peck of Rhode Island red-top, (herdsgrass of the Middle States,) one peck of Timothy seed, five pecks of winter rye, and 400 pounds of guano. The result was, that the field produced 600 bushels of rye, worth 90 cents per bushel; 15 tons of straw, worth $10 a ton; and a large amount of pasturage besides.

Statement of JOSEPH PARKER, *of West Rupert, Bennington county, Vermont.*

Guano, super-phosphate of lime, gypsum, and wood-ashes, are the principal fertilizers used in this vicinity. With the exception of barn-yard manure, gypsum is the chief foreign substance used, though guano has been tried on corn with good success. Last season I tried super-phosphate on corn, by applying it to the hills previous to hoeing; and in order to test it more thoroughly, I applied it to a few rows after hoeing, but with no perceptible difference in its effects. The difference in the portion of the field to which super-phosphate had been applied could be distinctly seen at a distance, and the yield at harvest was often one fourth to a third more than the part to which no super-phosphate had been applied.

I also applied some super-phosphate to an old meadow near the commencement of a drought, but I could not perceive any difference in the overgrowth of the grass where it had been applied.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

Our principal supply of manure is from the barn-yard. Gypsum is extensively used—guano but little. Barn-yard manure is carefully saved, and applied to a considerable extent as a top-dressing to our grass lands. Some draw it out directly from the stables in the winter season; others haul it as it thaws in the spring; but our best farmers keep it under cover until late in the fall, and then spread it over their meadows. In so doing, the grass starts early in the spring, before the scorching rays of the sun in June have robbed the manure of its ammonia. There is not that attention paid to compost heaps there should be. We apply from 5 to 100 pounds of plaster per acre.

IMPROVEMENT OF LAND.

CONDENSED CORRESPONDENCE.

Statement of SIMON T. ASHETON *and* ELIJAH MYRICK, *Trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

Our meadows, previous to improving, had been cropped of their natural grasses for fifty years, until they were no longer worth cutting, when they were left to grow up to bushes three feet high, and with moss and bogs. First we commenced by ditching six feet wide to the bottom of the peat, as near each other as necessary to perfect a draining. The bushes were then mowed, the bogs cut up and burnt, and the ground turned over with a meadow plough in the fall. They were then planted similar to our usual rotation of crops, sometimes omitting corn.

In September, 1852, we ploughed four acres of meadow similar to those described, which was left for the action of the frosts. Owing to the abundance of rain that fell in the spring, it was difficult to get a team on it until quite late in the season. It was the first week in June when we commenced ploughing. On the 10th the rains came on again, and it was difficult to draw over muck for manure. We succeeded however, in getting on ten loads per acre, which was put in the hill on planting our potatoes, and well covered in the usual way. Drought immediately followed the rains, and the potatoes did not make much growth until the first of August, when they commenced growing rapidly. They were dug about the middle of September, the field having been left to its fate from the day it was planted until harvesting had begun; not one hour's labor having been expended upon it with hoe or other implement. The field yielded 800

bushels of as fine potatoes as any one could wish, and is now in good order for any other crop suitable for a peaty soil.

The whole expense of ditching, manuring, and planting, $15 per acre. Price of potatoes in Boston market, 50 cents per bushel. Cost of transportation by railroad, 12½ cents per bushel.

Three years ago we commenced a new plan of reclaiming meadows. First we mowed the bushes close to the ground, bogs and all, leaving the surface clean and smooth, and then burnt over the ground, which made an excellent manure. We next carted on about fifty loads of clayey loam, and harrowed it with a light harrow to mix the soils. Then three pecks of herdsgrass (Timothy) and red-top seeds were sown, which came up the following spring, and the yield was one ton of excellent hay. This season it was estimated, by competent judges, that there were 2½ tons of hay on that same acre.

Price of hay, $16 per ton. Cost of clearing, $5. Cost of carting, $10. This experiment exceeded our expectations, and we are about to prepare fifteen acres more in the same manner. Clay proves better on our meadows than any kind of earth we have ever tried.

Statement of HENRY F. FRENCH, *of Exeter, Rockingham county, New Hampshire.*

To show that reclaiming swamp lands for grass, if properly done, will pay, I send a condensed statement of my operations on a meadow in Exeter. The price paid for it was generally thought, at the time, to be very high, and probably no looker-on while my work proceeded, ever believed that it was other than a waste of money. I consulted a gentleman who had had charge of the land several years, and he said it had been examined by the best farmers, who had agreed that the most of it was entirely worthless, and could never be made productive. On the very part pronounced the worst, I have cut 3⅓ tons of hay to the acre at one cutting. The account shows that my expenditures, and the interest on the cost, have exceeded $800 since I bought it, in 1844; and yet, that at the lowest price for hay, the lot has repaid it all, and much more. The soil is part a clayey loam, and part black mud upon sand. My account was kept very exactly, for my private use. The hope that farmers may be induced to keep such accounts, and that their faith in the gratitude of mother earth to her sons for their attention to her may be increased, has induced me to publish it. I do not regard the work as very well done, and I know that 20 tons of hay might have been profitably raised, instead of 15, upon the lot, had I treated the whole as I treated part. I have sold most of the hay yearly, so that the weight was ascertained, and not merely estimated.

DR.—*The Court-house Meadow.*

1844. May.	To purchase-money for seven acres		$639 00
	ploughing, &c., for potatoes, 97 rods	$9 14	
	12 bushels of seed potatoes	3 00	
	11 loads of manure, and hauling	26 98	
	ditching	5 00	
	breaking up one acre, six yoke of oxen	14 50	
			58 62
Nov.	To six months' interest on cost		19 17

1845.	To 5 casks of lime	$5 45	
	ploughing and cultivation of oats and potatoes	27 93	
	seed potatoes	1 80	
	making roads and planting potatoes	11 58	
	fencing	35 15	
	15 loads of manure	30 00	
	labor of men and oxen, ploughing, digging stumps, ditching, levelling, spreading manure, and digging potatoes	79 30	
	grass-seed	2 25	
			$193 46
	interest on balance of last year		39 00
1846.	To grass-seed	2 27	
	1 barrel of guano	5 60	
	stable manure, hauling and composting	24 42	
	labor of men and oxen, ploughing and laying land to grass	14 70	
			46 99
	interest on balance of last year		47 90
1847.	To manure, and hauling and composting	32 50	
	labor of men and cattle, clearing up the last piece	52 50	
	ditching, &c.	8 00	
	grass-seed and rye	3 75	
			96 75
	interest on balance of last year		47 00
1848.	To labor		10 00
	interest on balance of last year		49 69
1849.	To interest on balance of last year		46 97
1850.	To interest on balance of last year		43 69
1851.	To ploughing and laying one acre to grass, and manure		25 00
	interest on balance of last year		40 70
1852.	To 7 loads stable manure, hauling, composting, and spreading, for top dressing		19 25
	interest on balance of last year		20 34
1853.	To interest on balance of last year		16 71
			1,460 24

CR.—*The Court-house Meadow.*

1844.	By 6 tons good hay, standing	$32 00	
	meadow grass and second crop	6 00	
	81 bushels potatoes	16 20	
			$54 20
1845.	By 7 tons of hay, standing	56 00	
	25 bushels of oats	10 00	
	3 bushels of barley	2 50	
	50 bushels potatoes	15 00	
	wood	1 00	
			84 50
1846.	By 10 tons of hay, standing	90 00	
	40 bushels potatoes, (on shares)	20 00	
			110 00
1847.	By 12½ tons of hay, standing	95 00	
	8 loads mud hauled	4 00	
			99 00
1848.	By 15 tons of hay, standing	100 00	
	5 bushels of rye	5 00	
			105 00
1849.	By 15 tons of hay, standing		105 00
1850.	By 15 tons of hay, standing		90 00
1851.	By 12 tons, (one acre sold off)		75 00
1852.	By 9 tons hay, standing		100 00
1853.	By 9½ tons hay, standing		133 00
	Balance, being the present cost of the lot, after paying all expenses, and 6 per cent. interest, to November, 1853		504 54
			1,460 24

The result of the operation, *agriculturally* speaking, is that the lot has paid all expenses of labor, fencing, and manure, 6 per cent. interest annually, and $134 46 more. But this is not all. More than half the lot was, when purchased, a worthless swamp, part filled with hassocks, so that six yoke of oxen were required to plough it, and part covered with stumps, from which the wood had been recently cut. Now, the whole is a clean, level, mowing-field, free from all obstructions except a few open ditches.

I think the fair value of such land is about $200 an acre, near any good market; and to show that my opinion is not singular, it may be stated, that I have sold enough of the lot, since last haying time, at $166 75 per acre, to bring me $565. It adjoins no street, and was purchased merely for agricultural purposes, and was subject to an incumbrance, for which I had received $100. I also, in 1851, sold a little more than one acre for $[illegible]40, a part of which perhaps was for fancy, though it is occupied only for farming.

Farmers can make money by reclaiming wet meadows, and the foregoing statement shows it. This land was no better than thousands of acres which may be bought in New England at $10 an acre; yet I paid for it nearly $100, because it joined my garden where I then lived, and, like all land-owners, I like to buy all that joins my own. Farmers can attend to such work at times of leisure for themselves and their cattle. I paid $1 per day for every day's work of a man or yoke of oxen. The account will show that the hay, which was of the first quality of herds-grass, was estimated at only from $6 to $8 per ton until 1852, when it is set down at about $9. This is a lower price, by far, than the average in our region in past years, prior to 1844. This year I sold it from the field at $16. Again: every cord of manure is charged at $4, whether purchased or hauled from my own barn, and this is twice the cost of making it in most localities. Then, as usual, I followed no beaten path, but tried all sorts of scientific experiments in a small way, with lime and guano, and with barley, rye, and oats, on places where it was said they would not grow. Everybody knows that these experiments are expensive to him who tries them, however they may help the cause. Indeed, I flatter myself that, with the added experience of ten years, I can manage wild lands to much better advantage than this lot was managed. I sold a part, because my home is now on a new farm, where I am indulging my propensity to make rough places smooth, on land which cost me but $25 an acre; so that my interest account will not consume the profits.

The three acres which I still hold of the "Court-house Meadow," are worth more per acre than what I have sold.

Now, whether we regard the annual product of the land, or its selling value, it must appear that reclaiming swamps is, sometimes at least, a profitable business, and that is the proposition which my statement and remarks are designed to illustrate.

Statement of experiments made by Dr. Sidney Weller, *of Brinckleyville, Halifax county, North Carolina.*

About three years ago I sowed, in the latter part of July, on a very poor spot of worn out land, some guano, at the rate of about 200

pounds to an acre, ploughing it under, and then sowing and harrowing in some buckwheat and rye, and afterwards clover-seed. Wherever the clover came up, I strewed thereon plaster, or gypsum, at the rate of a bushel and a half to the acre. The buckwheat I cut two months after sowing, and the rye in about eleven months. The result was, that each of the three crops was good, all having been sown at one time and on the same ground. A portion of the ground before manuring was too poor to produce a crop of any kind. Hence it may be inferred that the success of the experiment was owing entirely to the gypsum and the guano.

Encouraged from the above named experiment, I next tried guano for wheat, on a comparatively poor soil, at the rate of 200 pounds per acre. During the growth of the crop, there was a striking difference in its appearance in favor of the parts where the guano had been applied, and the yield, by actual measurement, had increased four-fold. On the first of March following, I harrowed over the field and sowed with clover-seed; after which I rolled the ground. As soon as the clover came up, I sowed the field with plaster, at the rate of a bushel and a half to an acre. The result was, that the clover on the part of the field where no guano had been applied was inferior, while the guanoed portion, like that in wheat, was about four times as good.

These experiments have convinced me that the effect of guano, as a renovator of the soil, is as enduring as other manures, and does not expend itself in one season, as has been heretofore supposed.

In the spring of 1852, I instituted a comparative experiment with four fertilizers, namely: guano, bone-dust, wood-ashes, and a clover-ley. A parcel of ground was selected which had been cropped with clover three consecutive years. After the first ploughing, I ran two deep furrows, with an opening or drill-plough, seven feet apart, over the clover-ley, and similar furrows over the adjoining ground, which was a part of a poor old broom-sedge field that had also been previously broken up. In the two furrows next to those on the clover-ley, after filling them with earth nearly level with the surface, I applied bone-dust mixed with loam, in the proportion of four-fifths loam to one-fifth bone-dust, at the rate of a bushel of this mixture to every 450 lineal feet. At the bottom of the next two furrows or drills on the clover-ley, I applied leached ashes, at the rate of about one bushel to 450 lineal feet; and next, continuing throughout the clover-ley, I strewed guano at the rate of two quarts and a pint, mixed with one-fourth part of plaster to every 450 feet, putting it at the bottom of the deep furrows or drills, in order that it might not come in direct contact with the seed-corn when planted, and thereby kill the germ. Next, a bull-tongue plough was run on each side of the drills, forming another set of drills or hollows, in which I planted "Ward corn," in single kernels, a foot and a half apart. At harvest time, I found that the crop where the bone-dust and guano had been applied was good, nearly equal in product, averaging about three ears to each stalk, and yielding, by estimate, about 60 barrels, or 300 bushels, to the acre; but on the part where the leached ashes were applied, the yield was quite inferior.

I will give one more experiment with fertilizers, which, from its peculiarity, may be regarded with some interest. Last winter it was

proposed that as many members of the North Carolina State Agricultural Society as might feel inclined, should deposite in one common fund $5 each, to be awarded in three graduated prizes—first, second, and third—(after reserving for the use of the society 15 per cent.) to those of the number who should produce the largest yield of corn on an acre of land, which, in an unimproved condition, would not yield more than three barrels, or 15 bushels—to be selected and determined by disinterested judges. Each member was to have the privilege of resorting to his own mode of cultivation.

The acre of ground selected for my experiment, in an unmanured state, it was judged, would not have produced more than 2½ barrels, or 12½ bushels; but by the aid of guano, plaster, super-phosphate of lime, and Chappell's fertilizer, connected with a light dressing of manure from the barn-yard, and compost heaps made of swamp mud, cotton-seed, and stable dung, I produced 14¾ barrels, or 73¾ bushels of corn, valued at $62 50, and this at a cost of about $20 for fertilizers and their application, to say nothing of the fodder derived from the stalks, blades, and shucks, and the increased fertility of the land; from which I expect to make a good crop of clover and wheat without additional manure. Besides, in the opinion of my neighbors, who are considered competent judges, had not the season been unfavorable from wet and drought, my acre would have yielded 8 or 10 barrels more.

I commenced the improvement of my ground in the winter, first by running a plough a foot deep, and then sprinkling in the furrow guano mixed with one-fourth by weight with plaster, at the rate of 150 pounds to the acre; and directly after, loosening the ground to a depth of 15 inches with a subsoil plough, finishing one furrow before another was opened. Next a light dressing of barn-yard manure was spread over and harrowed into the field, which was followed, in one part, by a sprinkling of compost, and in another with a dressing of Chappell's fertilizer mixed with one-fourth part guano, which were also harrowed in.

Just before planting, about the 20th of April, 1853, the ground was again subsoiled, and then worked off into drills 3½ feet apart with a subsoil plough, into each of which a sprinkling of Chappell's fertilizer was added. I then planted the drills with Ward corn, with the kernels nine inches from each other, which was afterwards thinned out to 18 inches apart. The field was kept as nearly level as practicable, by working it with coulters, cultivators, and harrows, one after the other. It may further be remarked, that, as I never sucker my corn, not only two ears were grown to a stalk, but many of the suckers themselves produced good ears.

In reference to Chappell's fertilizer, others who have tried it agree with me in thinking, that when used with one-fourth part of guano, it goes as far as an equal quantity of guano unmixed, though at a much lower cost.

Statement of ELMER ROWELL, *of Federalton, Athens county, Ohio.*

Perhaps nothing connected with the manual labor of the farm is of so much importance as skill in ploughing; and among other things necessary to constitute the right kind of skill, is a knowledge of the depth

proper to plough. Land that has been ploughed a number of years at the usual depth, should be done deeper and deeper from year to year, until the greatest practicable depth, say one foot, is obtained. In connexion with deep ploughing, it is presumed the subsoil plough, in some soils, would be highly beneficial.

One reason for ploughing deeper and deeper each year must be obvious to every person who has witnessed the operation of leaching ashes. In like manner, as the potash of the ashes is dissolved and settles with the water through the ashes, is it not possible, probable, and even certain, that some, at least, of the constituents of the soil, or peculiar food of plants, or some of the elements of this food, subsides with the water in copious rains, and is deposited in the more compact earth directly under where the plough and harrow have loosened it? The writer has a field of some twelve acres, which was first brought into cultivation and planted with corn in the spring of 1811. This field is somewhat peculiar, as it consists of five or six different kinds of soil in as many localities. It was ploughed every year, and put in corn and wheat alternately, nine or ten years; after which a rotation of meadow, pasture, and wheat succeeded, until in the fall of 1839, when the first manure was applied, and this only on the poorer spots, not exceeding twenty loads of half a cord each to the acre. In the fall of 1841, it was sown with wheat, and in the spring following with clover, and pastured through the summers of 1842–3. In the spring of 1845, it was ploughed two inches deeper than ever before, and planted with corn, when it produced a heavier crop than it had ever done before. This result was undoubtedly obtained by deepening the furrow, which not only gave the corn a greater depth of earth into which to expand its roots, but also brought up and rendered available matters suitable for its nourishment, which had, in a series of years, leached from the loosened surface.

Another resource of the farmer by which to keep his acres full fed, and the cheapest, too, when rightly managed, requiring the least possible labor, is shelter, shade, or protection from the fierce rays of a summer's sun, and the winter's piercing, withering blasts. For this purpose I would name clover as the best remedy; but any of the grasses will answer as good purpose, if a full growth is suffered to stand. Among the grasses, the far-famed Kentucky blue-grass is pre-eminent—equal to clover, perhaps, except in depth of root, which is a great object with the skilful farmer. In addition to the fertility imparted to the soil by turning under a green crop—or rather, as I would have it, a dry crop—the ground, when thus protected, seems to exert a renovating energy, equal if not superior to the actual manure of the crop.

BREAD CROPS.

By *bread plants*, it is to be understood that they comprise those which contain, in one or more parts of their structure, a sufficient abundance of starch to furnish an essential article of food to man. Starch, or fecula, is that material which constitutes the principal mass of bread, although other substances usually occurring with it, (gluten and vegetable albumen) play an important part in regard to nutrition in a stricter sense, especially to the formation of muscle.

It would be interesting to give a complete summary of the production of our bread plants, of the manufactures and trade resulting from them, and of their geography, history and origin; but, for the want of sufficient statistical and other data, we must confine ourselves to such statements and facts respecting them as have come under our reading and observation. It may be remarked, however, that the early history of the bread plants is enveloped in obscurity, in the form of traditions and myths, according to which the gods themselves descended to the earth to confer the great gift upon mankind. For instance, in India it was Brahma; in Egypt, Isis; in Greece, Demeter; in Italy, Ceres, who gave corn to the natives and taught them to cultivate it. The ancient Peruvians and the Indians of North America had similar traditions or legends respecting maize, or corn.

INDIAN CORN.

Among the objects of culture in the United States, maize, or Indian corn, takes precedence in the scale of crops, as it is best adapted to the soil and climate, and furnishes the largest amount of nutritive food. Where due regard is paid to the selection of varieties, and cultivated in a proper soil, it may be accounted as a sure crop in almost every portion of the habitable globe between the 44th degree of latitude and a corresponding parallel south.

The corn plant, or its grain, frequently entered into the forms, the ceremonies, and the mythology of many of the Indian tribes, both in North and in South America, an instance of which may be illustrated in the following allegory, as related by Mr. Schoolcraft, of the Odjibwas: A young man went out into the woods to fast, at that period of life when youth is exchanged for manhood. He built a lodge of boughs in a secluded place, and painted his face of a sombre hue. By day he amused himself in walking about, looking at the various shrubs and wild plants, and at night he lay down in his bower, which being open, he could look up into the sky. He sought a gift from the Master of life, and he hoped it would be something to benefit his race. On the third day he became too weak to leave the lodge, and as he lay gazing upwards he saw a spirit come down in the shape of a beautiful young man, dressed in green and having green plumes on his head, who told him to arise and wrestle with him, as this was the only way in which he

could obtain his wishes. He did so, and found his strength renewed by the effort. This visit and the trial of wrestling were repeated for four days, the youth feeling at each trial that, although his bodily strength declined, a moral and supernatural energy was imparted, which promised him the final victory. On the third day his celestial visitor spoke to him. "To-morrow," said he, "will be the seventh day of your fast, and the last time I shall wrestle with you. You will triumph over me and gain your wishes. As soon as you have thrown me down, strip off my clothes and bury me in the spot, in soft fresh earth. When you have done this, leave me, but come occasionally to visit the place to keep the weeds from growing. Once or twice cover me with fresh earth." He then departed, but returned the next day, and, as he had predicted, was thrown down. The young man punctually obeyed his instructions in every particular, and soon had the pleasure of seeing the green plumes of his sky visitor shooting up through the ground. He carefully weeded the earth, and kept it fresh and soft, and in due time was gratified by beholding the matured plant, bending with its golden fruit and gracefully waving its green leaves and yellow tassels in the wind. He then invited his parents to the spot to behold the new plant. "It is Mondamin," replied his father, "it is the spirit's grain." They immediately prepared a feast, and invited their friends to partake of it, and this is the origin of Indian corn.

Although there has been much written on the Eastern origin of this grain, it did not grow in that part of Asia watered by the Indus at the time of Alexander the Great's expedition, as it is not among the productions of that country mentioned by Nearchus, the commander of the fleet. Neither is it noticed by Arrian, Diodorus, Columella, nor any other ancient author; and even as late as 1491, the year before Columbus discovered America, Joan. di Cuba, in his "Ortus Sanitatis," makes no mention of it. It has never been found in any ancient tumulus, sarcophagus, or pyramid; nor has it ever been represented in any ancient painting, sculpture, or work of art, except in America. But in this country, according to Garcilaso de la Vega, one of the earliest Peruvian historians, the palace gardens of the Incas were ornamented with maize, in gold and silver, with all the grains, spikes, stalks, and leaves; and in one instance, in the "garden of gold and silver," there was an entire corn-field, of considerable size, representing the maize in its exact and natural shape; a proof no less of the wealth of the Incas than of their veneration for this important grain.

In further proof of the American origin of this plant, it may be stated that it is found growing in a wild state from the Rocky mountains, in North America, to the humid forests of Paraguay; where, instead of having each grain naked, as is always the case after long cultivation, it is completely covered with glumes, or husks, as denoted by the cut on the succeeding page. It is, moreover, a well authenticated fact that maize was found in a state of cultivation, by the aborigines, on the island of Cuba, at the time of its discovery by Columbus, as well as in most other places in America first explored by Europeans.

The first successful attempt of the English in North America to cultivate this grain was made on James river, in Virginia, in 1608. The colonists sent over by the "London Company" adopted the mode then practised by the Indians, which, with some modifications, has been pursued ever since. The year following, thirty or forty acres were broken up and planted by the colonists near Jamestown. The yield at that time is represented to have been from two hundred to more than a thousand-fold.

In 1621, the Indians, Samoset and Squanto, visited the Pilgrims at Plymouth, and instructed them how corn should be planted, and the manner in which the ground should be manured with alewives. The colonists planted twenty acres with corn, and six acres with barley and peas. The corn produced well, but the other two failed. The same year, Edward Winslow and Stephen Hopkins visited the Indians at Namasket, in Middleborough, who received them with great joy, and regaled them with bread, called *mazium*, made of Indian corn. In 1629, the yield on Massachusetts bay was from two hundred to five hundred to one. Thirteen gallons of seed gave 52 hogsheads of corn of seven bushels each.

In the early settlement of Illinois, the yield of corn in some instances was a thousand-fold.

In 1621, corn sold in Virginia for 2*s.* 6*d.* (62 cents) per bushel; on Massachusetts Bay, in 1630, for 10*s.* ($2 50;) in New Netherland, in 1660, for 10 to 15 stivers per skepel, (15 to 20 cents per bushel;) in Rhode Island, in 1670, for 25 cents per bushel; on the Piscataqua, in 1680, for 75 cents per bushel.

From the flexibility of this plant, it may be acclimatized by gradual cultivation, in some of its varieties, from Canada to Mexico, or from Oregon to Patagonia; but, in either case, its character is somewhat changed, and often a new variety is the result. Throughout the Atlantic States this grain associates itself with the soil and climate adapted to the growth of the flowery dogwood, (*Cornus florida*,) or the red bud, (*Cercis canadensis*,) and generally may be planted at the season of the flowering of these shrubs.

The varieties of Indian corn are very numerous, exhibiting many grades of size, color, and conformation. Among the twenty sorts indicated on Plate I, we recognise the "Wild Corn" of the Rocky mountains, and its petit grandchildren, "Pop" and "Rice;" the early "Canada," with tiny ears and flat, close-clinging grains; the "Improved King Philip," with its broad, oily grains and slender cob; the "Golden Sioux;" the starch-bearing "Tuscarora;" the "Jet-black New Mexican," of tortilla renown; the late green-keeping "Stowell Sweet;" the Virginian pure "White Gourd-seed," or New Mexican "White-flint," famous for homony and cakes; and the large "Gold-yellow Gourd-seed," with its swelling ears, of the South and West.

The varieties best adapted for the Middle and Southern States are the large white and yellow Gourd-seeds; the yellow "Shoe-peg," or "Oregon;" and the New Mexican and North Carolinian "White-flints." In the more northerly and Eastern States, the "Improved King Philip," or "Eight-rowed Yellow;" the "Twelve-rowed Dutton;" the large "Golden and White-flints;" the "Tuscarora;" the "Mammoth Sweet," and the "Stowell Late Green," are particularly deserving of culture.

By a very ingenious method, first discovered by Mr. A. A. Hayes, of Roxbury, and Dr. Charles T. Jackson, of Boston, Massachusetts, it will be found that if a watery solution of blue vitriol (sulphate of copper) be applied to a kernel of corn, longitudinally split, the germ, or "chit," only, becomes colored green, thereby beautifully defining the limits of the phosphates, by the formation of phosphate of copper. The same method may be applied to all seeds, tubers, roots, and stems of recent vegetables, except those producing oily seeds, and thus define the parts containing phosphoric acid, as indicated in Plate I.

If a grain of corn be split open, as above described, and thrown into a solution of sulphydrate of ammonia, the chit will soon be changed to a dark olive color, which arises from the change of the salts of iron into a sulphuret of that metal; a dark-colored matter forming with the ammonia, turns the vegetable coloring matter yellow, and the two colors combined produce an olive.

By preparing specimens of corn, or other grain, as above, and soaking them in a tincture of iodine, the limits of the starch and dextrine will be distinctly defined—the iodine striking an intense blue with the starch, and a deep Port wine red with the dextrine; so that, from this test, a rich violet will indicate the presence of both the starch and dextrine in the grain. If the oil be extracted from the transparent, horny part of the corn, by means of alcohol or ether, the tincture of iodine will show the presence of starch in that part of the grain associated with the gluten.

By these means we may easily cause any of our cereal grains to represent the extent and precise limits of its phosphates, iron, dextrine, starch, and oil, and form by the eye an approximate estimate of their relative proportions of these ingredients.

Among other curious results of these experiments by Dr. Jackson, is the proof that the relative proportions of phosphates in grain depend on the appropriating power of each species or variety; for, an ear of corn being selected which had on it two different kinds, namely, the Tuscarora and a variety of sweet corn, and these seeds being slit in two and immersed in the same solution, soon gave evidence of more than double the amount of phosphates in the sweet than in the other.

variety. Now, since the kernels came from the same ear, and grew side by side, they obtained unequal quantities of phosphates from the same sap, derived from the same soil. A crop of sweet corn will take twice as much of the phosphates as the other variety, and, consequently, will sooner exhaust the soil of them; and also, if the soil is deficient, will require more phosphates.

Some interesting facts will also be noticed in the variable proportions of phosphates in different varieties of the same species of grain, and the great preponderance of them in Indian corn, beyond what is contained in the smaller grains, like barley, oats, and wheat—a fact that seems to explain their peculiar properties as food for animals; the more highly phosphatic grains being more likely to surcharge the system of adult animals with bony matter, producing concretions of phosphate of lime, like those resulting from gout. Perhaps that stiffness of the joints and lameness of the feet, common in horses fed too freely with corn, may be accounted for by this preponderance of the phosphates. Young animals cannot fail to derive more osseous matter from corn than from other food.

With regard to the relative proportions of starch in the different varieties of corn, it has been observed that the Tuscarora contains the most, but does not contain either gluten or oil. The same may be said of the New Mexican Black. Rice-corn and pop-corn contain the least starch, and the most oil. It will be remarked that there is a great difference in the mode of distribution of the oily and glutinous parts of corn; many of the Southern varieties having it on the sides of their elongated seeds, while the starch projects quite through the grain to its summit, and, by its contraction in drying, produces the peculiar pits, or depressions, in those varieties known under the name of "dents."

The horny or flinty portions of corn, when viewed in their sections under a good microscope, will be found to consist of a great number of six-sided cells, filled with a fixed oil, which has been successfully employed for the purposes of illumination. On this oil depend the popping qualities of corn; for, when the kernels are heated to a temperature sufficiently high to decompose the oil, a sudden explosion takes place, and every cell is ruptured by the expansion of gaseous matter arising from the decomposition of the oil and the formation of carburetted hydrogen gas, such as is sometimes used in lighting large cities, the grain being completely evoluted and folded back, or turned inside out. This property is remarkably strong in the pop-corn, and is common, in a greater or less degree, in all kinds of corn that abound in oil; but those varieties destitute of a horny covering, as the Tuscarora, will not pop under any circumstances whatever. This change in corn is one of considerable importance, so far as regards facility of digestion; for, after the decomposition or extraction of this oil, it is more readily digested by man, though less fattening to animals.

One important use of the oil in corn is undoubtedly to prevent the rapid decomposition of the kernels when sown in the soil, and to retain a portion of pabulum, or food, until needed by the young plant, and is always the last portion of the grain taken up. It also serves to keep meal from souring, as it has been observed that a flint-corn meal

will keep sweet for years, even when put up in large quantities, without being kiln-dried; while the meal of the Tuscarora will become sour in a very short time.

The colors of Indian corn usually depend on that of the epidermis or hull, and sometimes on that of the oil. If the epidermis be transparent, the color may depend either upon the oil or the combined particles of which the corn is composed; but if the hull be opaque, the grain will present the same color. For instance, the yellow color of the Golden Sioux is derived from the yellow color of the oil; and the Rhode Island white flint-corn from the colorless particles of its starch and oil, which are distinctly seen through its transparent hull; but red, black, and blue corn, owe their lively hues to the colors of their epidermis, and not to the oil.

The proportions of oil in corn, as far as it has been examined, varies from an entire absence to 11 per cent., according to the varieties employed. In the manufacture of whiskey the oil is saved during the fermentation, as it separates and rises to the surface. One hundred bushels of corn yield from 15 to 16 gallons of oil. When corn is hulled by means of potash ley, a portion of the oil is converted into soap, and the epidermis becomes detached. The caustic alkali also liberates ammonia from the mucilage around the germ. Oily corn makes a dry kind of bread, and is not sufficiently adhesive to rise well without an admixture of rye or other flour. The oil of corn is easily convertible into animal fat by a slight change of composition, and consequently serves an excellent purpose for fattening poultry, cattle, and swine. Starch also is changed into fat, as well as the carbonaceous substances of animals, and, during its slow combustion in the circulation, gives out a portion of the heat of animal bodies; while, in its altered state, it goes to form a part of the living frame. Dextrine and sugar act in a similar manner, as a compound of carbon, hydrogen, and oxygen.

From the phosphates of grain, the substance of bone, and the saline matters of the brain, nerves, and other solid and fluid parts of the body, are, in a great measure, derived. The salts of iron go to the blood—and these constitute an essential portion of it, whereby it is enabled, by successive alterations of its degree of oxidation during the circulation through the lungs, arteries, extreme vessels, and veins, to convey oxygen to every part of the body.* 6833

The amount of Indian corn exported from South Carolina, in 1748, was 39,308 bushels; in 1754, 16,428 bushels. From Savannah, in 1755, 600 bushels; in 1770, 13,598 bushels. From North Carolina, in 1753, 61,580 bushels. From Virginia, for several years preceding the Revolution, annually, 600,000 bushels; from Norfolk, in 1791, 341,984 bushels; in 1795, 442,075 bushels; from City Point, in Virginia, in 1791, 21,180 bushels of corn and meal; in 1795, 33,358 bushels. From Philadelphia, in 1752, 90,740 bushels; in 1767, 60,206 bushels; in 1771, 259,441 bushels; in 1796, 179,094 bushels, besides 223,064 barrels of Indian meal. From Portsmouth, New Hampshire, in 1776, 2,510 bushels; in 1777, 1,915 bushels; in 1778, 5,306 bushels; in 1779, 3,097 bushels; in 1780, 6,711 bushels; in 1781, 5,587

*See Jackson's report on the geology and mineralogy of New Hampshire, pp. 255 et seq.

bushels. The amount of corn imported into the river Piscataqua, in 1765, was 6,498 bushels; in 1769, 4,097 bushels; in 1770, 16,587 bushels; in 1772, 4,096 bushels.

The total amount of corn exported from this country in 1770, was 578,349 bushels; in 1791, 2,064,936 bushels, 351,695 of which were Indian meal; in 1800, 2,032,435 bushels, 338,108 of which were in meal; in 1810, 1,140,996 bushels, 86,744 bushels of which were in meal.

The amount of Indian corn and meal exported from the United States within the last thirty-three years, is indicated in the following table:

Years.	Indian corn.	Value.	Indian meal.	Value.	Total.
	Bushels.	Dollars.	Barrels.	Dollars.	Dollars.
1820-21	607,277	261,099	131,669	345,180	616,279
1821-22	509,098	378,427	148,228	522,229	900,656
1822-23	749,034	453,622	141,501	476,867	930,489
1823-24	779,297	351,665	152,723	384,675	736,340
1824-25	869,644	429,906	187,285	448,167	878,073
1825-26	505,381	384,955	158,652	622,366	1,007,321
1826-27	978,664	588,462	131,041	434,002	1,022,464
1827-28	704,902	342,824	174,639	480,034	822,858
1828-29	897,656	478,862	173,775	495,673	974,535
1829-30	444,107	224,823	145,301	372,296	597,119
1830-31	571,312	396,617	207,604	595,434	992,051
1831-32	451,230	278,740	146,710	480,035	758,775
1832-33	487,174	337,505	146,678	534,309	871,814
1833-34	303,449	203,573	149,609	491,910	695,483
1834-35	755,781	588,276	166,782	629,389	1,217,665
1835-36	124,791	103,702	140,917	621,560	725,262
1836-37	151,276	147,982	159,435	763,652	911,634
1837-38	172,321	141,992	171,843	722,399	864,391
1838-39	162,306	141,095	165,672	658,421	799,516
1839-40	574,279	338,333	206,063	705,183	1,043,516
1840-41	535,727	312,954	232,284	682,457	995,411
1841-42	600,308	345,150	209,199	617,817	962,967
1842-43	672,608	281,749	174,354	454,166	735,915
1843-44	825,282	404,008	247,882	641,029	1,045,037
1844-45	840,184	411,741	269,030	641,552	1,053,293
1845-46	1,826,068	1,186,663	298,790	945,081	2,131,744
1846-47	16,326,050	14,395,212	948,060	4,301,334	18,696,546
1847-48	5,817,634	3,837,483	582,339	1,807,601	5,645,084
1848-49	13,257,309	7,966,369	405,169	1,169,625	9,135,994
1849-50	6,595,092	3,892,193	259,442	760,611	4,652,804
1850-51	3,426,811	1,762,549	203,622	622,866	2,385,415
1851-52	2,627,075	1,540,225	181,105	574,380	2,114,605
1852-53	2,274,909	1,374,077	212,118	709,974	2,084,051

According to the census returns of 1840, the amount of the corn crop of the United States was 377,531,875 bushels; of 1850, 592,071,104 bushels; showing an increase of 214,539,229 bushels. The total amount of corn raised in 1853 may be estimated at 600,000,000 bushels; which, at 40 cents per bushel, would be worth $240,000,000.

CONDENSED CORRESPONDENCE.

Statement of Ralph R. Phelps, *of Manchester, Hartford county, Connecticut.*

This town formerly belonged to Hartford, and for many years the farmers would set fires here in the spring and burn over all the dry land to make pastures for their cattle. Thus the town was worn out, or rather burnt out, before its settlement; and "the iniquities of the fathers," in this matter, are "visited upon their children" to this day. I think the average yield of corn per acre is about 20 bushels without manure, and from 40 to 50 bushels with it.

My mode of cultivating is as follows: if a strong sward is to be turned over, or if the land is infested with insects, I prefer fall ploughing. I like a deep furrow, say from 7 to 10 inches in depth. After ploughing I give a thorough harrowing. When I plough in the fall, I apply the manure from my yard and hog-pen on the furrows in the spring, and cover it as well as I can with the harrow. If the ground is not ploughed until spring, I prefer to spread the manure before ploughing. I put from thirty to forty loads, say 15 bushels each, to the acre. This manure is made from loam, weeds, leaves, potato-vines and corn-roots, carted into the yards or hog-pens, and mixed with the litter and droppings of the cattle, sheep and hogs. As soon as the frost is out in the spring, the whole mass is dug over and thrown into heaps, and thus thoroughly mixed and fermented before using. After harrowing the ground, I mark it for rows each way, three feet apart. This is done with what I call a "planting gauge,"—a piece of common scantling, having three strong pins or teeth firmly set in it to mark the ground, with a pair of plough handles attached to hold it by, and a pair of old wagon thills to draw by.. With this gauge, a man and a horse, a field is very speedily marked off, three rows at a time. The corn is then planted at the angles of the marks with a hoe, in the ordinary way. About a tablespoonful of plaster is generally put into each hill with the corn. When the corn is up so that the rows may be fairly run, I pass with the cultivator between the rows twice in a place, taking care not to cover the corn. When the corn has got somewhat past the ordinary size for weeding, I go through with the cultivator again, crossing the field, hoe thoroughly, and thin to three stalks in a hill. After this I use the cultivator as occasion requires, from two to three times; at each time at right-angles with the last. I make no hills.

I cultivate the potato in the same way, except that I make the ground with the horse-plough, omit hoeing altogether, and finish the cultivation by turning the earth to the hill with the plough.

When my corn begins to grow hard or gets glazed, I cut it up at the ground and set it up as I cut it, about twenty or twenty-four hills in a stack, binding the top with straw. In the fall, part of the corn is husked in the field in fair weather, and a part is carried to the barn to be husked in foul weather and winnings. In this manner I think my corn is sounder, and the fodder saved better and with less labor, than the

ordinary method of topping the stalks and letting the corn ripen in the hill. If I wish to sow wheat or rye on the corn ground, I throw the corn, as cut, on an ox shed, and draw it to an adjoining field. In this way I can get in a crop of rye or wheat in good season after corn.

Statement of T. L. HART, *of West Cornwall, Litchfield county, Connecticut.*

The manure commonly applied to the corn crop is that of the stable-yard; but for the last three years, I have been in the habit of drawing into the yard large quantities of swamp muck, first putting a layer of muck, and then a layer of manure as it comes from the stable; and thus continue alternately until the whole surface of the yard is covered several feet in thickness. By a light covering of corn-stalks, such as the cattle will not eat, and other litter from the stable, the yard is free from mud, and is suitable for the cattle to lie upon through the whole season. In the spring the manure is drawn from the yard and spread upon the land, at the rate of twenty or twenty-five cart loads, of 35 bushels each, per acre, and turned under to the depth of seven or eight inches. After a thorough harrowing, the ground is then ready for the seed.

The time of planting corn with us, is from the 10th to the 25th of May. The average product per acre is about 75 bushels shelled corn. Cost of production about 37 cents per bushel, with three times hoeing. A crop of 50 bushels to the acre will cost 50 cents per bushel, and one of 100 bushels may be raised for 25 cents per bushel.

Statement of ANTHONY M. HIGGINS, *of Wilmington, New Castle county, Delaware.*

Our corn tillage, considering the number of acres under cultivation, and withal on land so prone to grow weeds, will compare favorably with any other locality of the same extent in the State. This is especially the case in the section embracing the neat and thriving villages of Cantwellsbridge and Middletown.

Very little guano is used on this crop, as it is considered too high in price to pay well. Our farmers have two methods of managing a field of corn: One, to apply on a sod field, in August or September, previous to planting, from 25 to 50 bushels of quick-lime; the other is, to spread the lime in the spring, after the ground is flushed. I prefer the latter, as the cultivators diffuse the lime more equally over the surface; and, besides, it has a better chance to exercise its chemical properties upon the contents of the soil. Previous to its being ploughed in, I give it a good dressing of manure; then harrow well, and checker it out shallow, from 3½ to 4 feet each way, according to the strength of the land. We try to commence planting, in this meridian, about the 20th of April, and drop as many grains in each hill as will allow for casualties of birds, insects, &c. At thinning time, if the ground is strong, it will raise three good stalks; ordinarily but two is left in a hill.

The average yield per acre is about 40 bushels, though from 70 to 100 bushels have been raised. Price of corn per bushel at Brandywine, 65 cents.

Statement of J. E. MCCLUNG, *of Bloomington, McLean county, Illinois.*

The yield of corn in this region is from 40 to 75 bushels to the acre. The cost of production, exclusive of the interest upon the cost of the land, is about 8 cents per bushel. It brings from 18 to 25 cents per bushel; though much the largest portion of this crop is fed to stock. The best method of feeding is to grind it, cob and all, and use the meal.

Two bushels of oats are usually sown to the acre upon our lands, and the yield is from 40 to 50 bushels. The cost of producing is about 10 cents per bushel; the market price about 20 cents.

Statement of WILLIAM J. PHELPS, *of Elmwood, Peoria county, Illinois.*

Corn being our great staple crop, and the basis of our agricultural profits, deserves particular notice, in order that its actual cost to the producer may be seen. The ground for this crop is fitted with one ploughing, which, though deep and thorough, is accomplished by a man or boy with a pair of horses, at the rate of two to two and a half acres in a day. It is marked into rows one way, with the same team, at the rate of twenty acres in a day; and, with the additional help of one hand, it is planted at the same rate; thus standing in rows at right-angles. It is cultivated in general with a small plough, drawn by one horse, which passes twice between each two rows, in cross direction, every ten or twelve days, making about four ploughings in the season, at the rate of four acres in a day—thus devoting one day's work of man and horse to the cultivation of an acre. The entire cost per acre to the producer, exclusive of ground rent, will appear from the following estimate:

For preparing ground	$1 00
For planting	25
For cultivating	1 50
For husking and cribbing	1 25
Total	4 00

The average yield to the acre for the last twenty years, in this vicinity, on well managed farms, has not fallen below 60 bushels. Seven cents per bushel, it will be seen, exceeds the actual cost of a bushel of this grain.

Statement of JOHN M. LESLEY, *of Danville, Vermilion county, Illinois.*

Corn is the staple production of this county. Its average yield is about 40 bushels to the acre, but in a good season from 50 to 65 bushels, weighing from 60 to 63 pounds. It usually bears a price of from 20 to 30 cents per bushel, and in time of scarcity 50 cents.

The time of planting varies from the 10th of April to the 20th of June; the time of harvesting, from the 20th of September to the 1st of November. Before planting, the ground is well broken and laid off both ways, when from three to seven grains are deposited in a hill. It is then covered with a shovel-plough or a cultivator; after which it is

harrowed. There are probably 10,000 acres of land in this county used annually for the production of this grain, which would yield in a common season 400,000 bushels, with an aggregate value of $80,000. From this amount we may safely subtract 100,000 bushels, which are used for home consumption, leaving 300,000 bushels for exportation, with an aggregate price of $60,000, which is the amount usually exported, and sold at prices varying from 28 to 40 cents per bushel.

Statement of EDWIN WINSHIP, *of Winship's Mills, Clinton county, Indiana.*

My plan of cultivating this crop, on grass or clover sod, is to "break up" in February or by the 1st of March, or on stubble as soon as the ground becomes settled. I plough as deep as possible with two horses; after which the field is marked off for planting, with the plough, from 3½ to 4 feet between the intersections, from the 10th of April to the 20th of May. As soon as the corn is up, a harrow is passed through it, twice in a row. Sometimes I use a two-horse harrow, taking out the front teeth, so as to stride the young plants without injuring them as it passes over the hills. This operation pulverizes the ground and kills the grass and weeds which are just starting up. As soon as the corn is two or three inches high, I pass twice through a row with a steel plate shovel-plough, which turns the earth from the plants. A boy may follow the plough with a small rake, to remove the clods that may roll against the corn. A few days after this I pass the plough across the first ploughing, and thin out the plants to four in a hill, pulling out by hand any large weeds or tufts of grass which may have appeared. I generally plough between the corn five times in the course of the season, and harrow once, splitting the ridges between the rows at the last ploughing. The hoe is not used in the cultivation, as a man, boy, and a horse will pass over as much ground in a day as four men will with the hoe.

The average yield of corn on the Wabash is about 50 bushels to the acre, costing from 8 to 10 cents per bushel.

Statement of JOHN SPING, *of Connersville, Fayette county, Indiana.*

The growing of corn is among the prominent pursuits of our farmers. This crop is put in from the middle of April to the middle of May by planting in hills formed into rows, with four or five grains to each hill. The yield is from 30 to 80 bushels to the acre, according to the condition of the land and the mode of cultivation. It is fed to our stock, but mostly to hogs.

Statement of WILLIAM S. PAYNE, *of Rushville, Rush county, Indiana.*

Corn is extensively grown here, the mode of cultivation being better than for wheat. Some of us plough our ground in the spring six or seven inches deep, harrow well, furrow it about four feet apart each way at right-angles, and running the plough deep. Let the season be dry or wet, we plant three grains to each intersection of the furrows.

Our land produces from 40 to 55 bushels to the acre without manure, and corn is worth at our nearest market from 30 to 36 cents per bushel.

Statement of J. BARTLETT, *of West Lebanon, Warren county, Indiana.*

Corn is the main crop with us. It is very easily raised, and requires but little labor, comparatively, to secure from 40 to 60 bushels to the acre. It commands a ready market at 35 cents per bushel.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The ground is prepared for planting corn by breaking it up in early spring, with two strong horses, as deep as the plough can be made to penetrate. Then, between the 15th and last of April, the ground is marked off in checks or drills, and planted. The corn is dropped by hand, and covered with a small plough. The usual distance of planting, in good soil, is 3½ feet each way. The number of stalks intended to be left in the hill is three. When the plants are up about three inches, the ground is harrowed. After this, at intervals, it receives, first in one direction of the rows and then in the other, four successive ploughings. This is the common course pursued in the cultivation of corn in this neighborhood; but deeper ploughing, and a more thorough course or method of tillage, is attended with much better results. For the last twenty-five years, under the most adverse circumstances, we have not produced less than 40 bushels to the acre; nor have we, for the same time, under the most favorable conditions, produced more than 100 bushels. Indeed, 75 may be taken as an average. The best kinds for cultivation are the large and late varieties, white and yellow.

During the past season, corn was more or less affected with drought; yet one of our neighbors, F. P. Kinkead, who took the premium on corn at the Boyle county fair, produced 122½ bushels on an acre. The ground had been cleared thirty or forty years, but was never ploughed before three years ago. Two crops of hemp had been taken off since, and last spring it was ploughed, harrowed each way and rolled one, laid off in drills three feet apart, and the corn dropped in the drills eighteen inches apart, from two to three grains together, and covered with the plough. After this, it received all the attention necessary to insure a good crop. An acre produced 13,475 ears. There was no manure of any kind put on the ground, nor used in any way.

The average yield of corn in this section, when planted in good soil and properly cared for, is at least 60 bushels to the acre, and the cost of production, including rent of land, about 15 cents per bushel. The rent of an acre is about $4; preparing the ground, planting, tending, and taking off the crop, $5; cost of production, $9. The present price of corn on the farm is 25 cents per bushel. For the want of the proper facilities for getting to a distant market, it is seldom that any is shelled and sacked for exportation.

Statement of Howard M. Atkins, *of Mount Vernon, Kennebec county, Maine.*

Corn is raised almost entirely on sward lands, broken up either in the fall or spring, but generally in the former, though it is not thought to produce so well as when ploughed in the spring. The reason why it is done in the fall, is because the farmer has much more leisure at that time than in the spring.

To prepare the land for corn after it is ploughed, some green manure is spread over it, and then harrowed until it is mellow. It is next marked off with a small plough 3½ feet apart; then manured with a shovelful to each hill. After this, the corn is dropped and covered to the depth of one or two inches, and hoed twice in June. It is ready to harvest in September.

The average price of corn with us is 90 cents per bushel.

Statement of Daniel Fulton, *of Bowdoinham, Lincoln county, Maine.*

The best method of raising corn with us, is to plough grass land and plant potatoes the first year. In the spring of the second year, spread five cords of green manure to the acre and harrow it in. Then plough the land and furrow four feet apart, and mark across the furrows so as to place the hills 3½ feet apart in the row, putting five cords of fine old manure per acre in the hills. I plant one and a half inches deep, five kernels and one pumpkin seed in each hill. As soon as the corn is three or four inches high, I pass through the rows each way with a cultivator. I next follow the cultivator, pulling up the weeds that spring up among the plants, and loosen the earth with a hoe. Two weeks after, I cultivate as before, pull out the weeds, and thin the corn to three stalks in each hill, drawing a small quantity of earth around the hills with a hoe. At this time, wherever the corn is missing, I sow rutabaga seed. By this method I have raised 85 bushels of shelled corn, three cart-loads of pumpkins, and 15 bushels of rutabagas, to the acre.

Average yield of corn in this county, 35 bushels to the acre. Value, 85 cents.

Statement of William Bacon, *of Richmond, Berkshire county, Massachusetts.*

Corn, with proper management, is "fattening" to the soil, and becomes a source of "fatness" in all its applications. The very process of raising a good crop is just what the land requires at frequent intervals. It must be deeply and well ploughed and manured, and the after tillage must be good and thorough, and all this prepares it for future profit.

With regard to the time of ploughing for corn, opinions are at variance. Some prefer doing it in autumn, thinking thereby to have the soil lighter. On some lands this may be the best course. Again, there is a common opinion that when the land is ploughed in the fall it will prevent the ravages of worms, but this is incorrect. We noticed several pieces the last season, which to our knowledge were ploughed

in the autumn, where their ravages were horrible; while in others of similar soil, ploughed in the spring, no bad effects were visible. With another class of farmers the ploughing is done just before planting. The ground has then become dry and works mellow; and if thoroughly harrowed, it is light and friable to till through the season. As a preventive of worms, I have known the seed soaked in copperas water and saltpetre fully effective.

Seventy bushels of shelled corn to the acre, with us, is a large crop. The average is probably 40 bushels to the acre. Present price, 90 cents a bushel.

Statement of Simon T. Asheton *and* Elijah Myrick, *Trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

Our land is naturally stiff and clayey, rather moist, but suffers severely from drought, and is somewhat rocky and unfeasible. Such land as this, for producing corn, is not so profitable as a light loamy soil. We get tolerably good crops, however, under the following management, per acre:

Cost of ploughing in September	$4 00
Cost of twenty-five loads of compost, consisting of one part of meadow muck and two parts of long stable manure	30 00
Cost of cross-ploughing deep in the spring, planting three by four feet apart, and twice hoeing	7 00
	41 00

The yield varies from 35 to 50 bushels per acre, besides the stalks and husks for fodder. Our corn is heavier than the Southern varieties, weighing about 60 pounds to the bushel.

If we have a parcel of land that can be turned over smooth, we prefer spring ploughing. Although the corn may not thrive so well at first, it will better resist the effects of a drought.

Statement of Grove Spencer, *of Ypsilanti, Washtenaw county, Michigan.*

Indian corn, with us, can be raised for about 30 cents a bushel. To avoid damage by the cut-worm, plough early in the spring, as soon as vegetation has well started, but in no case before it is in lively growth. Corn is now worth here from 50 to 62½ cents per bushel.

Statement of J. D. Yerkes, *of Northville, Wayne county, Michigan.*

The cultivation of Indian corn is on the increase. The most esteemed varieties are the "eight-rowed yellow" and "dent." To produce and market an acre of corn will cost about $11, including interest on land. The stalks are worth $3 an acre, making the cost of the grain $8. At the present price of corn, (50 cents per bushel,) sixteen bushels is the smallest yield that will pay expenses. Our average yield per acre, the past season, was about 35 bushels. The ground

is prepared for a corn crop by ploughing late in the fall, or in the spring, to the depth of six or eight inches; mellow the surface with the harrow, mark it for rows both ways, about four feet apart, and plant four or five grains in the hill. The after-cultivation is done principally with the plough and cultivator.

Plaster is used with decided benefit in the production of corn, if applied as a top-dressing immediately after the corn makes its appearance out of the ground.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

I think I can speak of the whole State, when I say that its soil, climate, and seasons are more favorable to the production of Indian corn than any other crop. Corn is to the West what rice is to India and wheat to Egypt. Everything feeds on it; and the entire failure of this great staple, even for a year, would scarcely be compensated by the sacrifice of every other crop raised among us. We could better afford to lose every other crop than this.

The modes of cultivation of this crop differ with the soil and the amount of labor at command. The largest yield from a given space of ground could be raised, I presume, by drilling about five feet apart, with the stalks left at a distance of 10 or 12 inches from each other. This mode of cultivation requires more labor than the usual method of planting in checks four feet apart, and ploughing each way. Taking the whole State at large, and estimating the bad with the good farming, I suppose the general average of this crop would be seven barrels (35 bushels) to the acre. As an evidence of the effect, however, of judicious cultivation, I will state that a gentleman in the county opposite this, told me that he had gathered from a field of forty acres 800 barrels, (4,000 bushels,) or 100 bushels of corn to the acre, in his entire field. From one acre he gathered 24 barrels, (120 bushels.) We raise here almost every variety of this grain. The "large white" is preferred for bread, and the "large yellow" for stock; the latter containing a large amount of the alcoholic principle, and on that account is preferred by distillers, and, I presume, for the same reason it is thought more nutritious for stock.

Statement of H. L. BROWN, *of Fayette, Howard county, Missouri.*

The corn crop is the main stay of the farmers of this State. It enters largely into the food of every animal, and is also the main source for bread for our whole population. Indeed, too much dependence is placed upon this crop for feeding. The raising of so much corn tends rapidly to impoverish the soil, and is not so good for stock as a change of food. It would be very difficult even to approximate a general average of this crop throughout the county. Some farmers, by a careless method of cultivation, obtain but 20 or 30 bushels to the acre, while on clovered land, properly managed, the average would be from 60 to 70 bushels.

The cost of raising an acre of corn with us may be estimated as follows:

Interest on land	$0 90
Breaking up in the fall	2 00
Breaking up in the spring	$1 00
Harrowing and planting	1 00
Ploughing and thinning	2 00
Total cost	6 90
Value of 60 bushels of corn, at 30 cents	18 00

Profit, $12 90 per acre; or cost per bushel, 11½ cents.

Statement of ARMSTRONG O'HARA, *of Saint François county, Missouri.*

Corn, being our staple crop, is extensively cultivated. Our land produces from 35 to 40 bushels to the acre; cost of raising, 20 cents per bushel. It is sold in our neighborhood from 25 to 50 cents per bushel.

Statement of JOHN BROWN, Sen., *of Long Island, near Lake Village, Lake Winnipisiogee, New Hampshire.*

The island on which I reside is situated in about latitude 43° 40′ N., and comprises about 1,100 acres, the largest proportion of which is good arable land, the remainder being occupied by pastures or reserved as wood-lots. The soil naturally consists of a brownish yellow loam, which, when well tilled, becomes warm and retentive of manures. The subsoil is of a bright yellow, underlaid by a hard-pan, varying in depth and thickness. A specimen taken from a highly-cultivated field, which had produced 130 bushels of corn to the acre, as analyzed by Dr. C. T. Jackson, of Boston, gave the following results:

Mechanical separation of 1,000 *grains of gravel, sand, and loam.*

Coarse pebbles	90
Fine pebbles	260
Fine loam	650
	1,000

Chemical analysis of 100 *grains.*

Insoluble silicates	80.8
Peroxyde of iron	2.2
Alumina	4.0
Salts of lime	0.4
Magnesia, (a trace)	—
Phosphate of alumina, (a trace)	—
Vegetable matter	8.7
Water	3.9
	100.0

Five hundred grains of the soil were digested in boiling water: 2.3 grains dissolved. The solution was of a yellow color, and consisted of—

Vegetable matter	2.0
Mineral matter	0.3
	2.3

The residue from the solution before burning was acid; and after burning, alkaline. The acid was then a vegetable acid. The following substances were taken up by the water, viz: muriatic, sulphuric, carbonic, and phosphoric acids, soda, lime, magnesia, silica, iron, and manganese.

The rotation of crops generally adopted by me for more than thirty years has been, 1st, potatoes; 2d, Indian corn; 3d, wheat; and then lay down to grass, and continue it for mowing until "bound out"—say six or seven years. But the last season I made a successful experiment the other way, by planting corn the first year after "breaking up," instead of potatoes.

Early in the autumn of 1852, the ground was thoroughly ploughed, turning under the green sward, which was suffered to remain undisturbed until the first of May last, when about fifteen cart loads of 50 bushels each of well-rotted barn-yard manure were applied broadcast to the acre, and carefully harrowed in. On about the 25th of the same month, twenty-two loads of equal capacity of green, unfermented stable and hog-yard manure, made during the winter or fall preceding, were spread uniformly over each acre, and immediately ploughed in, harrowing down the surface quite level and smooth. On the 30th of May I planted my corn in hills, four kernels to each, three feet apart one way, and two feet the other. When the corn was up about three inches high, it was neatly hoed, without the aid of cultivator or plough, thinning out the plants three to each hill. In the month of July, the corn was again dressed with the hoe, lightly moving the surface of the soil, sufficient to keep down the grass and weeds, without making any mold, or hill, leaving the ground even and smooth. I prefer working with the hand-hoe to clear the weeds from the plants, instead of the cultivator or plough; for, when the latter are used they stir the ground too deep, cutting many of the tender rootlets of the corn, which greatly injures the crop. It has long been my practice to plough under a liberal coating of green stable manure a few days previous to planting, which, in my judgment, should lie undisturbed by any implement during the growth, in order that it may impart its whole benefit to the crop.

Early in September, when the ears were fully formed, and their silks began to wither and dry, I "topped" my corn, and preserved the stalks for winter fodder the usual way. On about the 9th of October, I harvested the crop, "husking" it immediately after gathering, and stored it in the ear in my granary for future use. The result of the experiment was, that I raised 104 bushels of shelled corn to the acre, while the average yield in the vicinity of the lake was estimated at 30 to 40 bushels.

We have a home market for all of our surplus produce in the manufacturing villages of this region. The present price of corn is $1 per

bushel. Estimating the profit of growng an acre, based on my last crop, the following would be near the truth:

104 bushels of corn, at $1	$104 00
4 tons of husks and stalks, at $8	32 00
	136 00

The value of the labor employed in the cultivation, including the drawing of the manure, at 75 cents per day, was $37; leaving a net income of about $100 per acre for the use of the land and the manure.

There are several things connected with the above-named experiment which it would seem necessary to explain; and these are, the mode of selecting the seed for planting, and the close proximity of the hills. It had been my rule, for a succession of years, to select well-filled ears of the "King Philip," or Northern eight-rowed yellow corn, with cobs having small butt-ends, of good length as well as uniform size; the second ripe in the field, and taken from stalks bearing more than two ears to each. The result has been, I have produced a variety of corn, apparently fixed in its character, which sometimes bears my name, (Brown corn,) having large kernels and a small cob, varying from 10 to 13 inches in length. The largest crop I have ever raised was 136 bushels to the acre, weighing in the ear 9,520 pounds, or 70 pounds to the bushel, and 59 pounds per bushel when dried and shelled.

Those who have been accustomed to plant their corn in hills from four to five feet apart may be struck with the closeness of my planting, which is only three by two feet. From the comparatively dwarfish growth of my corn, I was induced some years since to plant a field at various distances apart; and the result of my experiment was, that I obtained the greatest yield by the mode I now adopt.

Statement of JOSEPH WINSLOW, *of Epping, Rockingham county, New Hampshire*

The following is a statement of a crop of 190 bushels of corn grown by me on one acre and 113 rods of ground:

Thirty-two loads of stable or yard manure	$32 00
Hauling and spreading the same	7 50
Ploughing and harrowing	10 12
Planting	4 87
Seed	50
Hoeing and cultivation	15 37
Harvesting and husking	15 75
Interest on land, and taxes	10 90
Cost of raising	97 01
Value of 190 bushels of corn, at 92 cents	$174 80
3½ tons of fodder, at $10	35 00
	209 80
Profit	112 79

The fore-named crop was planted on the 14th of May, the rows crossing each other at right-angles, three feet each way, with five grains of "eight-rowed yellow flint corn," or 16 quarts in the lot. The stalks were topped off on the 22d of September, and saved for fodder; and the corn harvested and husked October 12th. The weight of a bushel of shelled corn, thoroughly dried, (January 16, 1854,) was 59 pounds; 68 pounds of ears, before shelling, produced a bushel of grain, leaving only nine pounds of cobs. The cost of raising was about 51 cents per bushel.

Statement of SAMUEL WEBBER, *of Charlestown, Sullivan county, New Hampshire.*

With us there is no established rotation of crops, each man doing what is right in his own eyes. Some have one system, some another, while others have no system at all. Generally speaking, land is broken up from the sward, manured, and planted with potatoes or Indian corn; then kept a year or two more in tillage, with these or some of the small grains; after which it is laid down to grass, for hay.

Of corn, 90 or 100 bushels to the acre is the maximum yield; but 60 or 70 bushels is considered as a good return, while the average yield is not more than 40 or 50 bushels per acre. If the land is economically cultivated, 30 or 35 bushels will pay expenses.

In harvesting, the corn is cut up near the roots when the kernel is well glazed, and made into stooks, or shocks, in the field, where it is kept until dry; though some still practise the old mode of "topping." When husked, the corn is usually put into cribs, made of laths or slat-work on the sides, so as to give free ventilation to the ears. These cribs are sometimes constructed in a small barn or corn-house, built expressly for the purpose, while others spread the husked ears on the floors of the lofts of their buildings.

Statement of WILLIAM H. COOKE, *of Howard, Warren county, New Jersey.*

No guano is used in this neighborhood in the production of corn. We prepare our ground by ploughing up a Timothy or clover sod early in the spring; furrow three and a half feet apart each way, and plant from the 1st to the 20th of May. We plough three times between the corn, and use the hoe sufficient to clear out the grass and weeds. The average yield is about 35 bushels to the acre, which brings about 60 cents per bushel as soon as shelled. The cost of production is about $7 per acre, including interest on the land.

Statement of J. P. ROUNSVILLE, *of Rounsville, Alleghany county, New York.*

For corn, we turn over the sod in the spring, and not in the fall, as many think that land which lies exposed to the sun and air for a length of time becomes somewhat exhausted. After harrowing, it is planted with a few handfuls of lime, ashes, and plaster, in mixture, on each hill, about the 20th of May. The crop is cut up and shocked a short time before the kernel is completely out of the milk. The average yield, under this treatment, is 60 bushels per acre. Cost of raising, and interest on land, about $15 per acre. The price for the last two years has been 62½ cents per bushel. It is more profitable for feeding to be ground, but not with the cob, as I have known it, thus mixed, so to inflame the stomachs of horses and cattle eating it, as to prove fatal.

Statement of F. W. LAY, *of Green, Monroe county, New York.*

We raise considerable quantities of corn in this county, and feed it not only to our hogs, but to our horses and other stock. We think it more profitable feed than oats or other grains. The most successful way of cultivating it among our best farmers, is to plough the ground in the fall, (old swarded meadow or pasture is preferred,) and drag and cultivate the soil as much in the spring as possible. The seed is generally planted, without any preparation, from the 15th to the 20th of May, about three feet and nine inches apart.

I have tried various articles sprinkled around the hills after the corn came up, such as lime, plaster, wood-ashes, bone-dust, and horn-shavings; and have also covered them with dirt around the hills at the time of planting, but could seldom see any marked benefit. We run a one-horse cultivator through the rows as soon as the corn is up so as to be seen, and dress it out with a hand-hoe. This is repeated twice, and sometimes three times. Of late, some farmers have adopted the plan of using the two-horse wheel cultivator to run through the rows, and when the land is soddy or hard, its advantages are obvious. The middle teeth are taken out, and two rows of corn are cultivated at once, the horses walking each side of the row. This requires a careful driver and a steady team. In this manner, a field can be worked and cultivated better than any other way. Our corn is always cut up and husked, and the stalks carefully secured. An acre of fodder is thought to be nearly equal in value to an acre of hay.

Statement of HERMAN POWERS, *of Lewiston, Niagara county, New York.*

The best soil for wheat is not usually a very preferable one for corn, although it is somewhat extensively cultivated in this county, and brings a fair return. Corn land requires more of the phosphates and vegetable mould than wheat, and it is found in considerable quantities in the basin of Lake Ontario.

The variety of corn preferred, as most suitable to our climate, is the "Dutton twelve-rowed yellow," which, on an average, yields about 50 bushels to the acre; although 100 bushels are frequently obtained. The most successul mode of tillage has been found to be this: to spread a liberal dressing of manure on a clover-ley in the fall, turned under by deep ploughing for the purpose of destroying the grub-worm by the action of the frost; and in the spring the surface is mellowed by frequent harrowing, care being taken not to disturb the clover sod. We plant in hills, the rows three feet apart; four stalks in a hill.

The Tuscarora Indians, who have a reserve in this town, grow a description of corn which they call the "Tuscarora white." It was introduced into this region by them, when they emigrated from North Carolina, in 1712.

Before dismissing the subject of corn, it may be proper to mention the great value of the stalks for fodder when seasonably cut and properly cured. They should be cut up near the roots as soon as the kernels of the grain commence glazing, while the stalks are yet green, and then cured and kept dry. Much waste is incurred by feeding them on the ground. The most approved method is to chop them in a cutting-box, in pieces not over half an inch in length; put them into a tub and moisten and mix them with a little meal, when cattle will eat them with the greatest relish, and without waste. Fed in this way, the stalks from an acre of corn will be found in value, in addition to the crop of grain, nearly equal to the grass which could be grown on the same space.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

Indian corn with us is grown to advantage upon a good, rich, gravelly or sandy soil. To raise it upon a clayey soil is an up-hill business. The greatest hindrance we experience is severe drought in July and August. This difficulty can be partially obviated by deep ploughing, heavy manuring, and a frequent stirring the earth with the corn plough. Fall ploughing will generally prevent the depredations of the wire-worm.

The expense of raising corn per bushel is about 12½ cents, as follows:

Ploughing once, per acre	$1 38
Harrowing once	38
Marking for rows	38
Planting	1 00
Seed, six quarts	20
Plaster, and putting it on	38
Cultivating among the corn both ways	76
Hoeing or half-hilling	1 00
Cultivating second time both ways	76
Hoeing second time	1 00
Cutting and shocking	1 00
Husking and cribbing, 4 cents per bushel	1 60
Shelling and delivering	1 00
Total	10 84
Value of stalks and husks per acre	6 00
	4 84

Forty bushels is about an average per acre, which makes the expense of raising, exclusive of interest on the land, about 12 cents per bushel.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

Sod-land with us is always broken up for corn. If ploughed in the fall it is better, and is more apt to kill the corn-worn called the "grub" than when ploughed in the spring. By ploughing the land in the fall, the soil loses its tenacity, is lighter, and more easily worked. I harrow the land after ploughing, and cross-plough it for planting. In a strong soil I put five or six kernels of corn in each hill—six are none too many. Good land will support six stalks as well as four, and give as large a yield on each stalk. I soak the seed in water and roll it in plaster. Care should be taken that the seed be dropped precisely in the angles made by the plough, so as to keep the rows even both ways; otherwise much of the corn, when large, might be broken by ploughing or hoeing. As soon as the plants are three inches high, I plaster them and commence the cleaning process. The cultivator is mostly used, being a substitute for the plough. I hoe twice; the second time hilling it. Keep the field as free from weeds as possible. I cut the stalks before the frost comes, and use them as fodder. They help along through our severe winters as a relish for cattle and sheep, which do much better on such a change of food than if kept steadily on hay. Cooked corn is preferable to raw for feeding, and ground, to whole or unbroken.

Thirty-five bushels of corn per acre for medium land is a good yield, though some of our best farms yield, when properly cultivated, 50 bushels per acre, and frequently as many as 60 are raised in favorable years. The cost of production depends upon the quality of the soil and the season. A wet season causes the grass to grow rapidly in the corn-fields, and requires more careful hoeing and tending.

Farmers will profit by planting a large quantity of pumpkin-seeds with their corn; the vines do not injure the corn. Often as many as three hundred wagon loads of fine pumpkins can be raised in this way, and the same number of bushels of turnips may be grown in the furrows in a fifteen-acre field. The turnip-seed should be sown about the first or middle of July, and covered with a hand-rake. They acquire a fine growth, and ripen early in the fall, making, when cooked, excellent food for hogs; and when eaten raw, healthful food for cows.

Statement of JOHN B. YOUNG *and* JAMES DEMOTT, *of Ovid, Seneca county, New York.*

Indian corn, including interest on land, will cost from $12 to $18 per acre. The estimate of expense made by a practical farmer, and the average crops produced by him for a term of years, is as follows:

Ploughing and fitting one acre	$4 00
Half of the manure chargeable to corn crop	1 00
Seed	14
Planting	1 00
Cultivating before hoeing	1 50
Hoeing first time	1 00
Cultivating and ploughing second time	1 50
Hoeing second time	50
Cutting up and "stouting"	1 00
Husking and cribbing	3 00
Interest on land, at $50 per acre	3 50
	18 14

Value of 50 bushels of corn, at 56 cents	$28 00
Cost of production as above	18 14
	9 86
To which add the value of the corn-stalks	4 00
Profit per acre	13 86

From the above estimate it will be seen that the largest amount of labor applied, yields the greatest profit.

The mode of harvesting this crop is to cut it up near the ground, and set about twenty-five hills in a "stout" and tie the tops. It will then stand until cured. When it is husked, the corn is put in cribs, and the stalks bound and housed, or otherwise secured.

Statement of JOHN HURLBUT, *of Arkport, Steuben county, New York.*

Corn is our most important grain crop, and when connected with stock raising, the fodder, judiciously saved and fed, will go far towards paying for the extra labor in tending the crop. Few farmers duly appreciate the value of corn fodder. It is worth more for feeding milch cows than the best of hay. In a former communication, (see Patent Office Report for 1852–3, page 194,) I gave a detailed statement of the raising of this crop, and will not repeat it here. I would merely state, that three essential points must be observed in its cultivation, if the farmer would look for a golden harvest: apply a heavy coat of manure, plough deep, and cultivate thoroughly. Without these we cannot expect success.

Statement of JOSHUA HARRIS, *of Welche's Mills, Cabarras county, North Carolina.*

The last crop of corn in this region was very light. We have just finished putting up, and find it to be only a half crop, owing to a long-continued drought, say from the 22d of June to the 3d of August.

Corn is now selling from 40 to 45 cents per bushel.

Statement of JOHN W. EVANS, *of Scio, Harrison county, Ohio.*

The average product of corn to the acre in this region is about 40 bushels, although some crops exceed 120 bushels to the acre. The cost of production is 10 cents per bushel. We generally break up sward land in the winter, harrow it well before planting, and mark it out 3½ feet apart both ways, covering it with hoes. When the corn is from three to four weeks old, we keep the ground loose with the cultivator and double shovel-plough, to check the growth of grass or weeds; cut up the crop in the fall, and sow the ground with wheat.

Statement of JOHN H. TARR, *of Liberty, near Mount Vernon, Knox county, Ohio.*

Corn can be raised to better advantage in this section than any other grain. The best mode of cultivation is to plough a sward of two or three years' growth, or a clover-ley, early in the spring, and let it lie until just before planting, which should be about the 1st of May if the season is favorable; then, with a large harrow run lengthwise the furrows, until the surface of the ground is finely pulverized. Mark off the field, 3½ feet each way, with a plough, and plant four kernels to a hill, and work, in the course of the summer, with a harrow and cultivator, keeping the ground free from weeds and grass with the hoe. Cut off the corn in September, and husk when dry. In this manner, in favorable seasons, we raise, on good land, from 50 to 100 bushels to the acre, though an average crop is only from 40 to 50 bushels. Corn is now selling at 33⅓ cents per bushel.

Statement of JACOB KNOOP, *of Elizabeth, Miami county, Ohio.*

Corn is our principal crop, many fields of which, in this vicinity, have been cultivated with success for fifteen or twenty years without any material diminution of yield. The average yield per acre is about 50 bushels, but 80 or 90 bushels are not an unusual crop from our bottom lands.

The price of corn is from 35 to 50 cents per bushel. A large portion of our crops is manufactured into whiskey, and the balance fed to stock or sent to New York.

Our mode of culture is simple. We first plough the land deep in April, and plant about the first week in May, in rows, about four feet apart each way. As soon as the corn is up we harrow the land thoroughly, and then run two furrows between the rows with a shovel-plough, thinning out the plants to three or four in each hill. After this, we use the plough and cultivator for three or four successive times. The "large yellow" and "white corn" are the varieties mostly cultivated.

Statement of WILLIAM M. MACY, *of Quercus Grove, Linn county, Oregon.*

Corn has been but little raised here before this season. With the same culture usual in the Middle States, it produces from 15 to 30 bushels to the acre. It has been thought that it could not be grown here in consequence of the climate, but this season proves it beyond a doubt.

Statement of H. A. CASE, *of Troy, Bradford county, Pennsylvania.*

The "eight-rowed yellow" variety, which is preferred here, is generally planted on the sod, about the 12th of May, and by some about the 1st of June, in order to avoid the worms. The rows are about three by four feet apart, with from five to six kernels in a hill. As soon as we can see the rows it is plastered; then the cultivator is passed through it, with a man going behind to straighten up such corn-plants as may have been disturbed, without the use of the hoe. When the corn is about a foot high it is again harrowed or dragged, straightened up, and left to itself. By some, ashes and plaster in equal quantities are applied to the hill at this stage of growth. In the fall, the

corn is cut up and "stouted" in small stouts, or stooks, in the field, and left there until the stalks are cured, after which it is husked out and the stalks stacked for fodder. Many of late sow corn for fodder, with excellent success. The average yield, when cultivated as above, is from 80 to 120 bushels of ears to the acre. Average price for the last ten years, 50 cents per bushel.

Statement of Isaac R. Evans, *of Harrisville, Butler county, Pennsylvania.*

Corn, with us, is the next crop in value to wheat. The best mode of cultivation is to break up a piece of old sod in the fall, or early in the spring. We next drag the ground without further ploughing, and mark it out both ways, about three feet apart. I mark my corn ground for planting by driving a sled over it, which makes two marks at a time instead of one. We plant from the 10th to the 20th of May. After the corn is up, we apply ashes, lime, or compost to it, on the hill. About a week before the first hoeing, we run a harrow over the field, letting the boys follow to set aright all young plants which have been bent down or removed. We then plough and give it a dressing with the hoe, following it with two more ploughings and dressings, at intervals of the same length, which will be accomplished about the 4th of July. About the 10th of September, we cut the corn for harvest. The common yield is from 50 to 60 bushels to the acre, which is raised at a cost of about 33 cents per bushel. The price in market has stood at 40 cents per bushel for several years.

The best method of feeding corn is in the meal. There is a loss of at least one-fourth by feeding it whole to cattle or sheep. We generally grind the ears, cob and all, in a mill similar to a tanner's bark-mill. The cobs are known to contain a considerable quantity of nutriment, and, besides, this saves the trouble of shelling.

Statement of H. N. McAllister, George Buchanan, James Alexander, J. K. Shoemaker, *and* William J. Waring, *being that portion of their report which relates to corn on the "Oakwood Farm," near Bellefonte, to the Centre county Agricultural Society, Pennsylvania, as the result of their personal experience and observation.*

A clover or Timothy sod is always preferred for corn; and having been prepared by a heavy dressing of barn-yard manure, or, when that could not be had, by having suffered at least a portion of the previous summer's growth of grass to fall, the ploughs (soil and subsoil) are introduced either late in the fall or early in the spring. By the former, the soil is turned up to the full depth to which at any time previously it had been ploughed, say from six to eight inches. By the latter, following in the track of the former, the subsoil is broken up to the depth of from four to six inches more. The manure is thus deposited between sod and the loosened subsoil. The capacity of the subsoil for retaining moisture is thus greatly increased, and the sod is placed in a situation to act throughout the season, as mulching to the roots of the corn, which, from the deeply-marked furrows, soon penetrates the sod, and amid the manure beneath. The ground is next pulverized by two or three successive harrowings as early in the spring as the nature of the season will allow. Should grass appear, a two-horse cultivator is used, so as completely to check and suppress its growth. The ground is then slightly marked in rows, east and west, three feet apart, and transversely, just before planting in rows, somewhat deeper, four feet apart. Four grains are dropped to a hill, with a pumpkin-seed in every fifth hill of every fifth row, making one pumpkin-seed to every twenty-five hills. Gypsum is in very general use. It is scattered upon the hill by some at the time of planting, but more generally about the time the shoots first make their appearance, in the proportion of from a peck to a half bushel to the acre. One-horse cultivators are used between the wider rows within a week or ten days after the shoots of corn appear; and having been passed back and forth, they are immediately turned in the opposite direction, followed by a boy to straighten up and remove clods from the corn, and to extract from every hill all above three stalks. In the month of June, the double shovel-plough is introduced, and is passed backwards and forwards, first between the narrow rows, and again between the wider ones. A short swingletree is used, to prevent breakage of the corn. Clover-seed is now sometimes sown, followed by a peck of gypsum to the acre, scattered broadcast. The clover occasionally succeeds, but it fails three times where it succeeds once.

Corn thus cultivated upon our best land, in a good season, produces from 60 to 80 bushels of dried shelled corn to the acre. One hundred bushels have been produced. The average product, however, of our valleys, under the ordinary tillage, is not over 30 bushels per acre. Horses on the Oakwood Farm have had no other food but corn, grass, and hay, for four years, except when occasionally off the farm; although they have been almost constantly employed, they have been in good condition, and entirely free from the diseases to which horses fed on chopped rye are liable. Our own experience accords with that of every person in the county with whom we have conversed on the subject.

Statement of N. Linton, *of Cochransville, Chester county, Pennsylvania.*

The best mode of cultivating corn is to plough old sod ground, as deep as circumstances will permit, a few weeks before planting; and if a good coat of manure can be afforded, and ploughed under, it will greatly increase the amount of the crop. The ground should be thoroughly harrowed and pulverized before it will be ready for the drill. The rows should be drilled four feet apart, and enough seed put in the ground to insure its coming up sufficiently thick. The corn should be well worked four or five times with the cultivator. All grass and weeds should be destroyed, and the young plants thinned out to a proper distance apart when about a foot high; and this last is a very important matter, and requires some judgment and skill—for if it be left too thick, it will be very injurious to the crop. The yield is from 40 to 100 bushels to the acre, though some ten miles south of us 120 bushels have been produced.

Corn sells at the present time, delivered at the railroad, for 58 cents

per bushel, and it costs 8 cents a bushel to transport it to Philadelphia.

The smallest yield of corn or oats that will pay expenses, at present prices, is 20 bushels to the acre; of wheat, 10 bushels.

Statement of PETER GROSS, *of Schnecksville, Lehigh county, Pennsylvania.*

Indian corn in our county is a good crop, giving a certain return. The average product per acre is about 40 to 50 bushels; the price, 65 cents per bushel. The best yield is produced by ploughing, and planting the following spring, three feet apart each way, with four or five grains to the hill; then harrow and plough frequently, to keep the ground perfectly mellow and clean; the cultivator is also occasionally used.

Statement of JOSHUA S. KELLER, *of Orwigsburgh, Schuylkill county, Pennsylvania.*

Indian corn is an important crop with us, on which depends our pork, and a great deal is fed to horses and mules. I consider it also among the best adapted grains for man. I am unable to say what might be an average crop; from 50 to 100 bushels can be raised on our best lands under favorable circumstances—the former is frequent, and the latter seldom; average price 62½ to 65 cents per bushel.

Statement of C. H. HEYDRICK, *of Utica, Venango county, Pennsylvania.*

In the selection of ground for corn, we choose a meadow, clover-field, or old pasture; if wet, or "spouty," we drain thoroughly, after which we manure at the rate of twenty-five or thirty loads to the acre; or more, if the manure is not of very good quality. We spread one load at a time, and plough it under immediately, as the fertilizing gases escape very rapidly. It would also be advantageous to sprinkle a handful of plaster over each heap when deposited upon the ground, for the purpose of fixing the ammonia, which would otherwise escape. Ashes are an excellent manure for corn lands.

Corn requires a greater depth of furrow than it generally receives; but this must depend upon the nature of the soil and subsoil, new land requiring shallower ploughing than old. Nine inches with subsoiling is shallow enough for most old lands. In ploughing, the furrows should be well turned, so that no grass will harrow up. When left a few days to dry, the land is harrowed sufficiently to afford loose soil enough for covering the corn, but not enough to make the ground very smooth; for, in that case, the rains which follow are very apt to make it heavy. In laying off the land for planting we mark shallow, being careful not to disturb the sward. The distance between the rows is regulated with reference to the variety of seed to be planted; the larger the stalks, the greater the distance apart; for the "eight-rowed yellow," I would say about three feet.

The best rule that can be laid down as to the time of planting, is to wait until the weather becomes settled, the ground warm, and in good

condition to receive the seed, which, in this latitude, takes place from about the middle to the last of May. The judicious farmer will provide himself with two varieties of seed—one, of the best grown in his vicinity, to be planted when it can be done at the proper time; the other, a variety adapted to a colder climate, to be planted when the spring has been unfavorable, or for second planting in the event of the failure of the first.

The ground being prepared, which should not be done long before planting, let the most careful hands drop the seed, four or five grains in a hill, distributed over a space of six or eight inches in diameter; and others following, covering every grain with a hoe, so that the birds may not get a taste. All preparations like tarring I consider injurious. If the birds commence taking up the corn, the cheapest and most effectual remedy is to feed them by sowing corn broadcast upon the field; a bushel or two will protect a whole crop. Plaster may be applied at the time of planting.

I have observed that corn growing on a sward generally looks rather feeble until decomposition begins to take place; after which, it outgrows that planted on stubble-land, although the latter may have looked much more promising in the earlier part of the season.

As soon as the plants are fairly up, the process of working should commence. If grass or weeds have made their appearance, a corn harrow or cultivator should be passed between the rows, and followed by hoes, exterminating every weed and particle of grass; that growing in the hills should be removed by hand. Let the first dressing be effectual, and the after-culture will be easy. Dust a small quantity of plaster on each hill at this stage of the crop, or sow a larger quantity broadcast, and apply ashes, if it has not been done at planting time; keep clean with a shovel-plough or cultivator, finishing with an ordinary plough, passing three times in a row, the third time very deep; let those who follow set up the corn, carrying hoes for the purpose of cutting out grass and weeds, and dressing such hills as need it; very little hoeing will be necessary; avoid hilling as much as possible. The working should be finished about the 4th of July, when the field should be perfectly free from weeds.

Cultivated in this manner, land will yield at least 100 bushels of sound shelled corn per acre; and the cost of producing it will be but a trifle greater than that of producing half the quantity.

Of the methods of harvesting practised in this vicinity each has its advocates, and under particular circumstances all are probably best; but, generally, "topping" is preferable, because it is less laborious than cutting off at the ground, as the fodder may be well cured, and is little inferior to the best of hay; the corn, also, is more easily husked, and comes off in a fine condition for cribbing.

Seed-corn should be selected in the field at the time of "topping" or cutting up. Stalks producing the earliest and finest should be left standing until perfectly ripe, when it should be gathered in fine weather, leaving a part of the shucks, or husks, by which it may be braided or "traced" in bunches convenient for hanging up, in a dry place, as hard freezing destroys the vitality of corn when damp. In saving from small-eared varieties, select from such stalks as produce two or more perfect

ears. In large-eared varieties, I do not think it profitable to encourage the growth of two ears to the stalk, as two are seldom equal to one good one.

With regard to the changes which may be wrought in a variety by cultivation, I cannot give a better illustration than the history of the "Vermont yellow," that I cultivated a few years ago. Its characteristics were, a short stalk, slender above the ear, strong below, ears small, with eight rows, thick at the butt-end, growing near the ground, and frequently having a stem two feet in length. My plan of selecting seed from this variety was, to choose from such stalks as produced two or more ears, rejecting those with large butt-ends, and such as were not set close to the stalk. Such seed was hard to find the first year. The second year nearly one-half of the stalks produced two ears, and there were fewer long stems and larger butt-ends. A milder climate had also produced another change; many ears appeared with ten or twelve rows. This induced me to improve the size of the corn, and accordingly I selected as before, adding such ears as contained more than eight rows, together with a few ears of a larger sort. Continuing this system a few years, I obtained a variety characterized by the following marks: stalks light, seldom exceeding six feet in height; strong below the ears, slender above; ears containing from ten to fourteen rows, and from two to three ears to the stalk more frequently than a less number. From these facts it will be seen that a mixed variety may be produced, possessing all the desirable qualities of several old ones. But such a new variety will require attention for years, to prevent it from degenerating into one of the original sorts; after which, I think, the variety will become as permanent as any other.

Statement of JOHN EICHAR, *of Greensburg, Westmoreland county, Pennsylvania.*

Next to wheat, corn is our most valuable crop. The best mode of raising is, to plough and subsoil a clover sod late in the fall, or in February, to the depth of twelve inches, harrow thoroughly, and mark out in rows 3½ feet apart each way, drop four grains in a hill, use the cultivator twice, and double shovel-plough twice. It should be thinned out to two or three stalks in each hill, the second time of working. The greatest yield we have is 75 bushels per acre; average yield, 50 bushels of shelled corn to an acre. Cost of production, 29 cents a bushel. Smallest yield that will pay expenses, at present prices, is 29 bushels.

Statement of E. F. GILBERT, *of Matagorda, Matagorda county, Texas.*

Corn will grow indiscriminately, and in the greatest abundance, in every portion of the State, with less labor, and a more bountiful return, than, perhaps, any other part of the world. From 60 to 70 bushels per acre is an average production of the Caney and Peach Creek lands, which doubtless might be increased by a higher degree of cultivation. None is raised for transportation, as cotton and sugar pay

best. In favorable seasons, these lands average from 1½ to 2 bales of cotton, or 2 hogsheads of sugar, to the acre.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

This is an important crop with us, as it is universally used for food, both for man and beast. When mixed with rye or wheat, it comprises one-half of our farmers' bread. It is employed, to a small extent, for hog-feeding; but, when ground with the cob, it is more extensively used for horses and cows. Average yield, 40 bushels per acre, if twenty or thirty loads of manure is used broadcast; but if hog manure or night soil is added, by putting a small shovelful in a hill, we frequently get 70 or 80 bushels to an acre. It is only raised for home consumption. Corn-stalks are an excellent food for cows in the fall of the year, as it increases their milk.

Statement of OSMAN DEWEY, *of Barre, Washington county, Vermont.*

Corn requires a rich sandy loam, and will do well on green sward if there are twenty loads of green manure spread upon the grass before ploughing. It will do equally well after oats, with the same cultivation. I plough seven inches deep, and turn the turf over flat. I harrow it with a fine-toothed harrow until it is perfectly mellow, three inches deep; then furrow it three feet apart one way, and drop a small shovelful of compost or well rotted manure, three feet apart, in the furrows, first putting a little dirt over it, and then drop five kernels of corn in each hill and cover two inches deep with fine earth, about the 15th of May. I next put half a gill of wood-ashes to each hill, and hoe it two or three times. I harvest in September. The ordinary yield is from 50 to 110 bushels per acre.

The annual price of corn here is 75 cents per bushel; and I suppose 40 bushels per acre, at $30, would pay all expenses of cultivation.

Statement of RALEIGH W. DYER, *of Prillaman's, Franklin county, Virginia.*

Corn is the crop to which we devote the most of our attention, the kinds in use being the gourd-seed and flint. Our mode of raising is to take oat or wheat land and break it well in January and February. We lay off our ground four feet wide, and plant in April, thinning it to two stalks in a place as soon as it can be drawn by the roots. We commence ploughing as soon as it is well up, and work three times before stopping, and no more. Every one adopts the plan he thinks best to destroy weeds and make his corn grow; a majority of us using the plough and hoe alone. The yield is from 15 to 40 bushels per acre, which is worth at home 50 cents, and in market from 60 to 85 cents per bushel. The cost of raising is thought to be about 37½ cents per bushel.

Statement of JAMES ARMSTRONG, *of Hartwood, Stafford county, Virginia.*

We plough our land for corn in the fall, as deep as can be done with two horses or a yoke of oxen, from six to eight inches deep, allowing it

to lie in the rough furrow until spring. Then all the manure that we have is distributed over the field and ploughed in; after which the land is marked off with furrows, four and a half feet apart, and the corn planted two feet asunder in the hills, leaving only one stalk to a hill. In the course of the summer the ground is kept loose by frequent stirring with the cultivator and hoe, and free from grass and weeds. The yield, by this management, is often 30 bushels to the acre.

Statement of JAMES DURLEY, *of Platteville, Grant county, Wisconsin.*

Corn, with us, is the principal crop. This year I think I have seen a yield as high as 60 bushels to the acre, with an average of 45 bushels. We have several varieties, the most popular of which we call "New York corn." My own experience, however, satisfies me that any variety will adapt itself in a few years to almost any climate, and the kind that has been the longest cultivated is the best

Corn should be planted in this region from the 1st to the 15th of May. It should be ploughed soon after it comes up; and the second time of ploughing, hoe and clear it of grass and weeds. After this it will bear the dirt, by which it can be kept clean till it is about two or three feet high, when it should be left to itself to continue its growth.

WHEAT.

Wheat, where the soil and climate are adapted to its growth, and the requisite attention is paid to its culture, is decidedly preferred to all other grains; and, next to maize, is the most important crop in the United States, not only on account of its general use for bread, but for its safety and convenience for exportation. It is not known to what country it is indigenous, any more than our other cultivated cereals; all of which, no doubt, have been essentially improved by man. By some, wheat is considered to have been coeval with the creation, as it is known that upwards of a thousand years before our era it was cultivated, and a superior variety had been attained. From a series of experiments, however, made by M. Esprit Fabre, an intelligent gardener at Agde, near Montpelier, in France, which have occupied some twelve or fifteen years, it has been ascertained that certain kinds, if not all of our cultivated wheats, are nothing more than peculiar forms of *Ægilops ovata*, or of *Æ. triaristata*, of which the whole coast of the Mediterranean more or less abounds. From the *Æ. ovata*, he has succeeded in producing a true wheat, (Triticum,) which, from careful cultivation in the open field for four consecutive years, has retained its form, and yields harvest like those of other wheat.

This grain has steadily followed the progress of civilization from the earliest times in all countries where it would grow. Even hostile

armies have been the instruments of its diffusion. Cortez, the inhuman conqueror of Mexico, wrote from thence to the King of Spain: "I beseech your Majesty to give orders that no vessel sail to this country without a certain quantity of plants and grain." The foundation of the wheat harvest of Mexico is said to have been three or four grains, accidentally taken by a slave of the conqueror in 1530, which he carefully cultivated and preserved; while the Spanish lady, Maria de Escobar, who first imparted the same blessing to Peru, has her name enrolled in history as the distributor of successive harvests among the Inca farmers of that country.

The introduction of this grain into the North American colonies dates back to the earliest periods of their settlements by Europeans. It was first sown, with other grains, on the Elizabeth Islands, in Massachusetts, by Gosnold, at the time he explored that coast, in 1602. In 1611, wheat, as well as other grains, was also sown in Virginia, and by the year 1648 there were cultivated many hundred acres in that colony. Although premiums were offered as an encouragement of its growth in 1651, it was not much cultivated for more than a century after, in consequence of the ill-directed attention to the culture of tobacco.

Wheat and other agricultural products had been cultivated in New Netherland in considerable quantities prior to 1626, as there arrived in Holland that year from the little colony on Manhattan Island samples of the recent harvest, consisting of wheat, rye, barley, oats, buckwheat, Canary seed, beans, and flax, as an evidence of their prosperity.

According to the records of the "Governor and Company of the Massachusetts Bay, in New England," there were ordered from England, in 1629, wheat, barley, oats, rye, beans, peas, the seeds or pits of fruits, (apple, pear, quince, peach, plum, cherry, pomegranate, and filberts,) saffron, woad, liquorice, hemp, flax, potatoes, (sweet?) madder, and hop-roots, and the cuttings or plants of the currant. In 1631, there arrived at Nantasket, from England, a ship containing thirty-four hogsheads of wheat-flour, fifteen hogsheads of peas, four hogsheads of oats, besides some seed barley and rye.

Wheat was introduced into the valley of the Mississippi by the "Western Company," in 1718, where, from the careless mode of cultivating it by the early settlers, and the sudden alternations of temperature, it would only yield from five to eight-fold, running to straw and blade without filling the ear. In 1746, however, the culture had so far extended that 600 barrels of flour were received at New Orleans from the Wabash; and by the year 1750, the French of Illinois raised three times as much as they consumed, and large quantities of grain and flour were sent to the same place.

Prior to the Revolution, the primitive soils of New York, New Jersey, and New England, appear not to have rewarded the cultivation of this grain much, if any, beyond the wants of the inhabitants. Considerable quantities were raised on the Hudson, and in some parts of New Jersey and Pennsylvania, which were exported to the West Indies and New England, and to Great Britain, France, Portugal, and Spain, in the years of scarcity, previously to 1723. In 1750, New Jersey raised more wheat than any other colony.

In New Hampshire, for several years preceding 1792, Siberian wheat

produced good crops whenever the seed was renewed by fresh importations from Siberia by the way of England; otherwise, it degenerated. On the "interval lands" along Connecticut river, it yielded from 40 to 50 bushels to an acre; on common upland, about 20 bushels.

The price of wheat in New Netherland in 1635, was two florins per skepel, (60 cents per bushel;) on the river Piscataqua, in 1680, $1 25 cents per bushel.

The amount of flour exported from New York in 1749–50, was 6,721 tons, besides the grain, estimated by the bushel; in 1756, 80,000 barrels. From New Jersey, in 1751, 6,424 barrels. From Philadelphia, in 1752, 125,960 barrels, besides 86,500 bushels of wheat; in 1767, 198,516 barrels, besides 367,500 bushels of wheat; in 1771, 252,744 barrels; in 1772, 284,827 barrels; in 1784, 201,305 barrels; in 1787, 193,720 barrels; in 1791, 315,785 barrels. From Savannah, in 1771, 7,200 pounds. From Virginia, annually, for some years preceding the Revolution, 800,000 bushels of wheat. From City Point, in 1791, 10,090 barrels of flour, besides 165,635 bushels of wheat; in 1793, 28,877 barrels, besides 88,115 bushels of wheat; in 1794, 5,853 barrels, besides 31,212 bushels of wheat.

The total amount of flour exported from the United States, in 1791, was 619,681 barrels, besides 1,018,339 bushels of wheat; in 1800, 653,052 barrels, besides 26,853 bushels of wheat; in 1810, 798,431 barrels, besides 325,924 bushels of wheat.

The quantities of domestic wheat, flour, biscuit, and ship-bread, with their valuations, shipped from the United States within the last thirty-three years, are given in the following table:

Years.	Wheat.	Value.	Flour.	Value.	Biscuit or ship-bread.		Value.	Total.
	Bushels.	Dollars.	Barrels.	Dollars.	Barrels.	Kegs.	Dollars.	Dollars.
1820-21......	25,821	20,925	1,056,119	4,298,043	47,509	31,370	157,389	4,476,357
1821-22......	4,418	3,080	827,865	5,103,280	44,581	33,382	180,928	5,287,[illegible]
1822-23......	4,272	5,663	756,702	4,962,373	43,700	30,994	183,401	5,151,437
1823-24......	20,373	20,740	996,792	5,759,176	50,888	33,282	197,339	5,977,255
1824-25......	17,990	18,570	813,906	4,212,127	68,627	37,873	235,982	4,466,679
1825-26......	45,166	38,676	857,820	4,121,466	72,253	49,705	251,728	4,411,870
1826-27......	22,182	14,800	868,492	4,420,081	59,856	44,236	210,903	4,645,784
1827-28......	8,906	6,730	860,809	4,286,939	51,494	35,191	171,105	4,464,774
1828-29......	4,007	6,372	837,385	5,793,651	44,254	26,849	172,897	5,972,930
1829-30......	45,289	46,176	1,227,434	6,085,953	57,101	38,592	188,474	6,320,603
1830-31......	408,910	523,270	1,806,529	9,938,458	67,113	46,048	250,533	10,712,[illegible]
1831-32......	88,304	93,500	864,919	4,880,623	73,883	29,208	255,735	5,[illegible]
1832-33......	32,221	29,592	955,768	5,613,010	72,642	23,716	252,555	5,895,157
1833-34......	36,948	39,598	835,352	4,520,781	66,309	25,161	231,708	4,792,[illegible]
1834-35......	47,762	51,405	779,396	4,394,777	59,013	36,447	221,699	4,[illegible]
1835-36......	2,062	2,062	505,400	3,572,599	55,988	30,691	244,760	3,819,[illegible]
1836-37......	17,303	27,206	318,719	2,987,269	43,308	17,606	244,[illegible]	3,[illegible]
1837-38......	6,291	8,125	448,161	3,603,299	49,566	21,633	263,6[illegible]	3,875,110
1838-39......	96,325	144,191	923,151	6,925,170	68,824	41,178	349,871	7,419,[illegible]
1839-40......	1,720,860	1,635,483	1,897,501	10,143,615	106,276	40,767	428,[illegible]	12,908,066
1840-41......	868,585	822,881	1,515,817	7,759,646	103,995	39,410	378,641	8,[illegible],568
1841-42......	817,958	916,616	1,283,602	7,375,356	83,594	29,773	323,759	8,615,731
1842-43......	311,685	264,109	841,474	3,763,073	96,572	29,251	312,[illegible]	4,339,414
1843-44......	558,917	500,400	1,438,574	6,759,488	117,781	41,920	388,603	7,648,491
1844-45......	389,716	336,779	1,195,230	5,398,593	117,529	30,183	366,294	6,101,[illegible]
1845-46......	1,613,795	1,681,975	2,289,476	11,668,669	114,792	25,505	366,688	13,717,[illegible]
1846-47......	4,399,951	6,049,350	4,382,496	26,133,811	160,980	31,082	556,266	32,[illegible],497
1847-48......	2,034,704	2,669,175	2,119,393	13,194,109	167,790	38,121	619,096	16,[illegible]
1848-49......	1,527,534	1,756,848	2,108,013	11,280,582	111,372	21,378	364,318	13,401,748
1849-50......	608,661	643,745	1,385,448	7,098,570	97,561	26,388	334,123	8,074,[illegible]
1850-51......	1,026,725	1,025,732	2,202,335	10,524,331	106,399	34,815	254,286	11,804,[illegible]
1851-52......	2,694,540	2,555,209	2,799,339	11,869,143	93,694	46,[illegible]	318,[illegible]	14,743,251
1852-53......	3,890,141	4,354,403	2,920,918	14,783,394	121,281	56,089	454,020	19,591,817

According to the census of 1840, the wheat crop of the United States amounted to 84,823,272 bushels; of 1850, 100,485,944; showing an increase of 15,662,672 bushels. The entire crop of 1853 may be safely estimated at 110,000,000 bushels, and valued at $100,000,000.

CONDENSED CORRESPONDENCE.

Statement of ANTHONY M. HIGGINS, *of Wilmington, New Castle county, Delaware.*

Our lands are admirably adapted to the growth of wheat. The Mediterranean variety is mostly selected in consequence of its early maturity. We try to finish seeding by the 20th of September and the 10th of October, for the double purpose of avoiding the ravages of the fly, as well as to afford sufficient time to become hardened to withstand our winters, which are sometimes severe. The most certain way to insure a good crop is, to break up a clover sod in the month of August to the depth of from four to six inches. The furrow-slice should not be over eight inches in width, and carefully laid up to prevent the seed-bed from getting too hard. We let it lie in its rough state for a couple of weeks, then roll and harrow well. We drill in the seed at the rate of 1¾ to 2 bushels to the acre. It is a risk to drill less, on account of broken grains, &c. I follow my drill with a brush-drag, made by framing together four light boards, the precise width of the drill, slatted across with four slats, about six inches apart, interwoven with any kind of convenient brush. To this drag I hitch a horse, with a boy to guide him, and with it follow the drill. It covers all wheat left naked by the drill. I think, too, it has a tendency to start the wheat more quickly, and cause it to grow stronger. In this way I have succeeded in raising over 2,000 bushels of wheat on less than sixty acres of ground. I might here state that, in 1833, when I entered into possession of my estate of something less than four hundred acres, one-third of it was abandoned to gauls, gullies, sedge, and the foxes, the residue only capable of producing from 3 to 10 bushels of corn to the acre. It will now average over 40 bushels of corn, and from 20 to 30 bushels of wheat.

On Mr. James Douglas's farm, recently belonging to the Hon. John M. Clayton, a field of wheat, containing thirty acres, was treated in the following manner: guano, in the proportion of 350 pounds; plaster and common soil, well mixed alternately by the shovel; then sown daily by the hand, lengthwise and crosswise, as much as the plough could cover. The wheat was drilled early in September. Throughout the fall and winter it was the admiration of all who saw it. In February it would quite hide a rabbit, and at harvest time was so rank that it all fell flat on the ground, and had to be mown. An acre of the best of it was threshed, and yielded 53 bushels. This splendid estate of three hundred acres, ten years ago, would not have averaged 8 bushels of wheat, nor more than 20 bushels of corn; but now, 40 of the former,

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and from 70 to 80 of the latter. This renovation is the result of the abundant use of lime and guano, with vegetable and animal manures.

Many grazing farmers prefer to sow their wheat on oat-stubble, as this practice secures a better grass-bed, and taxes the land less for a succession of crops.

The average yield of wheat is about 20 bushels to the acre. Price at Brandywine, $1 45 to $1 50 per bushel.

Statement of JOHN M. LESLEY, *of Danville, Vermilion county, Illinois.*

The wheat crop is beginning to fail in this vicinity, and farmers in some cases are abandoning its culture, to engage more extensively in the production of Indian corn, which is by far more valuable and productive. The usual time of sowing winter wheat is the last of August, or first of September. Prior to this, however, the soil is well broken with a plough, and loosened with a harrow. When it is sown, it is usually ploughed under, and smoothed with a harrow or brush, till the ground is made perfectly mellow. On an average, the yield of wheat is 20 bushels to the acre, bearing a price of 50 to 75 cents per bushel.

Statement of DANIEL JARRETT, *of Muncietown, Delaware county, Indiana.*

From my experience, I would say from the 1st to the 15th of September is about the proper time for sowing wheat with us. We plough the ground early enough for the stubble to become partially rotted by the time of sowing. We then sow the seed, and plough or drill it in. I consider it important that the lands should not be over 24 feet in width, in order that the open furrows may carry off the water when there may be an excess. Care should also be taken to draw other furrows in whatever direction may be necessary to facilitate the draining. This, however, depends much upon the soil. If it be open and porous, less care about draining may answer.

Statement of JOHN SPINY, *of Connersville, Fayette county, Indiana.*

The cultivation of wheat with us is on the increase. If sown late in the season, or if the fall is warm or wet, it is liable to be attacked with the "rust" the following year. Early sowing, say the last of August, on good ground well prepared, gives the best chance of a fair crop. The seed is usually harrowed in, though a light plough is sometimes used. Of late, drilling in the seed has been practised by some, and it is believed with good success. The average yield is from 15 to 35 bushels to the acre, and brings from 50 to 65 cents per bushel.

Statement of WILLIAM S. PAYNE, *of Rushville, Rush county, Indiana.*

Wheat is a sure crop in this county, except when attacked by rust. The varieties most successfully grown are the Mediterranean and Alabama, neither of which is liable to rust. We sow from the last of August to the 15th of October, and harvest from the 25th of June until the 6th of July. The principal part of our wheat is sown among standing corn; not that it is considered the best, but the easiest plan.

Last October, I sowed some Alabama wheat on a piece of ground that had been planted in corn the spring before, turning my hogs upon it about the 1st of September. When they had done eating the corn, say by the 5th of October, I sowed my wheat broadcast on the hard ground and ploughed it in with a shovel-plough. I harvested about the 25th of the following June, when it produced 25 bushels to the acre. A neighbor of mine ploughed a piece of clover sod about the 1st of last September, and sowed it with wheat broadcast, harrowing it but once. He harvested it about the 25th of June, when it produced 27 bushels to the acre. Another of my neighbors sowed his wheat a year ago last fall on standing corn, and ploughed it in with a small plough. It produced 27 bushels to the acre, which is considered an uncommon yield.

We consider clover an excellent manure for wheat or corn; and what is still better, to pasture with hogs during the summer, and afterwards ploughing under what remains. I believe that land kept in clover two years and pastured by hogs, and cultivated with wheat and corn three years out of every five years, will keep up the fertility of our soil for all time to come.

We sow from one to one and a half bushels of wheat to the acre. The average yield without manure of any kind is not over 14 bushels to the acre. Price at our nearest market this year, 70 cents per bushel.

Statement of J. BARTLETT, *of West Lebanon, Warren county, Indiana.*

Wheat is raised to a considerable amount here, and of very good quality. Average yield, 15 bushels to the acre. The mode of cultivation is to sow in corn, or let the corn-ground lie over and fallow it the next year.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Wheat, with us, generally follows clover. The ground is thoroughly and deeply broken up, and the clover turned under in the latter part of August. About the 1st of October, it is loosened with a heavy harrow, and, if necessary, rolled, and the seed sown. It is then carefully harrowed each way. Deep and close ploughing in the breaking up of the ground is very important. We have sometimes produced more than 30 bushels to the acre, and rarely fallen below 15. The average for the last twenty years is about 20 bushels. In 1852, our crop averaged 22, and the past season it reached 24 bushels to the acre. The crop of J. H. Handy, a neighboring farmer, being taken from land of a superior quality, averaged, the past season, 34 bushels and one quart per acre. About the 1st of October, after removing his hemp crop, the seed was sown on the stubble where the hemp had grown, and ploughed in with the shovel-

plough, and then harrowed. It received no further attention until the time for harvesting.

The kind of wheat sown was the "New York premium." The old varieties of wheat seem to have lost their character, and new ones have come into use; of these, the "New York premium," and the "May," are in favor with us. Cost of production, from 45 to 50 cents per bushel, including the rent of the land. Value in the market, or in the mill, 75 cents.

The best means we have of harvesting is found in the use of the McCormick or "Virginia reaper." Two hands and three horses will cut twelve acres in a day, doing the work exceedingly well, and delivering the wheat from the machine in snug and well-formed "gavels." The grain is threshed and cleaned by the use of portable horse-power machinery.

Statement of HOWARD M. ATKINS, *of Mount Vernon, Kennebec county, Maine.*

The most common method of raising wheat in this vicinity is to sow in the spring upon corn or potato ground, which has been planted the previous season. The land is first ploughed to the depth of from five to seven inches; then harrowed two or three times before sowing, and once or twice after; and then is generally rolled. It is, also, sometimes sown upon newly broken-up ground, where the land is treated in nearly the same manner as the other, being first ploughed rather deep, say seven or eight inches, and then treated as before. The crop upon the broken-up ground is not generally so large as upon the old ground.

The average yield, I should judge, is from 10 to 15 bushels per acre. Wheat is now worth from \$1 25 to \$1 50 per bushel, according to quality. The kind mostly raised in this vicinity is the "red-bearded," which is considered the surest, although the "tea wheat" is grown to some extent.

There is not much manure put upon the land at the time of sowing; it is chiefly applied the year before, as upon corn and potatoes.

Statement of DANIEL FULTON, *of Bowdoinham, Lincoln county, Maine.*

For many years insects have injured our wheat, so that it has been little cultivated; but the last two years we have raised fair crops. Average yield, 15 bushels to the acre. Price, \$1 25.

Statement of DAVID BRUMBAUGH, *of Marsh Run Mill, Washington county, Maryland.*

The principal varieties of wheat cultivated in this county are the "Zimmerman" and the "smooth" and "bearded Mediterranean." The latter is generally considered the surest crop, but will not yield so much to the acre as the Zimmerman, when it is not injured by the fly or other casualties. The average yield of the wheat crop of this county last season, from the best sources of information that I could obtain, might be estimated at from 15 to 20 bushels to the acre. Market value, \$1 35 per bushel. The crop was somewhat injured by the fly, late in the season, yet many parts of the county yielded much more than the estimate herein made.

The usual time for sowing wheat is from the 1st of September to the middle of October. The Mediterranean generally succeeds best by being sown early.

Statement of C. F. MALLORY, *of Romeo, Macomb county, Michigan.*

The best mode of cultivating wheat with us, is once ploughing, and then use the cultivator to drill in the seed. The lowest quantity of wheat per acre that will pay expenses, may be put at 8 to 10 bushels; the common yield is from 15 to 20 bushels to the acre.

Statement of WILLIAM S. MAYNARD, *of Ann Arbor, Washtenaw county, Michigan.*

Our principal crop is wheat, which is very profitably and expensively raised. The average yield this year has been 20 bushels to the acre, while 8 bushels, at present prices, would have paid expenses.

The price soon after harvest is 90 cents per bushel; average price for the last six years, 80 cents.

Statement of J. D. YERKES, *of Northville, Wayne county, Michigan.*

Wheat is the most important crop cultivated in this part of our State. The "blue-stem" is the favorite variety, giving a larger yield than any other kind, and is not so liable to rust, nor to injury from the Hessian fly; besides, it commands the highest prices.

The common mode of raising this crop, is to plough the ground in June or July, six or eight inches deep, using the cultivator and harrow to pulverize the surface, and sow about the 10th of September.

The weevil has made its appearance in some localities in this part of our State, but not in sufficient numbers to injure the crop. To guard against the Hessian fly, I know of no better remedy than to keep the ground rich. If a rank and vigorous growth can be obtained, the wheat will suffer but little injury from this fly.

The average product per acre in this vicinity, is about 24 bushels; though some farmers have obtained as high as 40 bushels to the acre.

Statement of GROVE SPENCER, *of Ypsilanti, Washtenaw county, Michigan.*

Among the crops which may be cultivated with profit here, wheat and Indian corn stand first.

The maximum yield of wheat here is about 35 bushels to the acre, and the average about 18 or 20 bushels. The smallest yield that will pay expenses, is 8 bushels to the acre, provided the price is \$1 per bushel. The expense of raising a bushel of wheat is as follows, taking one acre of ground:

Interest on land one and a half years	\$3 50
Once ploughing	1 00

Cultivating, sowing, and dragging	$1 00
Seed, 1½ bushels	1 50
Harvesting	1 50
Threshing	1 50
Transportation and marketing	50
	10 50
Value of straw	1 50
Product of an acre, 20 bushels	9 00
Cost per bushel	45

The best mode of raising wheat in this county is, beginning on new land, or "oak openings," to cut and burn the bushes, and then, with a strong team and plough, turn over the sod six inches deep in the summer; drag and sow the same in the early part of September following, and thoroughly drag and grub the ground before the wheat is up large enough to be injured by the operation; taking off the stumps with oxen and cart. This process, if well done, will insure a crop, of about 20 bushels per acre. As soon as the wheat is taken off, the succeeding season, and the stubble has become dry, burn over the field, plough once, and sow again the same land. In the succeeding spring sow with clover. This second crop of wheat will bring about 18 bushels to the acre. Let the land remain to clover two or three years, and then in August turn over the sod well with the plough, and early in September sow to wheat; and when that crop is harvested, burn the stubble, plough, and sow as before; seeding to clover in the following spring.

Statement of THOMAS W. SAMPSON, *of Ashland Farm, Rocheport, Boone county, Missouri.*

Wheat is rather an uncertain crop in this county, but I think it is mainly owing to the careless manner in which it is put in. It is generally sown after corn, from the first to the last of October. But our best farmers are adopting a better plan by sowing much earlier, on fallow land, where they produce much better crops. The varieties most in use, are the "smooth red chaff" and the "Iowa white," the latter of which is rather scarce, but is esteemed the best and most profitable.

Wheat, the present season, has been worth from 75 to 90 cents per bushel. Cost of transportation to St. Louis, 5 cents per bushel.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Wheat stands next in importance to Indian corn in the list of cereals raised among us. I doubt if this crop succeeds as well here as in more northern latitudes, on account of our changeable climate. A warm day will loosen the earth, and a freeze at night and (by its irregular crystallization) expose the roots to the subsequent action of frost.

To raise a crop that is likely to be free from the rust in the spring,

and to get root sufficiently deep and strong enough to stand the winter, wheat should be sowed in September. When properly cultivated, it generally succeeds very well. I have raised a crop which I thought averaged 30 bushels to the acre. One of my neighbors informed me that his averaged 35 bushels. I have heard of 40 and 50 bushels being raised to an acre. A gentleman from St. Charles county (in which this crop is raised to a larger extent than in any other in the State) informed me that the average of that section was 20 bushels. The quality of the wheat raised in Missouri is generally very fine.

Statement of W. M. JACKSON, *of Fayette, Howard county, Missouri.*

Wheat is not extensively raised in this county, as it is not considered a certain crop. It frequently blasts and takes the rust from ten to fifteen days before maturing. This, I think, is caused by its being too thin on the ground, which causes the straw to grow very luxuriant and coarse, retaining the sap sufficiently long to produce the rust. When sufficiently thick, it seldom fails to mature well, and yields about 20 bushels to the acre, and frequently 30 bushels and upwards.

In the fall of 1848, about ten acres of my crop were sown by an inexperienced hand, with about two bushels and a peck to the acre. When it came up, I thought it would produce nothing, it was so thick. Out of sixty acres, sown with 1¼ bushels to the acre, the ten acres of thick sowing was the only good wheat I made that season, and there was a total failure in my neighborhood. I have since that time sown from one and a half to two bushels to the acre, and have generally made good crops. I have been growing wheat on the same farm for twenty-one years, and have never had any crop injured by the Hessian fly, before last year. One field, which was sown the last week in August, did not yield more than half a crop.

Wheat is mostly sown in this county on corn-ground after the corn is cut up, which is generally done the last of September or first of October. Those who raise tobacco generally sow on their tobacco land after taking off the crop. If the tobacco has been well cultivated, and the wheat well put in, a good yield will be the result. The only fertilizer we use is, to sow our land that begins to fail with red clover, which pays well, either for grazing or cutting for hay. By standing three years in clover, land that has not been very badly cultivated will produce better than it did when first cleared. I turn the clover sod under in the fall crop, plough in the spring, and lay off the rows four feet apart; as soon as up finger-length, harrow with a two-horse harrow, plough three or four times with a one-horse diamond plough, and make from 40 to 60 bushels per acre, according to the season. Last year I cultivated thirty acres in corn as above stated, cut it up and sowed broadcast in wheat the first week in October, and harrowed in, with a two-horse harrow, 1¾ bushels to the acre. The corn was ploughed the last time with the shovel-plough, which left the land in ridges and furrows; the wheat, as sown, fell in the furrows, and was there covered by the harrow as it was dragged across the ridges. It grew as though it had been drilled.

As I had been of opinion, for several years, that wheat in this county would stand the winter better in drills, I had twelve rows harrowed down smooth before sowing, and then harrowed in the same as the other, which was double the amount of labor. The result of this levelling was about 20 per cent. less; and had it not been a very favorable winter, I have no doubt but it would have been even less. This experiment induced me to buy one of Pennock's drills this fall, and put in my crop with it. It works well, and is a great labor-saving machine. I have sown widths across my fields broadcast, and ploughed and harrowed in the usual way.

All my experience in the cultivation of wheat has satisfied me that ground should be ploughed from six to eight inches deep, sufficiently early to cause all the litter and vegetable matter to rot and pulverize by the last of September or first of October. In confirmation of this, I will give an account of a casual or accidental experiment. In the summer of 1838, in order to make a new track through one of my fields, I had the oats cut the first week in July. Where the track was made, the stubble was immediately turned under with a large two-horse plough, about eight inches deep, and then harrowed, and re-ploughed about the 1st of August, and frequently harrowed in the course of that month. The last of September, I ploughed the field from six to eight inches deep, turning the stubble and grass well under, sowed the wheat, and harrowed in. From early in the spring to the cutting of the wheat, the track could be traced by the growth, and the yield on the track was more than double. I have since made similar experiments with like results. Our clover fields, when cultivated as above, generally retain a sufficiency of seed to produce a good growth of clover after the wheat is taken off; and by continuing the clover one year, to be mown or pastured, a rotation of corn and wheat may be continued without much, if any, reduction of the soil. If the corn-stalks are left on the ground, an improvement of the soil will be made, and they will prevent the soil from washing.

Statement of H. L. Brown, *of Fayette, Howard county, Missouri.*

The average product of wheat for this county, for the last year, is probably 10 or 12 bushels to the acre. Time of seeding, from the 1st of September till the last of October. Early sown wheat does much the best; as deferring the time of sowing till after tobacco is housed, renders it too late to withstand the winter frost. Time of harvesting, the last of June.

The best preparation of the soil is to turn under a crop of clover, and sow immediately, and harrow in the seed with a light plough or drill. By this method, the maximum amount of wheat that our soil will produce can be obtained, which is about 25 bushels to the acre. Our soil can be improved almost indefinitely by the use of clover—so much so, that it will not produce good wheat. If it is increased beyond the point of 25 bushels to the acre, the growth of straw will be increased, but the grain diminished, the growth of straw being too luxuriant and weak.

Statement of Armstrong O'Hara, *of Saint François county, Missouri.*

Wheat is not a sure nor a profitable crop here, as the fly injures it in the fall, if early; if sown late, it is sometimes destroyed by the rust. Cost of raising, 50 cents per bushel. Market value 60 to 65 cents per bushel. Average yield, 10 bushels to the acre.

Statement of William H. Cooke, *of Howard, Warren county, New Jersey.*

There is no guano used by us in the production of wheat. The system we generally pursue in the rotation of crops is, to let our fields lie in sod two years, then plough for corn, fallow for wheat or rye the next year, and seed down with Timothy in the fall, and with clover in the spring. We plough three times for wheat when fallow land is used, and sow 1½ bushels to the acre. The time of seeding is from the 10th to the 25th of September; and harvest commences about the 10th of July. The yield is from 12 to 15 bushels to the acre, which brings about $1 20 per bushel.

Statement of J. P. Rounsville, *of Rounsville, Alleghany county, New York.*

In growing wheat, our surest crops are produced by turning under a luxuriant growth of clover about the 10th of June, after which it is ploughed twice, and harrowed well. The ground thus prepared is sown the 1st of September with about two bushels per acre of perfect seed, which may be obtained from good wheat by throwing the grain some 40 feet, and using only that which falls the farthest off. On the 1st of March, in the following spring, 15 pounds to the acre of clover-seed may be sown, and also at this time 100 pounds of lime, with the same amount of plaster. When the kernel is two-thirds out of the milk, the wheat is harvested. Under this mode of treatment, the average yield is about 25 bushels per acre.

The cost of raising and threshing may be calculated at $10 per acre. Interest on land, $3. The price of wheat is generally $1 per bushel. The best crop in town last year was 43 bushels to the acre.

Statement of Collins Gardner, *of Springwater, Livingston county, New York.*

Wheat is our principal crop. Soule's white-flint variety I consider the best adapted to our soil and climate. It grows well, ripens early, and has plump and handsome berries. The average yield may be set down at about 15 bushels to the acre. I consider the best mode of harvesting to cut as soon as the berry begins to harden; shock in round bunches of ten or twelve sheaves, with caps of two sheaves each. Clover is generally sown, and soon after plastered in the spring on winter wheat. This usually makes good pasture, and is indispensable to keep the soil in proper condition. Deep ploughing and clover will renovate our soils, and yearly increase the amount of grain.

Statement of F. W. LAY, *of Green, Monroe county, New York.*

Almost every farmer in this region has a different process of preparing the ground for wheat. The old method of summer fallowing is but little practised, excepting to clear lands from foul weeds or grass. Where land is fallowed, it is ploughed in May or June, generally eight or nine inches deep, and then using the drag or wheel cultivator as often as practicable till seeding. We generally sow from 1½ to 2 bushels per acre, between the 1st and 20th of September; and the best farmers brine, plaster, or lime their seed previous to sowing. This can easily be done by spreading the wheat-seed upon the barn floor, and sprinkling about a peck of salt to every 10 bushels of grain, throwing sufficient water upon it to dissolve the salt; after which, plaster or lime may be raked into it to dry it. This preparation on our soils I believe to be an infallible preventive of smut in the berry; and as these substances enter largely into the elements of the plant, it is thought that they add to the productiveness of the crop.

As farmers grow wiser, and adopt a more scientific rotation of crops, the yield increases. At present it may be set down at from 20 to 35 bushels per acre; though 60 bushels have been obtained in this town.

The best remedy for the Hessian fly is, to have the land in such a state of fertility that the plant will grow so rankly as not to be injured by it, which seldom occurs seriously, except upon light land and dry knolls. It gradually disappears after a hard frost.

The weevil, or wheat midge, has not been known in these parts for four years past. As our harvest is earlier than to the eastward, it is thought it will not do the same damage as in former times. Thus far its ravages have been confined to spring and late winter wheats. This readily indicates that we should sow our wheat on warm land, and adopt every method to bring the crop forward early. I notice considerable difference in their ravages in different kinds of wheat. The Mediterranean is scarcely injured at all; and generally the coarser the grain, and the thicker the chaff, the less liable it is to injury—probably because the insect in its winged state cannot insert its ovipositor through the harsh, coarse chaff of certain kinds of wheat.

Plaster is generally sown upon wheat in the spring, both as a fertilizer to the crop, and also to bring forward the clover and other grasses sown therewith. Guano and other imported manures have been tried, but have generally been found too expensive to be profitable.

Statement of JAMES H. WATTS, *of Rochester, Monroe county, New York.*

Our farmers generally sow clover as a fertilizer, and, with the use of gypsum, the land has been kept in good condition for the last thirty-five to forty years. Soule's white-flint variety is the kind generally sown, and will usually yield from 25 to 27 bushels to the acre, weighing full 60 pounds to the bushel.

Wheat is produced at a cost of 75 cents per bushel, and for the last four years has brought in market from $1 to $1 50 per bushel. Flour is manufactured here in large quantities, of an excellent quality, and is transported to Albany, via the Erie canal, in boats carrying from 600 to 800 barrels to a trip, at a cost of 32 to 65 cents per barrel; thence to the city of New York, via the Hudson river, from 8 to 15 cents per barrel. It is also taken in the winter, as well as at other seasons, via railroad, for 70 to 90 cents per barrel.

Statement of HERMAN POWERS, *of Lewiston, Niagara county, New York.*

The average crop of wheat in this portion of the State is about 25 bushels to the acre; although in many instances, from proper cultivation, the yield has been more than double. My neighbor, Mr. William Hotchkiss, who exhibited the largest yield at the World's Fair in London, in 1851, in a field of six acres, in 1849–50, averaged 63½ bushels to the acre, of wheat weighing 63 pounds to the bushel. It attracted much attention from the wheat growers of Europe, who could scarcely believe that so large a yield could be taken from an acre. There was nothing unusual in Mr. Hotchkiss's method of cultivation. He ploughed deep, taking good care to pulverize the soil well, and to intermix the top with the subsoil, subduing the grass, &c. The seed was drilled in near the end of August, two bushels to the acre of "Soule's wheat." But extraordinary as this yield was universally acknowledged to be, it was exceeded during the summer of 1853, by Mr. Thomas Powell, of this county, who averaged, on a field of seven measured acres, within a small fraction of 70 bushels to the acre—namely, 489 bushels.

This latter yield was so unusual, that I deem it proper to give the particulars of the method pursued in its cultivation. In the fall a heavy dressing of swamp muck was applied. During the winter the field was used as a yard for stock, including a flock of sheep. In May there was carted on a liberal coat of barn-yard manure, which was immediately ploughed in very deep. Up to the 15th of August it was used at night as a sheep-yard, when the field was again ploughed three times, until the soil was perfectly pulverized and thoroughly intermixed with the manure. Two bushels to the acre of "Soule's wheat" was then sown broadcast, and covered with a light plough, which completed the process. The variety known in Western New York as "Soule's wheat," is in fact no other than the very best of the Genesee "white flint," having a stiff straw and maturing early.

As the product of this soil in wheat as yet stands unprecedented, it may be useful to give the following analysis, by Professor Emmons:

Water of absorption	3.00
Organic matter	7.75
Silicates	76.93
Carbonate of lime	2.82
Phosphate of alumina	0.15
Magnesia	0.25
Peroxide of iron and alumina	8.82
	99.72

In this county it is supposed that 13 bushels of wheat to the acre

will pay all expenses of culture, and my experience teaches me that an additional outlay of 40 per cent., judiciously applied, will bring an average return of 40 bushels to the acre. Under the European system of cultivation, it could unquestionably be run up to an average of 56 and perhaps 70 bushels to the acre, as is evinced by the success of Messrs. Hotchkiss and Powell.

It can scarcely be necessary to caution the experienced and enlightened farmer as to the careful selection of his seed. Threshing wheat by machines should be avoided, as the grain is frequently crushed and the germinating principle greatly injured or destroyed. It should be well cleaned, of course, and chess and other noxious seeds excluded as much as possible by repeated screening. These seeds sometimes get buried deep and lie dormant for years, until the plough, by accident, brings them under the influence of the sun, when they germinate and mysteriously show themselves, to the vexation of the husbandman.

It has been found beneficial, also, to change the seed by selecting it from different localities every three or four years. Between the middle of August and first of September is found to be the most proper time for sowing wheat, and deep ploughing is deemed almost indispensable for a good crop.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

Wheat is harvested with us about as soon as the berry gets hard enough to be worked into dough in the hands. A great part of this grain in our county is cut with the reaper. This implement continues to give great satisfaction, and works well upon smooth and level lands. It cannot be used where it is very hilly, nor among large stones or stumps, nor where the grain has fallen into whorls; but in lodged grain, which all lies in one direction, it works better than the cradle. Our mode of shocking grain is to set it in rows two sheaves abreast, which is thought to be the best. It allows the sun to come to the sheaves, and heavy rains to run off. Our grain seldom, if ever, sprouts or grows in the shock. Some have tried round shocks with caps, but the other form is generally preferred. In storing or housing wheat, we never, if we can avoid it, store it away upon a partly filled hay-mow, especially if the hay is new, for the wheat in that condition takes the steam from the hay, which makes it musty and disagreeable; but far greater damages are often sustained by bad stacking. I have seen a great deal of good wheat destroyed by unskilful stacking. The midge, or weevil, has done a great deal of damage to our white wheat. The only remedy that we have discovered is, to try every means to get the crop matured as early as possible. With that object we sow early and thick, upon the dryest and richest land, and cultivate the soil to a very fine tilth. The Hessian fly has not for many years done us any injury.

The expense of raising an acre of wheat may be estimated about as follows:

Ploughing once	$1 38
Cultivating once and harrowing twice	2 28
Seed, 1½ bushels	1 50
Sowing the same	$0 13
Cutting and binding	1 50
Threshing 20 bushels, at 8 cents per bushel	1 60
Conveyance to market, 2 cents per bushel	40
Total	8 79

The above sum divided by 20, which is an average number of bushels raised per acre, and we have 44 cents per bushel as the expense of raising wheat in this county. It costs about 12 cents per bushel to send wheat to New York via the Erie canal.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

When pasture land is sown with wheat, we plough it in the summer, which gives the sod and roots time to rot. In September cross-plough and manure it. From the 10th to the 20th, sow it broadcast, about one or one and a half bushels to the acre. Harrow it in about two inches deep.

Supposing the field to be in pasture, we adopt the following rotation of crops: The first year we plant it with corn; the second, sow with oats, barley, or peas, in April or May; then in August or September plough, and sow it with wheat or rye, seeding it down with clover. In the following, or third year, in July or August, we gather the grain, and the three succeeding years let the field remain in pasture, or grass, for hay.

Do not rely upon the statements you see in the papers of a large number of bushels of wheat grown to the acre in this State, more especially in the eastern part. These accounts in themselves are strictly true, but the whole truth in regard to them should be told. A few acres only, in such cases, are devoted to wheat, of the best quality, under the highest state of cultivation, manured to its utmost capacity with the kinds of fertilizers best adapted to the soil—every possible care taken with it; and it would be most extraordinary if a large yield should not be the result. Few only of our farmers can thus afford to cultivate their lands; and the average yield of wheat per acre cannot be determined from such hot-bed crops. No one can calculate with any certainty the average yield. It depends upon the quality of the soil, and the care and attention given in preparing and manuring the land. Deep snows, cold winters, and wet springs in this climate, are more favorable to the growth of wheat, than an open winter and a dry spring. When the ground is covered with snow which remains until spring, but little of the grain is winter-killed. If the months of May and June are wet, the growth is large, and the yield abundant; but an open winter, with dry weather in April and May, is injurious.

Guano is not used to much extent in the production of this grain. A few of the wealthy farmers have used it with great benefit; they speak highly of it, and say it is well adapted to wet lands, causing so large a growth of the plant in the fall of the year, as to give the roots a firm hold of the soil, and thus prevent them from being winter-killed. Wheat,

in this county is raised only on the best of the land; other crops are much more certain on poorer soils, and are quite as profitable.

The raising of wheat has received a severe shock in this county, owing to the great demand for rye-straw for the manufacture of paper. The price has risen to an alarming extent. Incredible as it may seem, rye-straw found a ready sale at $14 per ton in this county the past year, and in great demand at that. The immense amount of paper used will keep the price of straw at a high rate, until the Western States enter largely into the manufacture of paper.

The Hessian fly and weevil, of late years, have not to any great extent injured the grain in this county. I do not know of any remedy for them. The farmers, for a while, quit raising wheat; these insects do not materially injure the rye.

Timothy is now sown with wheat, immediately after harrowing it in; the ground is better fitted for it, being moist and soft. The cool weather in autumn is favorable to its growth, which is much more certain than when sown in the spring. Clover, however, is sometimes sown in the spring, in March or April. When a field is seeded down, the practice is to pasture it the first year, and mow it the second and third. By pasturing it the first year, the clover is lessened in amount, and the grass gets a liberal growth so as to root out the clover, in a measure, the second or third year. The price of wheat for the last sixty years, at Albany and Troy, will be seen by the following table, which is the amount per bushel as claimed and received by the Van Rensselaers for wheat rents on their lease lands. The table is in shillings and pence, eight shillings being a dollar. The prices of fowls will show the value of poultry, and the price of days' work the cost of a team per day, with a driver:

January 1, 1793,	1 bushel of wheat	was valued at	6s.	0d.,	4 fowls at 4s.,	1 day's service at 10s.
Do....1794	do	do	8	0	do	do
Do....1795	do	do	11	0	do	do
Do....1796	do	do	16	0	do	do
Do....1797	do	do	12	0	do	do
Do....1798	do	do	10	0	do	do
Do....1799	do	do	9	6	do	do
Do....1800	do	do	12	6	do	1 day's service at 14s.
Do....1801	do	do	14	6	do	do
Do....1802	do	do	8	0	do	do
Do....1803	do	do	9	0	do	do
Do....1804	do	do	10	0	do	do
Do....1805	do	do	16	0	do	do
Do....1806	do	do	11	6	do	do
Do....1807	do	do	11	0	do	do
Do....1809	do	do	8	0	do	do
Do....1810	do	do	12	6	do	do
Do....1811	do	do	14	0	do	do
Do....1812	do	do	15	0	do	do
Do....1813	do	do	18	0	do	1 day's service at 16s.
Do....1814	do	do	15	0	4 fowls at 6s.	do
Do....1815	do	do	13	0	do	do
Do....1816	do	do	14	0	do	do
Do....1817	do	do	18	0	do	do
Do....1818	do	do	15	0	do	do
Do....1819	do	do	14	0	do	do
Do....1820	do	do	8	0	do	do
Do....1821	do	do	6	0	4 fowls at 4s.	do
Do....1822	do	do	9	0	do	do

January 1, 1823,	1 bushel of wheat	was valued at	10s.	0d.,	4 fowls at 4s.,	1 day's service at 16s.
Do....1824	do	do	10	0	do	do
Do....1825	do	do	8	0	do	do
Do....1826	do	do	7	0	do	do
Do....1827	do	do	8	0	do	do
Do....1828	do	do	8	0	do	do
Do....1829	do	do	14	0	do	do
Do....1830	do	do	8	0	do	do
Do....1831	do	do	10	0	do	do
Do....1832	do	do	10	0	do	do
Do....1833	do	do	10	0	do	do
Do....1834	do	do	8	0	do	do
Do....1835	do	do	8	0	do	do
Do....1836	do	do	12	0	do	do
Do....1837	do	do	18	0	4 fowls at 6s.	do
Do....1838	do	do	13	0	do	do
Do....1839	do	do	14	0	do	do
Do....1840	do	do	9	0	do	do
Do....1841	do	do	8	0	4 fowls at 4s.	do
Do....1842	do	do	10	0	do	do
Do....1843	do	do	7	0	do	do
Do....1844	do	do	8	0	do	do
Do....1845	do	do	8	0	do	do
Do....1846	do	do	9	0	do	do
Do....1847	do	do	9	0	do	do
Do....1848	do	do	10	0	do	do
Do....1849	do	do	9	0	do	do
Do....1850	do	do	9	0	do	do
Do....1851	do	do	9	0	do	do
Do....1852	do	do	8	0	4 fowls at 4s.	do
Do....1853	do	do	9	0	do	do

I cannot give anything like the average yield of wheat in this county; but will say, from 8 to 30 bushels per acre can be raised, depending entirely upon the soil and season, and the attention paid to preparing and manuring the land.

Statement of John B. Young *and* James De Mott, *of Ovid, Seneca county, New York.*

The cost of raising various crops must necessarily depend much on the price of labor. In 1848, the estimated cost in labor to raise an acre of wheat, was $10. The following is estimated to cover all expenses, including interest, on land yielding 20 bushels of wheat per acre:

Cost of ploughing first time	$1 25
Cost of ploughing second time	1 00
Cost of ploughing third time, or its equivalent by cultivator	1 00
Harrowing three times, at 38 cents each time	1 14
Drilling in	50
Cradling and putting in shock	75
Housing or stacking	30
Threshing twenty bushels, 8 cents per bushel	1 60
Conveyance to market	50
Seed-wheat, 1½ bushels, at $1 per bushel	1 50
Interest on value of land at $50	3 50
	13 04

Twenty bushels of wheat in market, at $1	$20 00
Cost of production as above	13 04
Profit per acre	6 96

Twenty bushels is the estimated average yield per acre for this county; but on our best wheat lands, and with the above course of tillage, it will average much higher, very often reaching 40 bushels per acre under favorable circumstances.

The crop is generally cut (as it should be) a little while before it is fully ripe, raked, bound, and put into "stouts," twelve sheaves in the stout, and there left until it is fully cured, when it is either housed or stacked, and threshed out as soon as can be conveniently done. The straw is carefully stacked for the use of stock, and the wheat is taken to market.

The wheat crop was less with us than an average last season, in consequence of injury by the weevil, an evil for which there has not yet been discovered a remedy. It has been stated that those varieties which are least liable to injury from the Hessian fly by early sowing, are those that mature early, and are cultivated on fields that are elevated or ridgy, for the reason, as it seems, that the crop is more agitated by the winds, and the insect, in consequence, prevented from remaining on the head to deposite the larvæ; but these are only preventives to a limited extent, and not remedies.

Statement of JOHN HURLBUT, *of Arkport, Steuben county, New York.*

Of wheat, the Soule variety takes the preference. It will yield with us at least five bushels per acre more than any other. After several years' experience, I am fully prepared to say that we obtain better crops when the ground has produced a crop of corn the previous summer, than when it has been "summer fallowed." The following is the mode of culture we adopt: as soon as the corn is glazed we cut it up, putting thirteen rows together, carrying six from each side, and set them on the middle row. We put twenty-six hills together, and bind a few stalks firmly round the top. One man will cut and set up an acre a day in this manner. We next gather the pumpkins, and immediately start the plough; then sow two bushels of seed-wheat to the acre on the furrow, and harrow twice. After the corn is husked, the stalks should be bound in small bundles and set up on the sown wheat field, as this allows the teams to pass, in gathering them up, on the strip not ploughed, and saves driving on the wheat. The land on which the shocks stood can then be sown. No fears need be entertained about its ripening uneven.

On a field of 7½ acres, treated in the manner we have just described, we harvested the past summer 265 bushels of wheat, worth $1 50 per bushel.

Statement of JOSHUA HARRIS, *of Welche's Mills, Cabarras county, North Carolina.*

I received in December, 1851, a small amount of wheat grown by Mr. James Code, of Maryland, which I sowed the next day on good land, but too late for a fair crop. I had one peck of wheat, however, which I sowed on the 15th of October, 1852, and harvested from it, on the 17th of June, 6½ bushels of good plump grain. Three bushels of that product I sowed on good land, on the 7th, 18th, and 19th of October. The other 3½ bushels I let out to my neighbors, and I hope by my next I will be able to make a good report.

The last crop of wheat fell very short of an average, as most of the farmers have been so taken up in picking their cotton, that they neglected sowing in good time until the weather became very wet, many of them being under the necessity of giving it up altogether, and what had been seeded was too thin on the ground.

Flour in our nearest market is worth only $5 per barrel.

Statement of SANTARRILLI S. G. FRANKLIN, *of Cuba, Clinton county, Ohio.*

Wheat, in this region, is raised to a considerable extent. The average yield is about 15 bushels to the acre; though some, by slovenly cultivation, get less than 10 bushels, while others, by deep ploughing and thorough harrowing, obtain 30 bushels to the acre. The time of sowing here is from the 10th of September to the 1st of October. I prefer sowing about the 1st of September, to avoid the rust.

The average price of wheat here is 60 cents per bushel; present price, 70 cents.

Statement of LUTHER BAILEY, *of the United Society of Shakers, North Union, Cuyahoga county, Ohio.*

Our soil is generally stiff and clayey, and not well adapted for agricultural purposes without draining. For wheat, we select from our poorest pastures or meadows a field, which we first plough in the fall. In June or July following, it is cross-ploughed, and thoroughly harrowed, and again ploughed into ridges a rod wide, just before seeding, in order to allow the water to run off freely. While this is going on, the manure from the yard is hauled on and spread broadcast, and the wheat and grass-seed sown immediately, and harrowed in about the last of August. Early sowing gives the grass a start, and the wheat is not so liable to rust.

Red clover and Timothy are the kinds of grass-seeds we sow with the wheat, at the rate of about eight quarts of the former or three of the latter to an acre. We think it is not a good practice to sow the two on the same ground, as they do not ripen together.

The "blue-stem" variety is generally preferred in this vicinity, as it is the least liable to rust, stands the winter well, and makes the most and the whitest flour. We prepare our seed-wheat by putting several bushels into a box of a suitable size, pour on water, and stir it up with a shovel until the grain is thoroughly wet. Then sprinkle on a sufficient quantity of air-slacked lime to give the wheat a good coating, and shovel it over as before. Thus treated, the wheat is sown broadcast, at the rate of two bushels to the acre. The average yield is about 30 bushels to the acre.

Statement of John W. Evans, *of Scio, Harrison county, Ohio.*

The usual average product of wheat per acre in this region is from 15 to 25 bushels, although 35 bushels are often raised; the time of seeding, from the 1st to the 20th of September, but some sow still later. The time of harvesting commences generally from the 1st to the 10th of July, and continues some three weeks. The quantity of seed sown to the acre is from one to two bushels—generally 1½ bushels. The varieties which have proved most successful are Soule's garden and the white velvet wheat.

Statement of Jacob Knoop, *of Elizabeth, Miami county, Ohio.*

Wheat is generally sown with us in September, about 1½ bushels to the acre, and generally succeeds some other crop. We use no fertilizers, except barn-yard manure, which is spread on the land and ploughed under previous to sowing. The low price of this grain for some years past, has lessened the amount raised; but if the present prices should be sustained, more attention will be given to its culture. The kinds usually raised are the "Mediterranean," "Starbuck," and the "Select."

The price of wheat at this time is $1 08 per bushel. The crop is liable to be much injured by the frosts of winter, the Hessian fly, and the midge. The average crop is about 15 bushels to the acre.

Statement of P. W. Gillett, *of Astoria, Clatsop county, Oregon.*

There is but a very small quantity of wheat grown in this county, as almost its entire surface is covered with a heavy growth of timber. But sufficient wheat has been grown to convince farmers that our climate and soil are well adapted to its successful growth.

Corn cannot be grown in this climate in sufficient quantities to make its cultivation any object. Our summers are too cool for the ordinary varieties.

Oats do remarkably well with us. They are generally cultivated in the usual way, but without manure. I have counted five hundred perfect grains of oats upon a single head, the stem of which was eight feet high. They are usually worth from $1 25 to $1 50 per bushel.

Statement of William M. Macy, *of Quercus Grove, Linn county, Oregon.*

The plan of wheat-growing here is simple; the ground, if fallow, is ploughed up in August, which is the first rainy season, lasting through September. The second rainy season is in February, at which time it is pleasant. The ground being ploughed, the wheat is sown, and harrowed in, most frequently, with the cragged bough of a forest oak.

The crops are not infested, while growing, by insects, the stalks and blades being clean, and emit a pleasant smell, instead of rust. Of late years, the smut has injured the grain in parts of the valley, and some endeavors have been and are making to obviate the calamity. As to the

true cause, it baffles our wisdom. Some are soaking the seed in alkali, others in sulphate of copper. It is found that smutty grains, in company with those which were originally clean, will impregnate as far as the smut of those grains reach. This season wheat is worth $2 50 per bushel. The yield is from forty to sixty-fold.

Statement of H. A. Case, *of Troy, Bradford county, Pennsylvania.*

Soule's variety of wheat is the great favorite here, but many other kinds are sown. It is considered a much surer crop, though not producing so good flour, nor is it of so good a quality as the "white-flint," "red-chaff," or "blue-stem." It is generally raised on lands that have lain in clover, or have been fed with sheep, or used for the purposes of the dairy. The land is generally summer fallowed in June or July, cross-ploughed, and sown about the 1st of September, with from 1¼ to 2 bushels of seed to the acre. It is frequently rolled with plaster or lime, and then sown by hand. Very good crops have been raised here of late years on oat or corn-stubble, sowing about the 20th of September. The average yield on old land is about 15 bushels, and on new land 25 bushels, to the acre. The average price is about $1 per bushel. As yet, we have not been troubled with the weevil nor the Hessian fly to much extent. I think late sowing prevents their ravages.

Spring wheat is not much cultivated here. When sown in March or April, on good ground well prepared, with about 2½ bushels of seed to the acre, the yield is from 20 to 25 bushels to the acre. We use strong brine to take the foul seeds out of the wheat sown.

The average price for the last ten years is 87½ cents per bushel.

Statement of Isaac R. Evans, *of Harrisville, Butler county, Pennsylvania.*

Wheat is raised here as the most suitable crop, as well as the most valuable. The average product per acre is rather low, say about 12 bushels where well cultivated, on common fallow land; but 40 bushels to the acre were raised in this county in 1852 by several men whom I know. The time of seeding with us is from the 1st to the 20th of September. There is no preparation used for the seed except selecting good clean wheat of the Mediterranean or blue-stem variety, and sowing 1¼ to 1½ bushels to the acre. The yield is increasing under improved culture.

The market price of wheat this year may be set down at $1 10 to $1 15 per bushel, while in 1852 it was but 62½ cents.

Statement of H. N. McAllister, George Buchanan, James Alexander, J. K. Shoemaker, *and* William J. Waring, *being that portion of their report which relates to wheat on the "Oakwood Farm," near Bellefonte, to the Centre County Agricultural Society, Pennsylvania, as the result of their personal experience and observation.*

For wheat, our corn-fields are ploughed the following year sufficiently deep to throw up to the surface the manure and a portion of the pulverized subsoil. This is done either in May or June, before hay har-

vest, or in July and August, after grain harvest. When ploughed before harvest, we have to harrow and plough, and harrow again, before seeding. When not ploughed until after harvest, we plough but once, using the harrow and the two-horse cultivator to pulverize the ground and keep it clear of grass. When the season happens to be favorable for ploughing and vegetation immediately after harvest, the late ploughing is decidedly preferable, as the fresh earth, which is enriched by the manure turned under for the corn, is then thrown up and left upon the surface for the wheat crop, and the seeds of noxious weeds and grasses germinate, and are destroyed by the harrow and cultivator in mellowing the ground preparatory to seeding.

The grain drill is in very general use among our best farmers, and is supposed to have increased the general average of our wheat crop. One bushel and a half is generally sown by the drill to the acre, and is esteemed quite equal to 1¾ bushels sown broadcast. A large wooden roller immediately precedes the drill. When the ground is rough, it is thus pulverized. If very loose, it is rendered more compact, and the grain in both cases is deposited at a more uniform depth. Timothy seed is sown after the drill, and clover seed the following March. Farmers who raise oats, generally turn down the corn-stubble in the spring, and sow their wheat in the fall upon the oat stubble. When manure is so abundant as to allow a dressing for the oat-stubble prior to ploughing for wheat, this course may be pursued to advantage. Many farmers, however, reserve all the manure of the year for the oat-stubble, by which they probably lose as much in the corn crop as they gain in the oats, while they gradually impoverish their land.

Our best farmers average from 20 to 30 bushels of wheat to the acre. For the last three years, Oakwood has produced an average of 20 bushels, and we are informed that as high as 40 bushels have been produced on lots in other parts of the county, although the general average of our valley does not probably exceed 15 bushels.

The "white blue-stem" variety has for several years been generally cultivated and preferred. Last season, owing principally to the severe drought in June, it suffered considerably, in common with all other white wheats, from the ravages of the fly, while the Mediterranean almost wholly escaped. This circumstance induced many of our farmers last fall to sow more of the Mediterranean and less of the white blue-stem.

When the young clover is killed by the drought, or when for any reason there is a failure of clover and Timothy, the wheat-stubble is frequently turned under in August and sown in Mediterranean wheat or rye, in order to supply the loss of the clover crop as speedily as possible. If the land is in very good condition, and especially if a coating of manure can be afforded, Mediterranean wheat succeeds well; under other circumstances rye is preferred.

The cost of transporting by canal a bushel of wheat to Philadelphia, including storage, is about 20 cents. The market value of wheat, therefore, in Bellefonte, is about 20 cents less than in Philadelphia. All our surplus corn and other coarse grain find a ready market at home, to iron-masters and lumbermen, at prices almost equal to what they would command in the Atlantic cities.

Statement of H. J. Beyerle, *of Sugar Valley, Clinton county, Pennsylvania.*

Plaster is extensively used, chiefly on corn and clover crops. Barn-yard manure is used, as a matter of course; but being exposed all the year round to the rain and sunshine, and heaped frequently on sloping ground, so that the rains drain it of nearly every particle of its animal ingredients, and the sun exhausting it of every atom of its ammonia, it generally arrives on the land in such an impoverished condition that it is far from having the effect that well-preserved manure would have. Were it not for this waste of manure, and the effects of what I consider a bad system of rotation, this valley could compete with any other section of country in the production of wheat; yet, as badly as farming is carried on, we raise from 25 to 30 bushels to the acre, and this of the very finest quality. The "white blue-stem" is generally sown, from a bushel to a bushel and a half per acre.

The rotation most advantageously practised here is clover, corn, wheat, and clover. Many farmers, however, raise two crops of wheat in succession, or follow wheat by rye or oats. The Hessian fly had never prevailed here to much extent; last year it was more destructive than ever before; but the damage it has done was not to be compared with its ravages in surrounding valleys. We are not troubled with the weevil, smut, nor the curculio.

Statement of Peter Gross, *of Schnecksville, Lehigh county, Pennsylvania.*

Wheat is raised to considerable extent in our county, a large portion of our lands being well adapted to its culture. We use no guano, but depend mostly upon barn-yard manure and clover, which are our best fertilizers, though lime is employed with good results. We generally plough twice for this crop, and are beginning to use the "drill," as it prevents winter-killing, and is also a saving of seed, which it buries at a uniform depth. The variety of wheat sown is the "Mediterranean," which, in general, succeeds better than the other sorts, as it ripens early, and usually escapes the "rust." The only remedy against the Hessian fly is late sowing. The average yield is from 15 to 20 bushels to the acre.

Statement of H. D. Maize, *of New Berlin, Union county, Pennsylvania.*

The crop which can be raised to the best advantage in our section of country is wheat. Various modes of cultivating it are adopted, and all with success; perhaps the best is to fallow the land in June, and plough and cultivate it afterwards, so as to destroy all noxious grass and seeds; then drill in the seed about the 20th of September. The maximum yield is from 35 to 40 bushels to an acre; the average, about 20; and the smallest yield that will pay expenses, about 10 bushels to the acre. Clover is generally cultivated for the purpose of ploughing under as a manure.

Wheat is now worth in this region $1 40 per bushel.

Statement of JOHN EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

The best mode of raising wheat is, to break up a clover sod, 8 or 10 inches deep, about the 1st of September, harrow it until it becomes thoroughly pulverized, and drill in the seed from the 10th to the last of the same month; if white wheat, drill five pecks to the acre; if Mediterranean, six pecks. By this method we get at least five bushels to the acre more than by sowing broadcast. Greatest yield when drilled, 35 bushels per acre; average yield, 25 bushels. Cost of raising a bushel of wheat on good land, including manure, labor, and interest on land, 62 cents. Smallest yield that will pay expenses, when wheat is worth $1 per bushel, 15½ bushels to the acre.

The general mode of harvesting wheat is to cut with the cradle; two men follow each cradler, and rake and bind it up, and afterwards put it into shocks of ten or twelve sheaves each, leaving it on the field five or six days; it is then drawn to the barn, and threshed when convenient. Some few farmers cut their grain with reapers, which, on level or slightly rolling ground, do very well.

Statement of OSMAN DEWEY, *of Barre, Washington county, Vermont.*

Wheat is not raised with us on meadow or low land, on account of the weevil, but on high land, with an inclination to the north or west. It is a sure crop after corn, and will yield from 15 to 40 bushels per acre. It is worth from $1 to $1 50 per bushel; and 15 bushels will pay the expenses of an acre. We sow as early in April as the land will do to work. We usually plough in the fall, and sow in the spring; seeding it down at the same time with eight quarts of Timothy to an acre; or six quarts, with four to six pounds of clover to the acre.

Statement of DARIUS BLAKE, *of Woodstock, Windsor county, Vermont.*

Wheat-growing is not considered a very sure crop in this region. It is not only killed by the severity of our winters, but we cannot always get a good yield. Last year I moved off my corn from a field of three acres, ploughed and sowed upon it four bushels of blue-stem wheat, and on the 18th of September harrowed and rolled it well—washing and liming the wheat-seed before sowing. On the 25th of July last I harvested, and threshed in September, 90 bushels of good wheat, one acre of which produced 35 bushels. The product brought in market $1 50 per bushel.

Statement of CHARLES YANCY, *of Buckingham Court House, Virginia.*

This State is blessed with more than an average crop of wheat, and the quality good. The success in this region is attributed to the general use of guano, together with a favorable season, exempt from mildew and rust. Our farmers in choosing their seed-wheat are governed by two considerations, namely: early maturity and a strong bright straw; for, when early ripe, it is freer from the attacks of insects, and a strong straw is not so liable to lodge or fall. The Mediterranean variety has had its day from the impression that it was fly-proof from its early maturity, but has lost favor among our millers from its dark grain. It is also subject to fall when sown upon good land, and is otherwise objectionable from its beard, which renders its chaff unfit for the food of stock; and, like all bearded wheats, it is more liable to shatter and waste in hauling or handling. The "blue-stem," or more properly the "Polish wheat," is now in general favor among us. Spring wheat has been tried, but is not adapted to our climate.

The price of wheat here, the last few months, has varied from $1 to $1 55 per bushel.

Statement of RALEIGH W. DYER, *of Prillaman's, Franklin county, Virginia.*

This crop has not been very profitable for several years past; owing, as I think, to an exhausted soil, late sowing, and carelessness in putting it in. The time of sowing was formerly from the 1st of October to the 15th of December, on corn land, with little or no preparation. The average yearly yield for the last twelve or fifteen years has not been more than 10 bushels per acre, with a perceptible tendency downwards. This miserable state of affairs, I am happy to say, is beginning to surrender to the many improvements of the age, and our farmers are opening their eyes to their better interest. We are beginning to see the importance of deep ploughing, clean and sound grain for seed, and forward sowing. We now see that corn land is not suitable for wheat, and that clover or oat land is far preferable. This should be turned to the deph of 9 or 10 inches in August, while the stubble and other valuable growths are yet green, as their enriching properties are more valuable, and act upon the soil quicker in a green state than when dry. Wheat should invariably be sown in the month of September, which gives the young and tender roots time to strike so deep in the ground as to prevent their being killed by cold. One ploughing, if done in a manner to break the sod ground thoroughly, and turn all the stubble and other stuff completely under, is all-sufficient.

Before sowing, the seed should be well washed in water, (bluestone I believe to be entirely useless,) so as to deprive it of all small and unsound grains, and leave none to be sown but the pure and undefiled seed. The wheat should then, while partially wet, be rolled in strong lime or ashes, and sown while in this condition, after which it should be harrowed in. Every particle of land where the least dampness appears should be thoroughly drained with blind ditches. I believe this course, when regularly and uniformly pursued, will improve the land, produce more and better grain, and will eventually destroy both smut and rust. Our farmers differ as to the amount to be sown to an acre, but a majority of them agree that one bushel per acre, on upland, and one and a half on bottom land, is as near right as we can get. The yield is now on the increase. Average price at home, 75 cents; at market, about $1 12½.

The kinds of wheat in use are the English bearded, golden chaff, and white-flint. All others have been thrown in the shade. The first is thought to be the most sure crop, while the last two are believed to yield the

largest amount, and make the best flour. The only remedy I know for the weevil is early threshing and grinding. Time of harvest from the 20th of June to the 10th of July.

Statement of James Armstrong, *of Hartwood, Stafford county, Virginia.*

After the corn is removed from the land in the fall, the ground is ploughed as deep as can be done with two horses, say eight inches; then harrowed to prevent the wheat from coming up in rows. It is sown broadcast at the rate of a bushel or a little more to the acre, harrowed in, and yields about six bushels to the acre.

The varieties of wheat most esteemed here are the Poland and the blue-stem; the latter of which, I believe, is fast supplanting all others. Guano, which is generally used on a part of the land, is applied broadcast, 200 pounds to the acre, and usually doubles the crop.

Timothy and clover are sown separately on the same ground, or with the wheat, and are cut as hay or grazed for two years.

Statement of Gustavus de Neven, *of Fond du Lac, Fond du Lac county, Wisconsin.*

The timbered sections of our county uniformly produce good crops of winter wheat, the average yield being, probably, not less than 25 bushels to the acre. The "oak openings" also produce this amount in favorable seasons; but the crop on this description of land is much more precarious, the cold winds of winter and early spring frequently destroying the entire crop; and finally, repeated failures have caused its entire abandonment by the farmers of the prairie. And yet, I have known some good yields of winter grain on prairie soil; such generally followed the first breaking up of the land, and were protected by a good coating of snow during the winter.

My own observation has led me to believe that the evil of winter-killing is caused more by the high, cold winds sweeping over the unprotected surface of the ground, than by the frost or cold itself. The prevailing winds here blow from the west or northwest. I have repeatedly observed that in a field of badly winter-killed wheat, such plants as were left uninjured were invariably protected from the west wind, either by a stump, stone, root, or rough furrow which the drag had failed to level down. These plants had undoubtedly been exposed to the same degree of cold as those which were killed. Along the fences, on the west and north ends of the fields, also, it is very rare to see the grain as badly injured as in the other portions, generally a strip of 10 to 15 feet being comparatively uninjured.

This remark has led many of our farmers to the conclusion that good winter wheat might be raised on exposed lands if a covering could be provided that would shelter the plants from the injurious effects of the winter winds. Accordingly, they have tried the experiment of spreading straw over the crop, either immediately after it is put in, or at any time in the fall or early winter; and this process, so far as I have heard, has invariably been attended with success—the crop being, it is confidently asserted, increased by the additional moisture and softness imparted to the soil by the operation. I have no doubt but this method will be found valuable in all countries, which, like this, are exposed to intense cold winds, without a protecting coat of snow. During winter, we either have no snow, or seldom more than a few inches.

The usual time for sowing fall wheat is from the 20th of August to the 15th of September. By sowing thus early, the plant is found to stand the winter better than if sown later.

A valuable kind of winter wheat, called the "Soule," has been recently introduced here by the Hon. J. B. Macy, who raised the past season 910 bushels on twenty-eight acres, or 37½ bushels to the acre. It sold for $1 per bushel.

Spring wheat raising is uniformly successful over the whole county, the yield ranging from 16 to 35 bushels to the acre. The "Rio Grande" and "Canada Club" varieties are considered the most valuable, although large quantities of "Hedgerow" and "Black Sea" are still raised. The practice is to sow as early as possible, by which the risk of the plant rusting is greatly lessened.

Wheat, both spring and winter, has yielded largely this year, and has been secured in the best possible condition, the weather proving highly favorable. The average product, all over the county, was probably not less than 18 or 20 bushels to the acre. The price this fall has been, at Fond du Lac, from 62½ to 88 cents, which is at least 25 per cent. better than for many years past.

Statement of James Durley, *of Platteville, Grant county, Wisconsin.*

Last winter was unusually mild, and our winter wheat turned out about 20 bushels to the acre; spring wheat about the same. Fall or winter wheat is most successfully raised by sowing among Indian corn, as the dead stalks protect it from the winds in standing in the field during winter, when unprotected by snow. The great difficulty with us is to prevent it from winter-killing; if not winter-killed, it generally produces a good crop, say 20 bushels to the acre.

We have lately had a new variety of spring wheat introduced among us, which bids fair to supersede all others. It is called here "Park wheat." This year and last it produced a good crop, and entirely escaped all enemies, being ten days earlier than any other kind in the county. The grain, to all appearance, was equal to good fall wheat.

Statement of J. A. Carpenter, *of Waukesha, Waukesha county, Wisconsin.*

Wheat, formerly, was the staple crop here; but of late, less is sown. Farming is more mixed in its character, owing to a partial failure in the wheat crops, which brought in market only from 30 to 50 cents per bushel. Last season we were more successful in its growth, the yield being from 20 to 40 bushels to the acre, and the price from 80 cents to $1 10 per bushel.

RYE.

It is not known with certainty to what country rye owes its origin. It was supposed that it had been found wild upon the Caspian Caucasian desert; but more recent observations have shown that this wild plant is different from the cultivated varieties, particularly in leaving the central stem of the ear so brittle that it cannot be threshed. A wild rye is also found in Sicily; but this, too, has characteristics by which it differs from the cultivated kind. Yet we do not know with certainty whether the parent of this plant has totally vanished, or has become so altered by cultivation in the course of time, that we cannot recognise it in the species to which it actually does owe its origin. It has been cultivated in the north of Europe and Asia from time immemorial, where it constitutes an important article of human subsistence, being generally mixed with the flour of barley and wheat. Its introduction into Western Europe is of comparatively recent date, as no mention is made of it in the "Ortus Sanitatis" of Joan. di Cuba, published at Augsburg in 1485, which treats at length of barley, millet, oats, and wheat.

Rye was cultivated in most of the North American colonies soon after their settlements by Europeans. Gorges speaks of it as growing in Nova Scotia in 1622. It was introduced into New Netherland prior to 1626, as it is mentioned among the products sent to Holland from the little colony on Manhattan island that year.

Rye was also introduced into the colony on Massachusetts bay as early as the year 1629. Good crops of this grain, as well as of barley and oats, were raised in Lynn in 1633. Plantagenet enumerates it among the productions of North Virginia (New England) in 1648, and alludes to the mixing of its flour with that of maize in the making of bread. It was also cultivated in South Virginia by Sir William Berkeley previous to that year.

The price of rye in New Amsterdam, in 1637, was 2½ florins per skepel (80 cents per bushel.)

This grain has never entered largely into our foreign commerce, as the home consumption, for a long period, has kept pace with the supply. The amount of rye-flour exported from Philadelphia in 1796, was 50,614 barrels; from the United States in 1801, 392,276 bushels; the amount of rye in 1812, 82,705 bushels; in 1813, 140,136 bushels.

The amount of rye-meal of domestic growth and manufacture, exclusive of the rye unground, with its valuation, exported from the United States for the last thirty-three years, is shown in the following table:

Years.	Rye meal.	Valuation.	Years.	Rye meal.	Valuation.	Years.	Rye meal.	Valuat'n.
	Barrels.	Dollars.		Barrels.	Dollars.		Barrels.	Dollars.
1820–21	23,523	55,226	1831–32	17,254	75,392	1842–43	21,770	65,631
1821–22	19,971	75,736	1832–33	36,038	140,017	1843–44	32,690	104,391
1822–23	25,665	91,957	1833–34	39,151	140,306	1844–45	35,371	112,908
1823–24	31,679	85,651	1834–35	30,854	129,140	1845–46	38,530	138,110
1824–25	29,545	73,245	1835–36	36,646	173,976	1846–47	48,892	225,402
1825–26	14,472	49,297	1836–37	28,323	165,457	1847–48	41,584	174,366
1826–27	13,345	47,698	1837–38	22,864	110,792	1848–49	64,830	216,948
1827–28	22,214	59,036	1838–39	29,458	145,448	1849–50	69,903	216,076
1828–29	34,191	127,004	1839–40	53,216	170,931	1850–51	44,152	145,802
1829–30	26,298	87,796	1840–41	44,031	136,505	1851–52	18,524	64,476
1830–31	19,100	71,881	1841–42	34,190	124,396	1852–53	8,910	34,186

According to the census returns of 1840, the product of the United States was 18,645,567 bushels; of 1850, 14,188,813 bushels; showing a decrease of 4,456,744 bushels. During the year ending June 1, 1850, there were consumed, of rye, about 2,144,000 bushels in the manufacture of malt and spirituous liquors. The amount of rye cultivated in the United States in 1853 may be estimated at 14,000,000 bushels, which, at 90 cents per bushel, would be worth $12,600,000. The diminution of this crop for the last twelve or fifteen years may be attributed in the main to a corresponding decline in the demand for the purposes of distillation, to which a large portion of this grain had annually been applied.

CONDENSED CORRESPONDENCE.

Statement of JOSEPH CORNISH, *of East Granby, Hartford county, Connecticut.*

Rye is raised to a considerable extent in this county, instead of wheat. When sown on a sandy soil, it is almost as white, as good, and a much more certain crop. Guano has been used in its production, and in some instances with great success.

Statement of EDWIN WINSHIP, *of Winship's Mills, Clinton county, Indiana.*

Rye is not extensively cultivated with us; but to those engaged in sheep husbandry, its importance is not duly appreciated. It should be sown the last of August, or early in September; or, if sown among growing corn, it should be done immediately after ploughing the last time. If grown for pasture, sow 1½ bushels to the acre; then early in the spring the weak of the flock may obtain an abundance of succulent food at the very time it is so greatly needed, and cannot be obtained anywhere else. This timely precaution by sheep owners would save, generally, thousands of valuable animals every year.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

Large quantities of rye are cultivated in this county, for the Baltimore market, where it is mostly distilled. It is one of the most profitable crops we raise. Thirty bushels to the acre we consider a fair yield.

Statement of OSMAN DEWEY, *of Barre, Washington county, Vermont.*

Rye does best on dry land, and is usually sown after corn or potatoes. The usual time of sowing is the last of September or the 1st of October, so as to have it get well-rooted in the fall. But it does well sown just as winter sets in, so as not to sprout before the ground is covered

with snow. If sown after corn or potatoes, on dry rolling land, it will sometimes yield 40 or 50 bushels per acre; but 15 bushels is an average. It is worth from 75 cents to $1 per bushel. At an average yield it would hardly pay the expenses, if it were not for the certainty of getting a good stock.

For rotation of crops, we commonly break up green sward and plant with corn or potatoes; follow with wheat, oats, or rye; seed down and mow from five to eight years, getting from one to three tons of hay per acre. When it yields only one ton per acre, it is ploughed and manured, and kept at corn, wheat, or oats, two or three years, and then seeded down again to grass.

Statement of Raleigh W. Dyer, *of Prillaman's, Franklin county, Virginia.*

This grain was formerly cultivated to a great extent, but is now almost abandoned; the cause of which I do not understand, for there can be no doubt of its great value even as food for stock, and the straw could be made one of our best renovators.

BARLEY.

It is a remarkable fact that we are still in uncertainty whether barley grows wild in the Old World; and if so, in what region this occurs. Even the authors of antiquity were at variance as to whence barley, as well as wheat, the grains chiefly used at that time, had been derived. It has been cultivated in Syria and Egypt for more than three thousand years, and it was not until after the Romans adopted the use of wheat bread that they fed this grain to their stock, as is practised by the Spaniards and Italians at the present day. It is evidently a native of a warm climate, as it is known to be the most productive in a mild season; still its flexibility is so remarkable, that it will grow on the Himalayas at an elevation of from 10,000 to 13,000 feet above the level of the sea, and mature in favorable seasons and situations on the Eastern Continent as far north as 72°.

The introduction of barley into the North American colonies may be traced back to the periods of their settlements. It was sown by Gosnold, together with other English grains, on Martha's Vineyard and the Elizabeth Islands, in 1602, and by the colonists of the "London Company," in Virginia, in 1611. By the year 1648, it was raised in abundance in that colony; but soon after, its culture was suffered to decline in consequence of the more profitable and increased production of tobacco.

Barley appears to have been cultivated in New Netherland as early as the year 1626, as samples of the harvest of that year, raised by the colonists of Manhattan island, were sent to Holland, with other grains, as an evidence of their prosperous condition.

According to the records of the "Governor and Company of the Massachusetts Bay in New England," barley was introduced into that colony in 1629. In 1633, good crops were raised in Lynn.

In 1796, the chief agricultural product of the isle of Rhode Island was barley, considerable quantities of which were raised.

Barley has never been much cultivated in the United States, nor has it entered extensively into our foreign commerce, as we have been consumers rather than producers of this grain. It has been chiefly employed for malting and distillation, and also in considerable quantities as a substitute for sago or rice, after being hulled.

According to the census returns of 1840, the amount of barley raised in the United States, the year preceding, was 4,161,504 bushels; of 1850, 5,167,015 bushels; showing an increase of 1,005,511 bushels. The amount of the barley crop of the United States in 1853, may be estimated at 6,500,000 bushels; which, at 75 cents per bushel, would be worth $4,875,000.

CONDENSED CORRESPONDENCE.

Statement of John Spiny, *of Connersville, Fayette county, Indiana.*

Barley bids fair to become an important crop with us. It is sown the last of August, or early in September, among the standing corn, from 1 to 1½ bushels to the acre, ploughed in with a light plough or cultivator. Some farmers, when the corn will admit, plough it in one way, and cross with the cultivator. The yield is from 40 to 50 bushels to the acre.

The green grain offers an excellent pasture during winter, especially for colts and calves, as they injure the ground less by tramping than old stock. It is better to manage the feeding so that they will not be on the lands after the winter frosts are out of the ground.

Barley ripens with us the last of June, when it is cut and stacked, or, what is better, housed, and afterwards threshed. The straw is saved for winter feeding to cattle, and answers well for horses when cut and fed with the grain crushed into coarse meal. Barley is also valuable for hogs when ground and made into swill, and fed during the first stage of fermentation; or the grain may be soaked in water until it is fully swollen, and then fed to them.

Statement of Daniel Fulton, *of Bowdoinham, Lincoln county, Maine.*

For many years barley with us was nearly destroyed by insects; but, for the last four years we have raised fair crops. Average yield, 20 bushels; price, 70 cents. It is used principally to feed hogs and poultry.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

Barley is pretty extensively grown here. To produce a good crop of barley, the land should be rich, mellow, early, and warm—such as will not suffer from drought. It should be such land as will bring large straw; for if the straw is only large, there seems to be no danger about its fillings. In this respect it is materially different from wheat, which often produces large straw without being at all well filled.

The expenses of raising barley, per acre, is as follows:

Ploughing once	$1 38
Harrowing twice	76
Seed, 2½ bushels, at 60 cents per bushel	1 50
Sowing	13
Harvesting and stacking	1 50
Threshing 20 bushels, at 6 cents per bushel	1 20
Conveyance to market, 3 cents	60
Total	7 07

The above sum divided by 20, which is the average number of bushels raised per acre, and we have 35 cents as the expense of raising a bushel.

Statement of JOHN W. FITCH, *of Troy, Rensselaer county, New York.*

Barley is not cultivated to much extent in this county, although some of our farmers raise it. It requires good land and much care. Twenty-five bushels per acre is above the average yield.

Statement of JOHN B. YOUNG *and* JAMES DE MOTT, *of Ovid, Seneca county, New York.*

Barley is cultivated here to some extent, but is not considered so sure a crop as oats, and requires a better chance to succeed well. Average yield, 21 bushels per acre; but sometimes produces a much higher amount. Cost of production, about the same as oats. In these estimates we say nothing about the expense of manuring, considering the straw an equivalent.

OATS.

The oat, when considered in connexion with the artificial grasses, and the nourishment and improvement it affords to live stock, may be regarded as one of the most important crops we produce. Its history is highly interesting, from the circumstance, that while in many portions of Europe, when ground into meal, it forms an important aliment for man, one variety, at least, has been cultivated from the days of Pliny on account of its superior fitness as an article of diet for the sick. The country of its origin is veiled in the same uncertainty as that of barley

or rye, though the most common variety is said to be indigenous to the isle of Juan Fernandez, while another sort, resembling it, is found growing wild in California. But, as these are met with in places which have been cultivated at former periods, it is probable that they are only outcasts, and not wild aborigines.

This plant was introduced into the North American colonies soon after their settlements by Europeans. It was sown by Gosnold, on the Elizabeth Islands, in 1602; cultivated in Newfoundland, in 1622, and introduced by the colonists on Massachusetts bay in 1629. In 1633, good crops of oats were raised in Lynn. It would appear that they were not much cultivated previous to that time, as four hogsheads of oat-meal came to Nantasket, from England, in 1631.

This grain was introduced into New Netherland prior to 1626, as there arrived in Holland, from the little colony on Manhattan island, samples of the recent harvest, consisting of oats and other grains, as an evidence of their prosperous condition.

Although the oat was cultivated in Virginia previous to the year 1648, it has never been very extensively raised there even to the present time.

The oat, like barley, has never much entered into our foreign commerce, as the domestic consumption has always been nearly equal to the quantity produced. The annual average exports, for several years preceding 1817, were 70,000 bushels.

By the census returns of 1840, it will be seen that the total produce of oats in the United States was 123,071,341 bushels; of 1850, 146,584,179 bushels; showing an increase of 23,512,838 bushels. The amount raised in 1853, may be estimated at 160,000,000 bushels; which, at 37½ cents, would be worth $60,000,000.

CONDENSED CORRESPONDENCE.

Statement of WILLIAM P. PHELPS, *of Elmwood, Peoria county, Illinois.*

Oats are produced by ploughing once, as for corn, and harrowing or brushing in the seed, at a cost of $1 25 per acre, and are harvested generally with a reaper, at nearly the same cost. The yield is from 30 to 60 bushels to the acre.

Statement of JOHN M. LESLEY, *of Dansville, Vermilion county, Illinois.*

Oats are not very extensively cultivated here. They yield a tolerably good crop, averaging 25 or 30 bushels to the acre. The seeding and harvesting are very similar to those of wheat. They are usually harvested about the 1st of July, and command a price of from 20 to 30 cents per bushel.

Statement of ADMIRAL B. MILLER *and* JOSEPH BROBST, *of Knoxville, Marion county, Iowa.*

Oats grow remarkably well in this county; much better, we think, from our experience, than in any other part of the State. The amount of seed sown to an acre is from two to three bushels. Average yield, 50 bushels.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Oats are a tolerably sure crop with us, and yield from 35 to 40 bushels to the acre. A large amount is raised and consumed at home, as feed for stock. The unthreshed sheaves are cut fine by horse-power machinery, and mixed with meal, shorts, &c., before feeding.

Barley is raised by only few farmers in this vicinity, but those who do raise it say it yields largely and pays well.

Statement of DANIEL FULTON, *of Bowdoinham, Lincoln county, Maine.*

Oats sown early yield a fair crop; but they are considered an exhausting one. Average yield, 25 bushels; price, 45 cents.

Statement of WILLIAM BACON, *of Richmond, Berkshire county, Massachusetts.*

Oats with many farmers are a profitable crop; and if a man wishes soon to turn the strength of his farm into cash, he can take no more effectual way to accomplish it than by continued ploughings and raising this grain without manure. It is an exhausting crop, but one that is quick in market. When sown after corn it probably gives in many instances 70 bushels to the acre, though the average of all lands, and every species of cultivation, will not exceed 35 bushels. The present home price is 50 cents a bushel.

Statement of GROVE SPENCER, *of Ypsilanti, Washtenaw county, Michigan.*

Oats with us are not considered a very productive crop. I have for several seasons raised them upon well manured corn-ground, and when they were harvested I turned over the stubble, and sowed the same ground to wheat. In these cases I have got a very light growth of straw, while the heads of wheat have been very heavy, long, and full. In connexion with this, I may add that my experiments have convinced me that plaster is very useful upon a wheat crop immediately succeeding oats. I have tried plaster often on corn, and the effect uniformly has been to hasten and enlarge the growth of the stalks, but not to benefit the corn. Thus in the growth of clover, where the main crop is stalks and leaves, plaster is the best fertilizer that is known.

Statement of J. D. YERKES, *of Northville, Wayne county, Michigan.*

Oats are less cultivated here than formerly. Owing to the drought, the yield per acre the past season has not averaged over 16 bushels.

Statement of W. M. JACKSON, *of Fayette, Howard county, Missouri.*

Oats with us are a very certain crop. Average yield, from 30 to 40 bushels to the acre. We sow two bushels to the acre as soon in the spring as the ground can be ploughed, which is generally in March.

Statement of ARMSTRONG O'HARA, *of Saint François county, Missouri.*

Oats here are raised for home consumption, and yield 20 bushels to the acre. Cost of raising, 15 cents per bushel. Market value, 25 cents per bushel.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

Oats are extensively cultivated with us, although there is an opinion among farmers that they are an exhausting crop. They are generally sown upon the poorest and most exhausted lands upon the farm; and if after raising a crop of oats, the land is further exhausted, it should prejudice no one against a reasonable plan of raising them. Although they will produce a fair yield upon an indifferent soil, no crop will pay better for manure and good culture. Upon a first-rate soil, in a good condition, they sometimes turn over 100 bushels per acre. Land that we intend for barley or oats should be ploughed in the fall, so as to be ready for sowing as soon as the frost leaves it in the spring. Barley and oats, to produce a good crop, should get a good start before the weather becomes dry and hot.

The following is an estimate of the expense of raising an acre of oats:

Ploughing once	$1 38
Harrowing twice	76
Seed, 2½ bushels, at 40 cents per bushel	1 00
Sowing	13
Harvesting and housing	1 50
Threshing 40 bushels, at 6 cents per bushel	2 40
Conveyance to market	80
Total	7 97

Forty bushels of oats is an average crop; therefore, $7 97 divided by 40 gives 19 cents, which is the expense of raising per bushel.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

Oats are raised by almost every farmer, and are in general use as food for horses. Forty bushels per acre is a fair yield, though as many as 80, and often 100 bushels, have been raised.

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Statement of John B. Young *and* James De Mott, *of Ovid, Seneca county, New York.*

The cost of raising a crop of oats, which is generally put in on corn stubble, is estimated per acre, on that supposition, as follows:

Ploughing	$1 00
Seed, 2½ bushels, at 38 cents per bushel	95
Harrowing in seed	40
Harvesting and housing	1 00
Threshing 38 bushels, at 6 cents	2 28
Interest on land, at $50 per acre	3 50
	9 13
Product per acre, 38 bushels of oats, at 38 cents	$14 44
Cost of production as above	9 13
Profit per acre	5 31

Thirty-eight bushels of oats is the estimated average yield in this county, for all sown. Corn-stubble we consider the best land, and the product much larger, say 45 bushels; in some instances, about 80 bushels per acre may be raised under favorable circumstances. This crop is usually cut and allowed to lie in swath some time, to cure, before raking and binding; then "stouted," the same as wheat.

Statement of John Hurlbut, *of Arkport, Steuben county, New York.*

The raising of oats is a money-making business at present, (price 40 cents a bushel,) but no husbandman who has a deed of his farm should think of sowing more than enough for his own use. I am satisfied, from careful observation, that they are the most exhausting to the soil of any crop we raise, with the exception, perhaps, of flax. As proof of this, I would state that a field of oats from which, in 1852, we harvested 80 bushels per acre, twelve years since, could not produce 15 bushels per acre. It was then "worked on shares," and had been cropped with oats for several years in succession. Since then it has been reclaimed by clover, and has not been troubled with oats.

Statement of William M. Macy, *of Quercus Grove, Linn county, Oregon.*

Oats do well here, yielding from 35 to 50 bushels to the acre. The best time, I think, for sowing, is in February. They are worth as much per bushel as wheat, owing to their scarcity.

Statement of N. Linton, *of Cochransville, Chester county, Pennsylvania.*

Oats are sown here on ground on which corn grew the previous year, at the rate of three bushels to the acre, as early in the spring as the ground can be got in good order. The yield is from 30 to 60 bushels to the acre, and sells in the neighborhood for 44 cents for 32 pounds.

Statement of John Eichar, *of Greensburg, Westmoreland county, Pennsylvania.*

A large quantity of oats are raised in this county. The greatest yield is 75 bushels to the acre; average yield, 50 bushels; cost of production, 19⅓ cents; present market value, 37½ cents per bushel; smallest yield that will pay expenses, 24½ bushels.

Statement of Joseph Bowditch, *of Fairfield, Franklin county, Vermont.*

This crop is considered as exhausting to the soil. It is necessarily raised, to some extent, usually upon sward land, to be succeeded by corn or potatoes, and followed by wheat, with herdsgrass, (Timothy,) and clover. We sometimes sow oats with grass-seed, for the third crop. We usually sow three bushels per acre. Average yield upon sward land, 35 bushels; when they succeed corn or potatoes, 60 bushels per acre. It generally costs 34 cents per bushel to raise them. They are worth 37 cents.

Statement of Osman Dewey, *of Barre, Washington county, Vermont.*

Oats are raised to a considerable extent here, because they are a sure crop, and are always in demand as feed for horses. They do best on rich land, but are often cultivated on green sward, without manure, where they will yield from 30 to 50 bushels per acre; but sowed after corn, on rich land, they will yield from 50 to 80 bushels. They are worth from 30 to 42 cents per bushel, and 30 bushels to the acre will pay for raising them.

Statement of Raleigh W. Dyer, *of Prillaman's, Franklin county, Virginia.*

This grain is our greatest crop, and without it our farmers could not remain in their present condition. The notion that oats are injurious to the soil is wrong; they are not, unless they are made so by bad management. Land that has produced a crop should not be pastured; but the stubble and large weeds which follow, should be turned under at least 10 inches in August. Oats, by these means, can be made a valuable renovator for a crop of wheat or rye. Our time of seeding is in the month of March. We sow from one to one and a half bushels per acre. The yield is from 15 to 40 bushels, according to the land and the season. They are worth in market from 30 to 40 cents, and at home from 15 to 25 cents per bushel.

Statement of Gustavus De Neven, *of Fond du Lac, Fond du Lac county, Wisconsin.*

Oats are extensively raised. The average product is probably not far from 40 bushels to the acre. Some crops have yielded as high as 80 bushels. Our soil and climate are well adapted to this product Price from 20 to 22 cents per bushel.

BUCKWHEAT.

Buckwheat is believed to be a native of Central Asia, as it is supposed to have been first brought to Europe in the early part of the twelfth century, at the time of the crusades for the recovery of Syria from the dominion of the Saracens; while others contend that it was introduced into Spain by the Moors, four hundred years before.

This grain appears not to have been much cultivated in this country prior to the last century, except by the Dutch, on the Hudson, and the Swedes, on the Delaware. Samples of American growth were sent to Holland by the colonists of Manhattan island, together with those of other grains, as early as 1626. Previous to the year 1750, it was extensively cultivated by the Dutch of New York for "supporn," and for provender for horses. Holm, in his "History of New Swedeland," (Pennsylvania and Delaware,) mentions it among the productions of that province; and Kalm, the Swedish naturalist, who visited this country in 1748–49, speaks of it as growing in Pennsylvania, New Jersey, and New York.

This product, heretofore, has never entered very extensively into our foreign commerce, although considerable quantities of the flour and grain are annually shipped.

According to the census of 1840, the quantity of buckwheat raised in the United States was 7,291,743 bushels; of 1850, 8,956,912 bushels; showing an increase of 1,665,169 bushels. The amount raised in the year 1853 may be estimated at 10,000,000 bushels; which, at 40 cents, would amount to $4,000,000.

CONDENSED CORRESPONDENCE.

Statement of WILLIAM BACON, *of Richmond, Berkshire county, Massachusetts.*

Buckwheat, of late years, has become a popular crop. It first came into notoriety through its effects in subduing weedy and waste lands; but from the demand for it in market, it is now admitted to all soils, and found to feel the effects of a fertile one like other plants. Average yield 25 bushels per acre, worth $1 25 per 100 pounds.

RICE.

Rice, the chief food, perhaps, of one-third of the human race, possesses advantages over wheat, maize, and other grains, of preserving plenty during the fluctuations of trade, caused by war, famine, or short crops, and is also susceptible of cultivation on land too low and moist for the production of most other useful plants. Like several

other bread-plants in common use, it is never found wild,* nor is its native country known, unless we except the statement of the Danish missionary, Klein, that he found it growing spontaneously in India, which is doubted by some. Linnæus considered it as a native of Ethiopia, while others regard it of Asiatic origin.

Rice was first introduced into Virginia by Sir William Berkeley, in 1647, who received half a bushel of seed, from which he raised 16 bushels of an excellent quality, most or all of which was sown the following year.

This grain is stated to have been first brought into Charleston, South Carolina, by a Dutch brig from Madagascar, in 1694, the captain of which left about a peck of paddy (rice in the husk) with Governor Thomas Smith, who distributed it among his friends for cultivation. Another account of its introduction into Carolina is, that Ashby was encouraged to send a bag containing 100 pounds of seed-rice to that province, from the crops of which 60 tons were shipped to England in 1698; while Darymaple maintains that rice in Carolina is the result of a small bag of paddy sent as a present from Dubois, treasurer of the "East India Company," to a Charleston trader. Upland or mountain rice was introduced into Charleston, from Canton, by John Bradby Blake, in 1772.

The culture of rice was introduced into Louisiana, by the "Company of the West," in 1718.

The amount of rice exported from Charleston, South Carolina, in 1724, was 18,000 barrels; in 1731, 41,957 barrels; in 1740, 90,110 barrels; in 1747–48, 55,000 barrels; in 1754, 104,682 barrels; in 1760–61, 100,000 barrels. From Savannah, in 1755, 2,299 barrels, besides 237 bushels of rough rice; in 1760, 3,283 barrels, and 208 bushels of rough rice; in 1770, 22,120 barrels, besides 7,064 bushels of rough rice. From Philadelphia, in 1771, 258,375 pounds.

The amount of rice exported from this country in 1770, was 150,529 barrels; in 1791, 96,980 tierces of 600 pounds each; in 1800, 112,056 tierces; in 1810, 131,341 tierces.

The following table shows the quantity of domestic rice, and its valuation, exported from the United States for the last thirty-three years:

Years.	Rice.	Value.	Years.	Rice.	Value.	Years.	Rice.	Value.
	Tierces.	Dollars.		Tierces.	Dollars.		Tierces.	Dollars.
1820–21.....	88,221	1,494,307	1831–32....	120,327	2,152,631	1842–43....	106,766	1,625,726
1821–22.....	87,089	1,553,482	1832–33....	144,163	2,744,418	1843–44....	134,715	2,182,468
1822–23.....	101,365	1,820,985	1833–34....	121,886	2,122,272	1844–45....	118,621	2,160,456
1823–24.....	113,229	1,882,982	1834–35....	110,851	2,210,331	1845–46....	124,007	2,564,991
1824–25.....	97,015	1,925,245	1835–36....	212,983	2,548,750	1846–47....	144,427	3,605,896
1825–26.....	111,063	1,917,445	1836–37....	106,084	2,309,279	1847–48....	100,403	2,331,824
1826–27.....	133,518	2,343,908	1837–38....	71,048	1,721,819	1848–49....	128,861	2,569,362
1827–28.....	175,019	2,620,696	1838–39....	93,320	2,460,198	1849–50....	127,069	2,631,557
1828–29.....	171,636	2,514,370	1839–40....	101,660	1,942,076	1850–51....	105,590	2,170,927
1829–30.....	130,697	1,986,824	1840–41....	101,617	2,010,107	1851–52....	119,733	241,680
1830–31.....	116,517	2,016,267	1841–42....	114,617	1,907,387	1852–53....	67,707	1,657,658

*It is to be understood that the wild rice, or water-oat, (*Zizania aquatica,*) which grows along the muddy shores of our tidal and inland waters, is a distinct plant from the common rice, and should not be confounded with it

According to the census of 1840, the rice crop of the United States amounted to 80,841,422 pounds; of 1850, 215,313,497 pounds; showing an increase of 134,472,075 pounds. The amount of rice cultivated in the Union in 1853, may be estimated at 250,000,000 pounds; which, at $3\frac{1}{2}$ cents, would be worth $8,750,000.

CONDENSED CORRESPONDENCE.

Statement of ROBERT F. W. ALLSTON, *of Chicora Wood, near Georgetown, Georgetown district, South Carolina.*

The quantity of rice produced in the year 1852–53, and exported from the plantations, amounted to 140,730 tierces. The following statement, for which I am indebted to a commercial house in Charleston, will indicate the manner in which it was disposed of or consumed:

Receipts and exports of rice at the port of Charleston from August 31, 1852, *to August* 31, 1853.

Received, in barrels		140,894
Less stock of 1852, September 1		164
Barrels on hand		140,730
	Barrels.	
Exported to Great Britain	11,293	
Exported to France	4,515	
Exported to North of Europe	6,703	
Exported to West Indies	16,237	
Total foreign		38,748
Shipped to Northern ports	70,311	
Shipped to Southern ports	17,683	
Total coastwise		87,994
City consumption		12,500
Burned		190
		139,432
Stock on hand September 1, 1853		1,462
Total crop and stock, in barrels		140,894

Of the above, there were exported in the rough (paddy)—

	Barrels rough.	Barrels clean.
To Great Britain	115,446	5,497
To France	11,642	554
To North of Europe	122,488	5,833
Total foreign	249,576	11,884

Coastwise North	114,276	5,441
Grand total	363,852	17,325

The exports in the rough are always estimated at 21 bushels to the barrel of clean rice, and included in the latter.

	Barrels.	
Great Britain, therefore, took in clean rice	5,796	
Do. do. in rough rice	5,497	
		11,293
Or nearly 50 per cent. in paddy.		
France took in clean rice	3,961	
Do. in rough rice	554	
		4,515
Or above $12\frac{1}{2}$ per cent. in paddy.		
North of Europe took in clean rice	870	
Do. do. in rough rice	5,833	
		6,703
Or about 87 per cent. in paddy.		
Total foreign exports, in barrels		22,511
Taken coastwise in clean rice	82,553	
Do in rough rice	5,441	
Or about $6\frac{1}{4}$ per cent in paddy.		
Total coastwise in barrels		87,994

Taking all things into account, I am inclined to estimate the crop as exceeding that of last year about 5,000 tierces. The market value will be much greater in comparison, not only because prices range higher this year, but also, and chiefly, because there is in the present crop more of strictly prime rice.

Meteorological observations at Waccamaw for the year 1853.

THERMOMETER.

Maximum.	Minimum.	Range.	Mean Temp.
May 7, August 7, 88°	January 28, 29, 25°	63°	62°.77

BAROMETER.

Maximum.	Minimum.	Range.	Mean Altitude.
January 28, 30.58	Januar[illegible] 24, 29.24	1.34	30.08

Rain on 93 days—43.5 inches.
The greatest quantity of rain fell in September—8.49 inches.
The least quantity of rain fell in April—4.4 inches.
Dew nights—257.

On the 19th of August, a destructive hail-storm, about five miles in width, passed across the tide-lands of this district, along the Waccamaw and Pee Dee, prostrating in its pelting course, and injuring more or less seriously, some three thousand six hundred acres of very promising rice. Then followed two freshets in the Pee Dee, which in the more northern parts of the same district overflowed, and injured several large tracts of rice in various stages of maturity, the harvesting of which was delayed some fifty days. By adding to this the trying incidents of high tides, which were succeeded by frequent rains, one may readily understand the waste that must have ensued by "mow-burning" the rice, and other damages sustained in curing.

POTATOES.

The common or Irish potato, so extensively cultivated throughout most of the temperate countries of the civilized globe, contributing as it does to the necessities of a large portion of the human race, as well as to the nourishment and fattening of stock, is regarded as but of little less importance in our national economy than wheat, rice, or maize. It has been found in an indigenous state in Chili, on the mountains near Valparaiso, and Mendoza; also near Montevideo, Lima, Quito, as well as in Santa Fé de Bogotá, and more recently in Mexico, on the flanks of the Orizaba; but some of these, if cultivated, doubtless would prove to belong to other species than that of the common potato, of the numerous genus to which it belongs.

The history of this plant, in connexion with that of the sweet potato, is involved in obscurity, as the accounts of their introduction into Europe are somewhat conflicting, and often they appear to be confounded with one another. The common kind was doubtless introduced into Spain in the early part of the sixteenth century, from the neighborhood of Quito, where, as well as in all Spanish countries, the tubers are known as *papas*. The first published account of it we find on record is in La Cronica del Peru, by Pedro de Cieça, printed at Seville in 1553, in which it is described and illustrated by an engraving. From Spain it appears to have found its way into Italy, where it assumed the same name as the truffle. It was received by Clusius, at Vienna, in 1598, in whose time it spread rapidly in the South of Europe, and even into Germany. To England it is said to have found its way by a different route, having been brought from Virginia by Raleigh's colonists, in 1586, which would seem improbable, as it was unknown in North America at that time, either wild or cultivated; and, besides, Gough, in his edition of Camden's Brittania, says it was first planted by Sir Walter Raleigh on his estate at Youghall, near Cork, and that it was cultivated in Ireland before its value was known in England. Gerard, in his Herbal, published in 1597, gives a figure of this plant, under the name of *Batata Virginiana*, to distinguish it from the sweet potato, *Batata Edulis*, and recommends the roots to be eaten as a "delicate dish," but not as a common food. "The sweet potato," says sir Joseph Banks, "was used in England as a delicacy long before the introduction of our potatoes; it was imported in considerable quantities from Spain and the Canaries, and was supposed to possess the power of restoring decayed vigor." It is related that the common potato was accidentally introduced into England from Ireland at a period somewhat earlier than that noticed by Gerard, in consequence of the wrecking of a vessel on the coast of Lancashire, which had a quantity on board. In 1663, the Royal Society of England took measures for encouraging the cultivation of this vegetable, with the view of preventing famine. Notwithstanding its utility as a food became better known, no high character was attached to it; and the writers on gardening, towards the end of the seventeenth century, a hundred years or more after its introduction, treated it rather indifferently. "They are much used in Ireland and America as bread," says one author, "and may be propagated with advantage to poor people." The famous nurserymen, London and Wise, did not consider it worthy of notice in their Complete Gardener, published in 1719. But its use gradually spread as its excellencies became better understood. It was near the middle of the last century before it was generally known either in Britain or North America, since which it has been most extensively cultivated.

The period of the introduction of the common potato into the British North American colonies is not precisely known. It is mentioned among the products of Carolina and Virginia in 1749, and among those growing in New York and New England the same year. They were much cultivated in the latter in 1750, where they produced well and were of good use. The varieties at that time were the "rough-coats," "red-coats," and the "flat whites." The red-coats were considered the best. In 1770, are mentioned the "reddish," the "bluish," the "white," and the "French" potatoes; the latter of which were flattened in their shape, and of a good flavor.

The famous "Mercer" or "Meshanock" potato of the present day originated on Meshanock creek, by Joseph Gilkey, of Mercer county, Pennsylvania, in about the year 1812.

The sweet potato *(Batatas edulis)* is indigenous to the East Indies and inter-tropical America, and was the "potato" of the old English writers in the early part of the fourteenth century. It was, doubtless, introduced into Carolina, Georgia, and Virginia, soon after their settlements by Europeans, being mentioned as one of the cultivated products of those colonies as early as the year 1648.

Among numerous other products ordered to be imported by the "Governor and Company of the Massachusetts Bay in New England," in 1629, was the potato. Sweet or Spanish potatoes were introduced into New England in 1764, and proved to be more prolific than the common sort, and were brought into general use.

The amount of potatoes exported from South Carolina in 1747–48, was 700 bushels; from Philadelphia in 1796, 9,004 bushels.

The quantity and valuation of potatoes exported from the United

States within the last thirty-three years are indicated in the following table:

Years.	Potatoes.	Value.	Years.	Potatoes.	Value.
	Bushels.	*Dollars.*		*Bushels.*	*Dollars.*
1820-21	90,889	30,500	1837-38	118,627	56,898
1821-22	129,814	45,758	1838-39	96,569	57,536
1822-23	104,187	37,241	1839-40	123,549	54,524
1823-24	131,194	44,042	1840-41	136,095	64,402
1824-25	106,954	37,588	1841-42	194,946	85,844
1825-26	87,734	41,583	1842-43	144,991	47,757
1826-27	95,748	39,174	1843-44	182,238	74,108
1827-28	94,898	35,371	1844-45	274,216	122,926
1828-29	77,226	30,079	1845-46	125,150	69,934
1829-30	105,620	39,027	1846-47	164 365	109,062
1830-31	112,875	41,147	1847-48	133,170	86,277
1831-32	106,517	42,077	1848-49	109,665	83,313
1832-33	136,127	52,052	1849-50	155,595	99,333
1833-34	97,427	38,567	1850-51	106,342	79,314
1834-35	83,823	41,543	1851-52	148,916	115,121
1835-36	91,581	43,630	1852-53	225,905	152,569
1836-37	100,703	53,630			

According to the census of 1840, the amount of potatoes of all sorts raised in the United States, was 108,298,060 bushels; of 1850, 104,056,044 bushels, of which 38,268,148 bushels were sweet; showing a decrease of 4,232,016 bushels. This deficiency in the crop of 1849, as compared with that of 1839, is attributed to the discouragement caused by the "potato disease" which has prevailed in most parts of the globe for the last ten or twelve years. The amount of potatoes of all sorts cultivated in the Union in 1853, may be estimated at 106,000,000 bushels; which, at 40 cents, would be worth $42,400,000.

CONDENSED CORRESPONDENCE.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The past season here was not favorable to the growth of the potato; but our crop, on an average, yielded 217 bushels to the acre. We cultivate a blue variety, which is very good and productive. The Meshanock, or Mercer, is preferred by some, and but few agree upon any one variety as being the best. Cost of production, 25 cents per bushel; market value, 60 cents. No manure is used in their culture.

Statement of DANIEL FULTON, *of Bowdoinham, Lincoln county, Maine.*

For the last eight years, potatoes have been an uncertain crop, on account of the "rot." The best method of cultivation, to avoid this malady, is to plant on sandy loam, where it can be obtained, or on pasture ground, with but little manure. For the last two years, the rot appears to have been gradually leaving us. Average yield in former times, 200 bushels to the acre; during the seasons of rot, 50 bushels; the last two years, 100 bushels. Since the rot commenced, the average price has been about 70 cents.

Statement of SIMON T. ASHETON *and* ELIJAH MYRICK, *trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

Potatoes, with us, thrive well. In their culture we employ nearly the same kind of manure as with our other crops; not that we prefer long manure, but because we do not consider the extra labor of overhauling improves the yield or quality sufficient to remunerate. The value per barrel, delivered at the Groton depôt, is $2 50.

The rotation of crops pursued by us is as follows: first crop after turning under the sward, potatoes; second, corn; third, oats; then three to five years in grass for hay.

The potato disease.—In the spring of 1849, we planted two acres of potatoes, as early as the 10th of April. In due time they came up, flourished, and produced a fine crop, all perfect and sound, while those planted in the latter part of May were smitten with the disease. We were thus induced to try early planting again. The next spring the ground was prepared, and the seed put in as early as the 1st of April. But this experiment proved of no avail against the ravages of the disease. The rot prevailed so, that they were not worth harvesting. But it happened in the spring of the same year a friend presented us with a peck of "black potatoes," as he called them. They were not the common "black kidney potato," but a variety with which we were wholly unacquainted. They were planted in the midst of other potatoes, and all proved sound and good, while the other potatoes around them were affected with the rot. We have continued to plant this variety, and have distributed them freely among our neighbors, who have informed us that the crop has never failed from disease. We have planted them four successive years, and have not lost a bushel, and can recommend them to any one wishing to obtain a variety not subject to the disease. When boiled, they are good and mealy, but not so light-colored as many other sorts. They are productive to a fault.

Statement of HORACE PARKER, *of West Teresa, Jefferson county, New York.*

From my experience, I will give the following short rule for raising potatoes, to be adopted by any if they are willing to try: Plant on dry ground, new or sandy, if to be had; next on sod land, free from manure, both early and late in the season; let the rows be north and south, say four feet apart, and cultivate, if possible, in dry weather. If your crop is smitten with the disease, omit digging as long as the season will admit.

Statement of HEMAN POWERS, *of Lewiston, Niagara county, New York.*

Owing to the ravages of the rot, the potato has of late years ceased being considered a reliable crop. The mysterious disease which has

for some years past affected this valuable esculent has occasioned much discussion among practical as well as scientific agriculturists; but thus far the cause of it has not been satisfactorily ascertained, nor has there as yet been any adequate remedy devised.

Potatoes require a cool and damp soil, situated in an elevated position; and when practicable, new ground. A loamy muck, light and friable, is preferable, where a virgin soil is not attainable. Fresh manure should not be applied to this plant, as it has been found, on trial, to increase the rot; but the field should be well manured, if manured at all, the year previous. For seed the very best tubers should be selected, which should be planted whole, as the young plant draws much of its sustenance in its first stages of vegetation from the old tuber. The "pink-eyes" are considered the best for the table; and the "Merinos" for stock, as they are so much more prolific. The average yield in this county is about 150 bushels to the acre. Planting in hills is preferred, although the old practice of earthing up the soil round the vines is not generally approved. Deep ploughing, as with corn and wheat, is preferable. Apples, especially sweet ones, are an excellent substitute for the potato, particularly for feeding stock; and the expense of raising them is not more than one-fourth that of raising potatoes, even when a full crop is expected, untouched by the rot.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

What is wanting in the potato disease is not a remedy, in the strict sense of the term, but we need the restoration of this vegetable to the condition it was in twenty years ago, when nearly every variety, however planted, and growing in whatever weather, was at least usually free from disease. Nothing but the regeneration of the race will, I think, accomplish this in this country. This has been done effectually under my own hand, by importation from the native land of this valuable plant, as well as by seedlings, produced variously from imported and home sorts. Thus, a variety imported in May, 1851, called the "Rough Purple Chili," has perfectly withstood the disease in the culture of 100 bushels. I spread it widely last spring for planting, and in every case but one I hear the most favorable reports of its vigor and health. So, also, have many hundred seedlings, derived from this and other varieties, proved hardy in large proportions.

The hope all along has been indulged that soon the causes of disease, be they what they may, would pass away. Such a hope has been singularly disappointed this year. Physiology and experience are, I think, fast verging to the conclusion that atmospheric changes—that is, climate or weather—especially as connected with a course of culture too stimulating, are the causes of almost all vegetable maladies; and not less the cause, similarly, of most animal diseases. No plant nor animal has a natural immortality; climate and the stimulation of culture are the falling weight by which both are kept for a time in motion, and by which both are in the end run down.

This suggests the most important inquiry—one which seems not to

have been distinctly proposed heretofore: What is the acme of hardiness in a plant, (and so correspondingly in an animal,) to which it is desirable and possible to attain? Is it a state of vigor absolutely incapable of injury by climatic influence—one above all impression, for instance, of the sudden changes of a northern or the hot damps of a southern climate? But such a point is incapable of attainment, since it involves the idea of a natural immortality in plants—a notion contradicted alike by physiology and experience. If, then, such an attainment be impossible, how much short of it is attainable? Clearly this much: such a state of hardiness and vigor as shall, under all changes and severities ordinarily occurring in the weather, preserve the health of all plants constitutionally adapted to that climate, but which yet may not sustain them under all possible, and even occasionally actual, enhancements of climatic influence.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

Potatoes are raised in this county in large quantities, and are yet regarded as a profitable crop. Of late years, this vegetable has suffered from the rot, and has otherwise greatly degenerated. I well remember when my father raised 200 bushels to the acre; but now, with the same culture, we cannot grow more than 70 bushels. Nor does it appear to be the defect of the soil, as other crops thrive as well as in former days.

Statement of P. W. GILLETT, *of Astoria, Clatsop county, Oregon.*

The potato, with us, is free from disease. The ground, when cultivated with this crop, is ploughed deep, well pulverized, and planted in rows three feet apart each way. If the rows are straight, a free use of the cultivator and shovel-plough is made. We obtain a large yield from our new, rich lands, without manure; yet fertilizing matter vastly increases the product.

About \$1 50 per bushel is the average price of potatoes.

Statement of WILLIAM M. MACY, *of Quercus Grove, Lynn county, Oregon*

Irish potatoes, with us, produce an abundant crop with little attention. The ground is broken up in the spring, laid off as for corn, and planted. They grow until September, which is the proper time for digging. If not taken from the ground before the autumn rains come, a second crop starts up, which by December are the size of a hen's egg; and what is more rare, the haulms above the ground produce potatoes, frequently from every joint of the stem; and this season potatoes have grown up the stalk quite to the seed-balls!

The yield of potatoes to the acre is 500 bushels and upwards, without limit. They are worth \$1 per bushel.

Statement of H. A. CASE, *of Troy, Bradford county, Pennsylvania.*

The "round pink-eyes" and "Mercers" are our best kinds. We plant them in good ground, cutting our seed, and putting from three to

five pieces in each hill; fertilizing them, generally in the hill, with barn-yard manure. We generally receive about 70 bushels to the acre, though double and even treble this amount has been harvested. As yet, we have not suffered much from the "rot." We think ashes, applied at the rate of about a handful to each hill, a good preventive. We know of no cure. The average price for the last ten years, 31 cents per bushel.

Statement of JOSHUA S. KELLER, *of Orwigsburgh, Schuylkill county, Pennsylvania.*

From 200 to 250 bushels of potatoes are considered a good crop to the acre. Under extraordinary circumstances, we are told that 300 bushels, and even more, have been obtained.

The average price of potatoes is from 60 to 70 cents per bushel. To raise the above named quantity, manure must not be forgotten. It is hard to say what an average crop might be. I prepare corn-stubble for this, by ploughing in manure; mark it off in rows, and cover the seed thinly; then keep the weeds down by frequent cultivation, and that before the blossoms appear.

Statement of JOHN EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

Potatoes are one of our most profitable crops, nearly all of which are consumed in the county, owing to the demand for them along the railroads now in progress of construction. They are still affected with the "rot" in this neighborhood. Low, moist lands and barn-yard manure appear to increase it, while on dry, sandy soils they are generally free from disease while growing. The greatest yield is 150 bushels to the acre; average yield, on good sandy loam, 60 bushels. Present price, 50 cents per bushel; smallest yield that will pay expenses at present prices, 30 bushels to the acre.

Statement of JOSEPH BOWDITCH, *of Fairfield, Franklin county, Vermont.*

This year our county sent 1,000 tons of starch to market, before the potato was diseased. We do not now exceed 20 tons a year, as only the refuse potatoes are worked. We formerly raised 300 bushels per acre, but now 150 is an average yield. I have frequently heard the potato called very exhausting to the soil. I have cultivated three acres of potatoes seven years in succession, with an average yield of 200 bushels per acre. The eighth year I sowed to spring wheat, (1852) which produced 23 bushels per acre. My method of cultivation is this: Plough deep, late in the fall—the deeper the better. I plough in the fall in order that I may turn under the potato-vines, and that the frost may more effectually do its work. It will become both earlier and lighter for being turned up to the frost. I plough late, that the fine litter and enriching matter in the soil may not be washed away by the heavy rains, as it certainly will be if the ground is not level, which was the case with the three acres I cultivated; it will also plough much easier, and will allow that implement to run to a greater depth when the ground has become well saturated, than it can before the rains. I plough in the fall from 10 to 12 inches deep, with a pair of strong horses. In the spring I put on 300 bushels per acre of manure, partaking largely of straw. I then plough as early as the ground will work light, harrow, and plant the rows 45 inches, and the hills 18 inches apart. As the seeds are dropped, a boy follows with a dish, dropping directly upon them at the rate of 100 pounds of plaster per acre. I then cover with the hoe three inches deep. As soon as the shoots make their appearance I go through with the cultivator, and give the plants a dressing with the hoe, hilling very slightly. Before the vines drop I give them a dressing; this time using the plough, passing twice in a row, that I may give them a thorough earthing; always being careful to keep the manure covered, both in planting and hoeing.

I plant the long reds—10 bushels per acre—first cutting them through lengthwise, then into pieces having two eyes each; putting two pieces into each hill. I have tried various kinds of seed, and have found none that pays regularly except the long reds. The tops of other kinds frequently die when the tuber is but half grown. The long reds continue to grow until they are ripe. I prefer digging as late as the 10th of October, unless we have hard frosts earlier. During the seven years that I cultivated this field in potatoes, I did not lose by the rot, in the fall of the year, over one bushel in 50; nor to exceed one-tenth when kept through the winter.

The usual price of potatoes here, in the fall, is 20 cents per bushel; in the spring, 40 cents.

Statement of OSMAN DEWEY, *of Barre, Washington county, Vermont.*

Potatoes are not a sure crop with us, though they are cultivated to a considerable extent here. They do best on an old pasture without manure, on dry land, and will yield on an average 200 bushels per acre. They are worth 25 cents per bushel. One hundred bushels will pay for cultivating an acre.

INVESTIGATION OF THE POTATO DISEASE.

SIR: I have the honor to submit the following report on the microscopic examination of various specimens of potatoes affected or supposed to be affected with the "potato rot." The first potatoes brought to the office were intended as samples of the early stage of the disease, which it was thought could not have been detected but for the presence of certain insects in the stem, which insects themselves were considered to be the cause of the disease. A second parcel of the same sort, but presumed to be in a more advanced stage of the affection, was furnished at a later date.

A most careful examination of these potatoes, continued through several months, resulted in the conviction that they contained no trace

of any disease whatever, and that the injury, if any, arose from the premature destruction of the vines, which left the tubers small but healthy. Mr. Henry F. French, of Exeter, New Hampshire, kindly furnished the office with potatoes in various stages of decay, and those that were not too far gone were made the subject of long continued observation. By keeping them dry the progress of the disease was greatly retarded, and its effects could be watched with the greatest ease. The marks of this malady are most distinct and unmistakable. When the smallest portion of an affected part is seen under the microscope, the walls of the cells are coated on the inside with a brownish granular substance which increases with the disease. At first, the starch grains are uninjured, and have none of the brownish matter upon their surface. On the other hand, the small cubical crystals so common in the cells of the potato, become brown at an early stage, apparently from a deposition of this same coloring matter. Even at a later period, if the cells are broken open, the starch will be found unaltered; showing its distinctive markings, and the reaction with polarized light, as in the healthy plant. So far nearly all observers agree, and there can be no doubt as to the identification of the disease. Influenced by the high reputation of Payen, I commenced the examination somewhat predisposed to his view, that the mischief was caused by a microscopic fungus penetrating the potato. But, after the most extensive examination, I am compelled to say that I have seen no indications of such fungus in most of the cells examined. Several forms, it is true, can be found on the surface of the decayed portions, and also immediately beneath the surface, but the progress of the disease, with all its distinctive characters, may be traced far beyond any such growth. Various fungi, known under the common name of "mould," are to be found on potatoes, and other vegetable substances, where there is even but a superficial injury or decay. In the case of the "potato disease," the decayed portions of the tuber afford the finest possible medium for such growths, resembling, in the more advanced stages, a mass of paste, and containing in fact nearly the same substances. The growth of mould under such conditions is too well known to need more than a reference.

I have looked over a large number of authorities on this subject, and find that the greater part of them have finally taken this same view, viz: that the growth of fungi or insects, in and upon the potato, is a *consequence* and not a *cause* of the potato rot.

It would be folly to attribute the mischief, as some have done, to insects whose range even in this country is so limited that we should have to ascertain for a wide-spread and common evil, a new and distinct cause in each portion of the United States, and the same for Europe.

It is not generally known, as it should be, that the potato is liable to several distinct maladies, but that the one now spoken of, and the most serious of all, is not as recent in its origin as has been supposed. It is even probable that in its native region, the plant has always been subject to the same affection. Care should be taken by observers not to confound various maladies under one name, or the results obtained will be worthless.

Those who wish to investigate the matter with any hope of adding to our knowledge on this subject, should become familiar with some good representation of the potato plant in its normal condition. The structure of the tuber itself is not so simple as most persons imagine; it is an *underground stem*, and shows all the various forms of tissue which are found in the green stem of the plant. There is reason to believe that in some cases these peculiarities, when noticed for the first time, have been mistaken for the commencement of disease, and that elaborate theories have been built upon even so poor a foundation as this.

The drawings which most completely represent the microscopic character of all parts of the healthy plant, are those of Corda, in the "Oekonomische Neuigkeiten und Verhandlungen," vol. 1, 1847: Prague. It is very tempting to imagine that one has found a simple and easily explained cause of such a serious evil, but no good can follow any such speculations. We must, in the first place, learn what has been done by others, before we undertake to arrive at results which have not been obtained but by the most laborious research of some of the most able observers in the world. It is not likely that any very striking discovery remains to be made. Each successive advance must be the result of the work of many hands, heads, and eyes, and no one fact can be considered as perfectly established until after it has been discussed by a large number of observers.

It seems certain that the brown deposition is a nitrogenous substance, formed in an abnormal manner; but although we can readily imagine that excessive manuring or other causes might lead to its formation, we are yet to learn why the disease is so widely spread all at once, and then ceases for a time—in short, why it is an epidemic.

There are some points in the progress of the affection about the time that the starch begins to change, which have never yet been examined. If fresh specimens can be procured during the ensuing season, I propose to investigate this subject, with the hope that it may lead to some useful practical results in the way of arresting the progress of decay after the disease has commenced.

I am indebted to Dr. Alexander S. Wotherspoon, U. S. A., for the use of an excellent microscope which was very kindly placed at my disposal during the whole time I was engaged in this examination.

Yours, respectfully.

GEORGE C. SCHAEFFER.

Hon. CHARLES MASON,
Commissioner of Patents.

Statement of ADMIRAL B. MILLER *and* JOSEPH BROBST, *of Knoxville, Marion county, Iowa.*

The culture of sweet potatoes, this season, has been exceedingly successful with us. Fourteen potatoes of an average size filled a half-bushel measure heaping full, seven of them weighing 14 pounds.

Statement of RICHARD E. HOLT, *of Jacinto, Tishemingo county, Mississippi.*

The "yellow yam" is the principal sweet potato raised with us. It grows nearly to perfection, weighing from 3 to 12 pounds each, and

produces from 200 to 300 bushels to the acre. We invariably set out the slips, but never plant the potato at all. The yam potato will pay better for labor and capital invested for hogs, than any other crop we raise.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Sweet potatoes grow well in those soils which are in part sandy, but not so well as they do further South, on account of the shortness of the season. Irish potatoes generally grow well. The kind most preferred in this section is the "Mercer," which is not very prolific nor very large, but remarkable for the whiteness and mealiness of its flesh. The average yield of this kind is 100 bushels to the acre; of other kinds, the product is much larger. The price here is about 40 cents per bushel.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

The sweet potato is grown here occasionally, of a large size, and at a cheap rate; but so uniformly are they deficient in the dry and rich flesh of the Southern variety, that their cultivation here should not be encouraged. Perhaps it would be a matter of useful experiment to determine whether new varieties could not be produced from seed, which would be better adapted to our short summers.

Statement of LUTHER BAILEY, *of the United Society of Shakers, North Union, Cuyahoga county, Ohio.*

Sweet potatoes can be raised here with profit and advantage, and readily command $1 per bushel in Cleveland market. A piece of old ground is first selected, manured, and thrown into beds or ridges 3½ feet apart, and the potato-sets planted at intervals of 16 inches.

TEXTILE AND FORAGE CROPS.

COTTON.

Cotton, which administers so bountifully to the wants of civilized as well as to savage man, and to the wealth and economy of the countries producing it, stands foremost among the crops in the United States, both as regards its superior staple and the degree of perfection to which its cultivation has been brought. One or more of its species is found growing wild throughout the torrid zone, whence it has been disseminated and become an important object of culture in several countries adjacent, where its consumption has increased just in proportion to the progress of the arts and civilization. It is mentioned by Herodotus as growing in India, where the natives manufactured it into cloth; by Theophrastus as a product of Ethiopia; and by Pliny as growing in Egypt,

towards Arabia, and near the borders of the Persian gulf. Nienhoff, who visited China in 1655, says that it was then cultivated in great abundance in that country, where the seed had been introduced about five hundred years before. Columbus found it in use by the American Indians of Cuba, in 1492; Cortez, by those of Mexico, in 1519; Pizarro and Almagro, by the Incas of Peru, in 1532; and Cabeça de Vaca, by the natives of Texas and California, in 1536.

In dividing the genus Gossypium into species, we would follow Dr. F. B. Hamilton, (Linn. Trans., V, VIII,) who says that the pubescence of the seeds is a better criterion than either the number and forms of the lobes of the leaf, or the number of the glands, for distinguishing the varieties. M. Rohr divides the cotton plants with which he was acquainted—

1. Into those with seeds black and rough.
2. Those with seeds brownish-black and veined.
3. Those with seeds sprinkled with short hairs.
4. Those with seeds completely covered with a close down.

According to Dr. Royle, who has been long engaged in the investigation of the subject in Great Britain and in India, the different varieties of cotton may be classed under four distinct species, in the following manner:

1. *Gossypium indicum*, or *herbaceum*—the cotton plant of China, India, Arabia, Persia, Asia Minor, and some parts of Africa.
2. *Gossypium arboreum*—a tree-cotton indigenous to India.
3. *Gossypium barbadense*—the Mexican or West India cotton; of which the Sea Island, New Orleans, and upland Georgia are varieties. It was long since introduced into the island of Bourbon, and thence into India; hence it acquired the name of "Bourbon cotton."
4. *Gossypium peruvianum*, or *accuminatum*—which yields the Pernambuco, Peruvian, Maranham, and Brazilian cotton; especially distinguished by its black seeds, which adhere firmly together. This variety has long since been introduced into India.

The chief varieties cultivated in the United States, are the black seed, or Sea Island, *(G. arboreum,)* known also by the name of "long staple," from its fine, white, silky appearance and long fibres; the green seed, *(G. herbaceum,)* called the "short staple," from its shorter, white staple, with green seeds, and commercially known by the name of "upland cotton;" and two kinds of Nankin, or yellow, *(G. barbadense,)* the Mexican and Petit Gulf.

Of the precise period of the first introduction of the cotton plant into the North American colonies, history is silent. In a pamphlet entitled "Nova Brittania, offering most excellent fruits by planting in Virginia," published in London in 1609, it is stated that cotton would grow as well in that province as in Italy. It is also stated, on the authority of Beverley, in his "History of Virginia," that Sir Edmund Andros, while governor of the colony, in 1692, "gave particular marks of his favor towards the propagating of cotton; which, since his time, has been much neglected." It further appears that it was cultivated for a long time in the eastern parts of Maryland, Virginia, Carolina, and Georgia, in the garden, though not at all as a planter's crop, for domestic consumption.

In another pamphlet, entitled "A state of the province of Georgia, attested upon oath in the court of Savannah," in 1740, it was averred that "large quantities have been raised, and it is much planted; but the cotton, which in some parts is perennial, dies here in the winter; which, nevertheless, the annual is not inferior to in goodness, but requires more trouble in cleansing from the seed." About the year 1742, M. Dubreuil invented a cotton gin, which created an epoch in the cultivation of this product in Louisiana. During the Revolution, the inhabitants of St. Mary's and Talbot counties, in Maryland, as well as those of Cape May county, New Jersey, raised a sufficient quantity of cotton to meet their wants for the time. It was formerly produced in small quantities for family use in the county of Sussex, in Delaware, near the headwaters of the Choptank.

The seed of the Sea Island cotton was originally obtained from the Bahama Islands, in about the year 1785; being the kind then known in the West Indies as the "Anguilla cotton." It was first cultivated by Josiah Tattnall and Nicholas Turnbull, on Skidaway island, near Savannah; and subsequently by James Spaulding and Alexander Bisset, on St. Simon's island, at the mouth of the Altamaha, and on Jekyl island by Richard Leake. For many years after its introduction, it was confined to the more elevated parts of these islands, bathed by the saline atmosphere, and surrounded by the sea. Gradually, however, the cotton culture was extended to the lower grounds, and beyond the limits of the islands to the adjacent shores of the continent, into soils containing a mixture of clay; and, lastly, into coarse clays deposited along the great rivers, where they meet the ocean tides.

Previous to 1794—the year after the invention of Whitney's saw-gin—the annual amount of cotton produced in North America was comparatively inconsiderable; but since that period, there is probably nothing recorded in the history of industry, including its manufactures in this country and Europe, that would compare with its subsequent increase.

The earliest record of sending cotton from this country to Europe is in the table of exports from Charleston in 1747–48, when seven bags were shipped; another parcel, consisting of 2,000 pounds, was shipped from the same port in 1770; and a third shipment of 71 bags was made in 1784, which was seized in England on the ground that America could not produce a quantity so great. In 1792, there were shipped 304 bales; in the first six months of 1796, 150 bales. From an old custom-house book at Wilmington, North Carolina, it appears that in July, 1768, the ship "Amelia" cleared from that port with an assorted cargo, among which were three bags of cotton. In 1796, there were exported from Philadelphia 911,325 pounds.

The amount of cotton exported from the United States in 1791, was 189,316 pounds; in 1793, 187,600 pounds; in 1794, 1,601,760 pounds; in 1795, 6,276,300 pounds; in 1800, 17,789,803 pounds; in 1810, 93,261,462 pounds.

The quantities and values of cotton and cotton goods of domestic production exported from the United States within the last thirty-three years, are denoted in the following table:

Years.	Sea Island cotton.	Other cottons.	Total value of unmanufactured cotton.	Nankin.	Cotton piece goods, printed or colored.	Piece goods, uncolored or bleached.	Cotton thread and yarn.	Other manufactures of cotton.	Total value of manufactured cotton.
	Pounds.	Pounds.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
1820-21	11,344,066	113,549,339	20,157,484	....	....	....	....	....	....
1821-22	11,250,635	133,424,460	24,035,058	....	....	....	....	....	....
1822-23	12,136,688	161,586,582	20,445,520	....	....	....	....	....	....
1823-24	9,525,722	132,843,941	21,947,401	....	....	....	....	....	....
1824-25	9,665,278	166,784,629	36,846,649	....	....	....	....	....	....
1825-26	5,972,852	198,562,563	25,025,214	....	....	....	....	....	....
1826-27	15,140,798	279,169,317	29,359,545	14,750	45,120	951,001	11,175	137,368	1,159,414
1827-28	11,288,419	199,302,044	22,487,229	5,149	76,012	887,628	12,570	28,873	1,010,232
1828-29	12,833,307	252,003,879	26,575,311	1,878	145,024	981,370	3,849	127,336	1,259,457
1829-30	8,147,165	290,311,937	29,674,883	1,093	61,800	964,196	24,744	266,350	1,316,183
1830-31	8,311,762	268,668,022	25,289,492	2,397	96,931	947,932	17,221	61,832	1,125,413
1831-32	8,743,373	313,471,749	31,724,682	341	104,870	1,052,891	12,618	58,854	1,229,776
1832-33	11,142,987	313,555,617	36,191,105	2,054	421,721	1,802,116	104,335	202,291	2,532,517
1833-34	8,085,937	376,631,970	49,448,402	1,061	188,619	1,756,136	88,376	51,802	2,085,994
1834-35	7,752,736	379,606,256	64,961,302	400	397,412	2,355,202	97,808	7,859	2,858,681
1835-36	8,544,419	415,086,888	71,284,925	637	256,625	1,950,795	32,765	14,912	2,255,734
1836-37	5,286,971	438,924,566	63,240,102	1,815	549,801	2,043,115	61,702	175,040	2,831,473
1837-38	7,286,340	588,665,957	61,556,811	6,017	252,044	3,250,130	168,021	82,543	3,758,755
1838-39	5,107,404	408,516,808	61,238,982	1,492	412,661	2,525,301	17,465	18,114	2,975,033
1839-40	8,779,669	735,161,392	63,870,307	1,200	398,977	2,925,257	31,445	192,728	3,549,607
1840-41	6,237,424	523,966,676	54,330,341	....	450,503	2,324,839	43,503	303,701	3,122,546
1841-42	7,254,099	577,462,918	47,593,464	....	385,040	2,297,964	37,325	250,361	2,970,690
1842-43	7,515,079	784,782,027	49,119,806	....	358,415	2,575,049	57,312	232,774	3,223,550
1843-44	6,099,076	657,534,379	54,063,501	....	385,403	2,298,800	44,421	170,156	2,898,780
1844-45	9,389,625	863,516,371	51,739,643	1,174,038	516,243	2,343,104	14,379	280,164	4,327,928
1845-46	9,388,533	538,169,522	42,767,341	848,989	380,549	1,978,331	81,813	255,799	3,545,481
1846-47	6,293,973	520,925,985	53,415,848	8,794	281,320	3,345,902	108,132	338,375	4,082,523
1847-48	7,724,148	806,550,283	61,998,294	2,365	351,169	4,866,559	170,633	327,479	5,718,245
1848-49	11,969,259	1,014,633,010	66,396,967	3,203	466,574	3,955,117	92,555	415,680	4,933,129
1849-50	8,236,463	627,145,141	71,984,616	....	606,631	3,774,407	17,405	335,981	4,734,424
1850-51	8,299,656	918,937,433	112,315,317	....	1,006,561	5,571,576	37,260	625,808	6,241,205
1851-52	11,738,075	1,081,492,564	87,657,732	....	926,404	6,139,391	34,718	571,638	7,672,151
1852-53	11,165,165	1,100,405,205	109,456,404	....	1,086,167	6,926,485	22,594	733,648	8,768,894

According to the census returns of 1840, the amount of cotton cultivated in the Union was 790,479,275 pounds; of 1850, 987,637,200 pounds; showing an increase of 197,157,925 pounds. The amount of the cotton crop of 1853, may be estimated at 1,000,000,000 pounds; which, at 7 cents, would be worth $70,000,000.

INVESTIGATION OF THE FIBRE OF THE COTTON PLANT.

As the cotton plant—which administers so much to the wealth, economy, and wants of this country, as well as to the world at large—is annually becoming of greater importance to our nation, anything that will tend to improve its culture or manufacture should receive public attention and be encouraged. In consequence of a degree of uncertainty prevailing in regard to the amount of injury or loss sustained by careless harvesting and ginning, the following circular was sent to various manufacturers in different parts of the country, which elicited the replies thereunto annexed:

CIRCULAR.

United States Patent Office,
June 23, 1853.

Sir: A communication has been received in this bureau from an intelligent planter of Georgia, accompanied by several bolls of cotton, asking information on the following points relating to the harvesting, ginning, packing, and manufacture of cotton:

1. Does the well-matured cotton-boll yield its staple, or fibre, of different lengths in one or the same boll or lock? or does the product of fibre of an individual seed exhibit an approximate uniformity in its length before separation by the gin?

2. What per-centage of loss would be considered a fair average in your establishment for a twelve-month stock, on the gross weight of cotton consumed, by reason of dust, grit, or sand?

3. What is the per-centage of loss, as above, caused by vegetable substances, as leaves, trash, motes, grass, &c.?

4. What is the per-centage of loss arising from shortened or divided fibre, caused by ginning, which flies off during the process of manufacturing; and how much, in your judgment, are the strength and durability of your fabrics diminished in consequence of such breakage or division?

5. Has the general condition of cotton staple, as to length and strength, deteriorated within the last twenty years?

The object of the communication above referred to, appears to have been intended to disabuse and correct any sentiment which may exist in the cotton-growing States among the planters, that it is really non-essential, in point of value, to the manufacturer, whether the staple is broken by ginning, or whether it is made foul from grass or other extraneous matter, except so far as it may be increased in its weight thereby. The question has also arisen, whether there may not be an improvement made in the cotton gin, should it prove that the fibres attached to each seed are of approximate or uniform lengths.

Any information which you may be able to impart relative to the points herein considered, will be acceptable to this bureau, and will be duly appreciated by the cotton-planters of the South.

You will understand these inquiries to apply only to "short-staple" or "upland" cotton.

Very respectfully, your obedient servant,
CHARLES MASON.

Boston, *July* 14, 1853.

Sir: I have had the honor of receiving a communication from you, asking information on some points relating to the harvesting, ginning, packing, and manufacture of cotton, induced by a communication in the Patent Office received from an intelligent planter from Georgia.

This is a subject that interests the planter and manufacturer more than is generally imagined, and I shall be most happy if the facts which I am able to give in relation to it shall serve in any degree to "disabuse and correct any sentiment which may prevail in the cotton-growing States among the planters, that it is really non-essential, in point of value, to the manufacturer, whether the staple is broken by ginning, or whether it is foul from grass or other extraneous matter, except so far as it may be increased in its weight thereby."

I will endeavor to answer the points in the order in which you have stated them.

Query 1. My knowledge on this point is quite limited; but, from occasional examinations of what were said to be "well-matured bolls," I should judge that the fibre before separation was always somewhat variable in length—more or less so according to circumstances, such as the exhausted or worn-out condition of the soil, unfavorable season, bad or neglected culture, proximity, while growing, to fields of different grades or kinds of cotton, and various other causes, which the intelligent and observing planter will at once perceive and be able to understand and account for. If this be so, it must be apparent that all attempts to render the length of staple more uniform in the bolls will be attended with some difficulty to the planter, and not willingly submitted to by him without a prospect of remuneration. As my opinion differs, in this respect, from one whose habit of observation is exceedingly accurate, and in whose opinion, in matters relating to the cotton manufacture, I have greater confidence than in that of any other man with whom I am acquainted, it will give me great pleasure to receive a few well-matured bolls (which I take to mean well-ripened) of different grades and qualities of cotton, in order that a critical examination of them may lead to the establishment of a fact which now appears to be unsettled.

Query 2. It is not usual to keep a separate account of these substances, unless they appear to be excessive. Ordinarily, I do not think they would exceed from 5 to 10 pounds in a bale of 400 pounds.

Query 3. These substances, like the last, being of little or no value, are not usually weighed; but after causing the manufacturer much labor to separate them, and injury or waste to the fibre of the cotton, are sold from the picker in a mass for a mere trifle. Probable loss from the gross weight, 4 or 5 per cent.

Query 4. This point opens a wide field which has been but little explored by the manufacturers of this country, and of course not duly appreciated by them. In fact, I doubt whether some of them ever thought that the cotton did not grow precisely as it comes to them in the bale. In truth we have, strictly speaking, but very few thoroughly bred manufacturers here. Our principal establishments are large corporations, making shirtings and sheetings from No. 18 to 25, for the last twenty or thirty years, requiring very little skill. They, in most cases, are managed by ministers from their pulpits; judges taken from the bench; lawyers from their clients, if they have any; merchants and schoolmasters, not always put there on account of any peculiar fitness for the places, but frequently because the places possess a peculiar fitness for them—sometimes as a reward for some legislative or political favor, and sometimes from family connexion and favoritism.

The directors mostly reside in Boston—gentlemen of capital, shrewd, and generally excellent managers of their own affairs, but in most cases very little acquainted with the details of the business at the factories.

In consequence, orders are sometimes given to "heave to the ship," when there is no rudder. After this digression let us proceed.

What the well instructed manufacturer wishes to obtain is a roving or strand of cotton of suitable size for the spinning machine, so evenly constructed, that when severed by a sharp instrument in different places, it shall present to view the same number of distinct fibres. If the fibres are sufficiently long and uniform in length, little more is necessary than to straighten, place them parallel to each other, and reduce the strands to a proper size, which can be done with very little labor. As it is, there are sometimes almost as many lengths as fibres, and the manufacturer has to exercise his skill to overcome this defect, just in proportion to the fineness of the yarn he has to make. This can only be accomplished in part, and by doubling and drawing.

The mill at Portsmouth, New Hampshire, making No. 70 yarn, double, as I understand, one hundred and forty thousand times. This requires additional machinery, adds much to the labor, causes waste, and does some injury to the staple; it, however, gives evenness, and consequently strength, but it does not restore that which was taken away by the gin. I think, therefore, it must appear plain to every one, that any breaking of the staple by ginning, or in any other way, tends to increase the cost and diminish the value of the article when manufactured. Cotton, therefore, is less valuable just in proportion to the fibres broken.

I would here remark, that cotton should never be ginned when wet or damp. Its adhesiveness, when in that condition, is very much increased, and the velocity of the saws does not give it time enough to separate without breaking.

The idea that grass and other extraneous matter may be mixed with cotton, and do no other injury than to increase the weight, is another pernicious sentiment. Let a pound of bran be mixed with a barrel of flour—will any one say that the barrel of flour is injured only to the value of one pound?

Some attempts have been, and are still being made, to improve the cotton gin, so that less injury may be done to the staple. Whether this can be accomplished without diminishing the capacity of the machine to perform its work, or to what state in their progress they have arrived, I am not informed.

Query 5. Has the general condition of cotton staple, as to length and strength, deteriorated within the last twenty years?

I think there is no good reason for believing that the staple is not as long and as strong now as at any former period, when grown under like circumstances. It is true that we have less fine cotton now in proportion to the whole crop than formerly; but this is no proof that it is not produced. If the wants of the manufacturers required it, and they would pay a remunerating price, I am told there would be no lack of fine cotton.

The cotton business with us is still in its infancy. So far as variety and fineness of fabric are concerned, little change is observable for the last twenty to thirty years. Whether it is destined to go on to the extent, variety, and fineness to which it has arrived in Great Britain, is problematical. Hitherto we have done nothing requiring much skill.

Fabrics under thirty or forty hanks to the pound, it seems, can be made by ministers or lawyers, or any one else, (provided they are fortunate in the selection of their cotton;) but whenever we shall attempt the finer grades, a different training by a different class of managers will be found necessary. We now substitute for skill a higher grade of cotton, and depend for remuneration on a higher price for the article when manufactured. So far as my experience goes, this can only be relied upon to a very limited extent. Some five and twenty years ago I undertook to make No. 40 shirtings of Sea Island cotton, and they cost me 2 or 3 cents per yard more than those made of the best New Orleans. I think they were really increased in value as much as the additional cost; but I found, when I came to sell them, that I had to go into an explanation with every purchaser. Sometimes, by the expenditure of much time and labor, I was enabled to get half a cent, and sometimes a whole cent, for what cost me two or three; consequently, I had to drop the use of Sea Island cotton altogether. All calculations of this kind must prove fallacious, for they are based upon the supposition that all purchasers are judges of what they buy, which is not the fact. The skilful manufacturer abroad strives to please the fancy, and when successful in this, at the least possible cost, he defies competition. This is a much safer reliance than upon any legislative aid or protection. Should the emigration from Great Britain continue, it may ultimately bring the price of labor there more nearly to ours, and put us on a more equal footing so far as labor is concerned. It will probably be as well in the main that their labor should come up to ours, for it matters little whether a yard of calico is sold for 10 cents or 12½ cents, provided 12½ cents is only a remunerating price, and it cannot be had for less. It only places calico in a different relative position in the great list of articles of a similar nature, and used for similar purposes.

I have shown your communication to Samuel Batchelder, esq., of this city. He commenced his successful career in the cotton manufacture, I think, about the same year with myself (1808.) He is still as actively engaged in the business as ever; and having been for some time impressed with the importance of the subject, and being prepared with experiments already made, has given me his views quite in detail, which I hereunto append, deeming them highly important and much to the point.

In order to keep alive the recollection of the past, I enclose a small strip from the piece of British cotton purchased by me at a prize sale in the fall of 1813, the second year of the war, which cost 85 cents per yard cash, Boston money—equivalent to specie, as the Boston banks did not suspend payment at that time. A like article now would not bring more than 3½ to 4 cents. It was then the fashion to have goods of this description highly glazed, so as to exclude the fabric entirely from view. It was so in this case; but time has separated the substance with which it was filled, and it now only presents the skeleton of a production once pleasant to the sight, somewhat similar to the animal kingdom under like circumstances. This specimen goes to show the condition of our manufactures at that time, and our complete dependence upon foreigners for all articles of a sim-

ilar kind. I then sold calicoes for 75 cents per yard that would not now bring more than 6 cents. Cotton was brought from the South by ox-teams, and a regular "ox-team express" was established throughout the country.

Very respectfully, your obedient servant,

ROBERT ROGERSON.

Hon. Charles Mason,
Commissioner of Patents.

Boston, Mass., *July* 9, 1853.

Dear Sir: The questions from the Patent Office which you have communicated to me respecting cotton are very important, and very interesting to me, as they relate to some views of the subject which I have endeavored to impress upon the minds of the planters for two or three years past, as far as it has been in my power.

1. It appears to me, from the examination of some parcels of cotton that have been carefully ginned in a manner to avoid breaking the staple, as well as some samples in the seed without ginning, that there is a very near approximation to an equality in the length of fibre of well matured cotton in the same boll, or of the same growth.

2. It would be impossible to state any average loss on account of dust, grit, or sand. We have opened bales of cotton, where the loss from this cause has been, by weight, between 15 and 20 per cent., while perhaps in ordinary cases it would not exceed 1 per cent. I suppose this depends much upon the soil where the cotton is grown, and upon the season. On a dry, sandy soil, or in very dry weather, the winds might blow the dust and sand so that much would lodge in the cotton boll, particularly if it should hang exposed for any considerable time in the field.

3. As to the loss from leaves, seeds, and vegetable matter, all the waste of this kind, as well as dust and sand, is separated from the cotton, as far as possible, before it comes to the card. From careful experiments at two different periods, of several days at each time, upon more than thirty bales of cotton of different lots, I found the loss in one experiment 3 per cent., and in the other 4½ per cent. This was the result of five operations upon the cotton, by five different machines. From the amount of labor and expense in these operations, some judgment may be formed of the correctness of the opinion alluded to, as prevailing among the planters, that the mixture of such substances with the cotton was of little consequence to the manufacturer, except as so much loss in weight. It ought also be borne in mind that the manipulation in all these operations produces some injury to the staple, and the result of the whole is only to clean it from those substances which ought never to have been mixed with it, and put it in the same condition in which it ought to have been before it was put into the bale.

4. The same experiments show that the loss by "flyings" in the carding, which consist of short fibres of cotton, either broken in the ginning or of immature growth, in the one case was 4⅜ per cent., and in the other 5 per cent., which, it will be noticed, is more than the loss in weight from sand, seeds, and other vegetable matter. The value of the material is much diminished from this cause, and to a greater extent in the manufacture of fine goods than for coarser fabrics. So far as this short cotton goes into the goods, it diminishes the strength and durability of the article; and, besides, increases the cost, by the additional labor required in spinning and weaving. To a certain degree, as the value of the Sea Island cotton is increased by additional length of staple, that of upland cotton will be diminished in proportion as the short, mossy, and broken staple may prevail. To give some idea of what the difference in value may be, I would mention that in purchasing cotton for the supply of a mill of 26,000 spindles, for three or four years past, my instructions to agents at the South have been, to purchase Mastodon or other similar cotton of extra length of staple, at 1½ to 2 cents per pound above the price of upland or New Orleans cotton of corresponding grade; and the shorter staple would depreciate in value accordingly. This depreciation applies to cotton which, though much of the staple may be of good length, contains a considerable proportion of broken and mossy or short fibre, which renders it unfit for those manufactures which require strength and fineness; but, at the lower price, would be purchased for coarse fabrics, to be mixed with other cotton, or used as the English manufacturers use the cotton from India.

5. From my experience, I should not think the length or strength o the common green-seed cotton had deteriorated within the last twenty years. Within a few years something has been done, in various parts of the country, in producing cotton of extra length by planting foreign seed. This I suppose to be the origin of the Dean-seed cotton in Texas, and of the Mastodon cotton; the staple of which, when first planted, was very long, but has *deteriorated* in length from year to year, except where great care has been taken in the cultivation, by planting it in separate fields, at a distance from other cotton. This deterioration can probably best be remedied by planting anew from foreign seed, though I have been told that some planters have succeeded in keeping up the quality and reputation of their crop by planting a small quantity of Sea Island in the field, which has an influence by the mixture of the pollen while in blossom. This plan may be well worth trial, and may have an important effect in improving the staple both in length and strength.

Such experiments in the production of cotton of long staple were very much discouraged in the beginning by the fact that, much of it was purchased for factories at the North, which were expressly built for the spinning of short staple, or upland cotton, and the machinery of which could not be properly adapted to that of longer staple. The consequence was, that they either suffered a loss in attempting to work it, or sold it at the best offer they could get; so that in purchasing a supply four years ago for the mill mentioned above, which was adapted for spinning long cotton, I was able to get a large portion of our stock for 2 cents per pound less than other fair cotton, instead of giving about 2 cents more, as I now do. This low price, and the complaints of the manufacturers, who suffered a good deal of inconvenience from occasionally getting a bale of Mastodon cotton into their mills with other cotton, discouraged the planters from its cultivation, and very few continued to produce it. But many mills are now adopting

a mode of spinning better suited to the long cotton, and this will be more and more the case, as the manufacture of finer goods continues to be extended; so that a regular market may be expected for cotton of superior quality at prices corresponding to its value. This description of cotton, which has been almost unknown in foreign markets until very lately, is beginning to be appreciated there for purposes to which it is adapted, and some shipments abroad have sold at very satisfactory prices. Under these circumstances, it seems to me that there is a fine opportunity for the planters to improve the value of their crops by extending the cultivation of long green-seed cotton, either by the introduction of foreign seed or by improving the quality of such as is now cultivated—the Dean-seed and Mastodon, for instance—by mixing it with the Sea Island, as mentioned above, if that should be found successful, or in any other improved mode of cultivation.

After the long cotton is produced, it becomes very important to adopt the best mode of ginning it, to prevent breaking the staple. The saw-gin operates very well upon the short staple cotton; but when the fibre is long enough to come in contact with two or more saws at the same time, it must of course be broken. To remedy this, I have proposed setting the saws further apart, or to file off half the teeth of each saw, alternately on opposite sides of the arbor, in the manner represented in the margin; so that while one saw is operating upon the cotton, the other will run free. By this or any other mode of ginning the cotton better, the quantity produced by one machine would be diminished, and the expense increased; but that must be expected when the work is done better, and the advanced price of the cotton ought to pay for it. I am told that some which has been ginned the present season upon an improved gin, so as not to break the staple, has sold for 1½ cents per pound extra; and a sample of this cotton which I have seen is well worth the difference, being entirely free from any of the short or broken fibres generally found in cotton ginned in the usual way. Planters, as well as manufacturers, are fully aware of the difference in value between Madras or Bombay cotton and our own New Orleans, and a similar difference would at once be apparent whenever we should put into the market an article superior to the New Orleans, either on account of length and strength of staple, better cleaned, or more free from broken fibres, or in any particular better fitted for the finer manufactures.

The present advance in the comparative price of Sea Island cot-

ton shows the tendency of things in this particular, and is a full confirmation of what I have said above as to the increased value of a better class of cotton.

I have lately received a sample of what was considered a native or wild cotton from Texas; and from the appearance of the staple I think it could not have been produced from the seeds of any of the cotton in common cultivation. The fibre was exceedingly fine, and the lock of cotton had a fleecy appearance, like Sea Island; but the staple was not strong, nor of extra length.. It might be improved by cultivation, or mixture in the field with other cotton, and experiments for this purpose would be very desirable.

I have gone into this subject much more fully than a simple answer to the questions proposed would seem to require, but I have long been impressed with the importance of the additional value that might be given to the cotton crop of this country by improving the quality. Our supply of the English market at present is only because they find the quality of our cotton better than they can obtain from any of their own possessions; and while they are making every effort in their power to increase the cultivation and improve the quality in their own provinces, this effort can best be counteracted by us by producing cotton of a quality which is beyond the reach of their competition; and as I think we may do, without any sacrifice of profit, for in both the English and Continental markets I believe a fair difference in price has generally been paid for superior cotton.

Yours, very truly,

SAMUEL BATCHELDER.

ROBERT ROGERSON, Esq.

PATERSON, N. J., *July* 6, 1853.

SIR: In answer to certain queries in a communication from the United States Patent Office, I would state that in the manufacture of sheeting, the yarn No. 15's, good Georgia cotton, we find the loss from dust, dirt, and sand, to be from 6 to 7 per cent., and the loss from seeds, leaves, trash, motes, &c., from 4 to 5 per cent., thus making a total waste on the gross weight of cotton used from 10 to 12 per cent. In making finer yarns, where the cotton is carded more, the loss is greater; but, as we never make finer than 15's, the per-centage of loss is not known. It may here be observed that bale cloth and ropes are not reckoned in the above.

The loss in weight arising from shortened or divided fibre, caused by the cotton being badly ginned, is small, and we have no means of arriving at the exact per-centage; but as regards the quality of the goods, the ginning is very important, as it is impossible to make even and smooth yarn when there is much of the fibre cut short; and to give sufficient strength to the yarn, more twist has to be put in, thus causing a loss in the amount produced by a given number of spindles. In purchasing cotton we always look to this point; there is a great difference in cotton in this respect. Some planters appear to take more care than others; and supposing the fibre of two bales to be of equal strength and

firmness naturally, the one which comes to market free from dirt, seed, and leaves, and not cut nor curled in the gin, will always command much the best price.

In regard to the deterioration of cotton, it is the opinion of our oldest farmers that the quality has not fallen off, neither has there been so much false packing as there was some years ago.

Very respectfully,

E. BOUDINOT COLT.

Hon. CHARLES MASON,
Commissioner of Patents.

BOSTON, MASS., *July* 12, 1853.

SIR: In answering the queries respecting harvesting, ginning, packing, and manufacturing cotton, I can afford you but partially the desired information. I am not a manufacturer myself, and it has been only by my professional services as a civil engineer that I have become acquainted with the general operations in the manufacturing of cotton cloth. I have made inquiries, however, of those who have been agents of cotton manufacturing companies, and the results of these, limited and incompetent as they are, are given below.

It is apparent that we, at the North, cannot be very familiar with the growing or harvesting of cotton, ; but, in relation to the first query, I am informed that the fibre in the same boll or lock does *vary* in length, supposed to be owing to the more sterile or sandy and dry condition of the soil on which it is produced—that on rich soil, and less parched by heat, the fibres are of more *uniform* length before they are separated by the gin.

As to the second query, I learn that the per-centage of loss on the gross weight of cotton is from 10 to 13 per cent.—the extremes being in some instances below and above these limits. The loss here referred to is the difference in weight between the cotton as purchased and paid for (that is, invoice weight) and the weight of the cloth manufactured from it. This loss or waste of, say 11½ per cent. on an average, arises from various causes; and as no miller goes into detail on this point, there is no record of the particular losses in the different stages of the material whilst passing from one machine to another. What I give you on this head, however, is mostly conjectural; still, it proceeds from some of our best informed agents. It is supposed that the ropes and bagging make of this 11½ per cent. loss—4½ per cent. if it is Kentucky bagging, and more if of Manilla bagging. The picker waste is put down at 2½ per cent., and here will probably be found the bulk of grit and sand. The carding machine will yield about 2 per cent. of the whole weight in dust, leaves, and motes. Of the residue, it will be difficult to decide without an experiment, which it may not be necessary to make. There is a loss of stock in the spinning, drying, and weaving rooms, and in wiping and cleaning the machinery, whenever it is convenient to use it. The loss in weight from leaves is not so great from their own gravity as from the mischievous effects they produce in the spinning and in adhering to the fibre. If extricated they carry off many full-length filaments, and if retained they give the cloth a rough and unsightly appearance. The leaves are brittle in their nature, break into many pieces, and are very tenacious of their position in the cotton. They produce specks in the cloth, and are at last got rid of by shearing.

The fourth query, relating to loss from shortened or divided fibre caused by ginning, must be answered by referring it to that residue of loss of which we have no particular account. And as to the strength or durability of fibre being affected by the ginning process, I am unable to inform you. This much, however, has been said—that from some cause—say from a damp or matted condition of the cotton when put into the gin—the fibre gets doubled, knotted, or kinked; and this condition, from whatever cause it may arise, affects the threads and is continuous in some degree, gives a cloudy aspect to the yarns, and shows itself at last on the surface of the cloth, and gives it an unfavorable appearance.

Lastly. "The general condition of cotton staple as to length and strength," has *not* "deteriorated within the last twenty years."

Respectfully yours,

JAMES F. BALDWIN.

The following letter was transmitted to the Department of State by George N. Sanders, esq., United States consul at London, from Thomas Bazley, President of the Chamber of Commerce of Manchester:

CHAMBER OF COMMERCE AND MANUFACTURES,
Manchester, February 28, 1854.

SIR: This morning I had the honor of receiving your communication and inquiry of yesterday.

To the simple question, "Do the manufacturers of Sea Island cotton assort it by the lock," I can give the positive reply that they do not; nor would it, upon an extensive or practicable scale, be possible for them to do so. The spinners of fine Sea Island cotton of course esteem the longest staple as the best, and in all their processes they get rid of as much short fibre as they can, and preserve unimpaired all the long fibres. Essentially, the art of the spinner consists of disentangling the fibres; in freeing them from all extraneous substances and impurities; in securing those which are the longest; in obtaining them of equal lengths; and, finally, in placing them parallel, so that they will freely and evenly pass each other in the subsequent process of elongation into a line or thread of yarn.

From my own knowledge, the cotton of Florida is of an excellent and desirable quality for the spinner; but it has been sent to the market in a "craply" or knotty condition, which has greatly diminished its value. I have seen some cotton from that State, cleaned and prepared by the "McCarthy gin," which I believe has been increased in value by that preparation to the extent of 20 per cent. That this gin applied to Florida cotton would be a great advantage, does not admit of a doubt.

If the cotton planter would always recollect that the spinner requires *only pure, even, and disentangled* fibres, I have no doubt that he would

save himself much trouble, and increase the value thereof; and if he could classify the fibres according to their length, and pack the cotton in bales, with equal and assorted fibres, a further advantage would be the result.

At any time I shall be most happy to afford you any information upon this all-important subject which I may possess.

I have the honor to be, sir, your most obedient servant,

THOMAS BAZLEY.

GEORGE N. SANDERS, Esq.,

Consul of the United States, London.

WASHINGTON, D. C., *March* 16, 1854.

SIR: In answer to circulars issued from this Office asking for information upon the subject of the growth and manufacture of cotton, several specimens of cotton in the boll have been received, which have been handed to me for microscopic examination. I had previously given you my views as to the importance of a careful examination of the character of all the textile materials of this country; and as circumstances have brought up questions connected with the fibre of cotton, it seems most convenient to commence with that substance.

The number and variety of the specimens furnished thus far, have been quite too small for the required purpose; and it will be proper to address circulars to manufacturers and producers, calling for specimens of the known varieties in all the different conditions, from the boll to the manufactured article, of every degree of fineness. Meanwhile, the following question has been asked: "Does the product of fibre of an individual seed exhibit an approximate uniformity in its length before separation by the gin?" The information obtained in attempting to solve this question, I now proceed to give at length.

Before making any measurement, I thought it worth while to ascertain how much was already known upon the subject. After pretty thorough search, I could only find the following passage in "Uri on the Cotton Manufacture of Great Britain:" "They (the filaments) vary in length from half an inch to one inch and three-quarters." This and other authors give numerous measurements of the breadth of the fibre; but for some reason, the exact, or even approximate length of staple of the different varieties of cotton, appears to have been considered a matter of no importance. From the communications made to the Office, it would seem that even those who have most to do with the material, have no very definite information upon the subject.

As the object in view was to obtain the length of the fibre in the condition in which it is brought to the gin, the method adopted was to measure every filament that was drawn out; and as care was taken in the separation, most of the staple was uninjured. It is not pretended that every filament was unbroken—in fact, the delicate taper ends were sometimes wanting; but no one was neglected, in order that a fair representation might be made of the available length before ginning. Of course, the most perfect method of conducting that operation could do no more than leave the cotton of the same length.

For the purpose of measurement, the filaments were gently extended

upon a glass plate slightly greased or moistened, and the finger was pressed several times over the whole length to remove the curl. This simple operation consumed more time than might be supposed, as the twist of the filament is very strong in the Sea Island. The measurement was made by dividers, and a diagonal scale to hundredths of an inch. As there always remains more or less of twist in the fibre, the length recorded must be slightly under the truth, and the last figure must be considered as only approximate. The specimens examined were, Georgia Sea Island, three parcels—and one of short-staple "top-cotton," or late cotton, not opened at the time of frost. None of the bolls of the "Sea Island" were fully opened, and it is therefore to be presumed that they had not obtained their full growth.

In order to ascertain more exactly the length of staple in different parts of the same boll, the contents of a single cell that had not yet opened were carefully removed, and a number of filaments drawn from the top, the base, and the middle, respectively; the measurements were separately averaged as given below. Each set of measurements is of fibres drawn from the same boll, or from the same part, and it is to be remembered that all were measured that were drawn out, (the Georgia Sea Island, No. 2, excepted.) The measurements are in inches and hundredths:

GEORGIA SEA ISLAND, No. 1.				GEORGIA S. I., No. 2	GEORGIA SEA ISLAND, No. 3.				TOP COTTON.	
						Not open—all from same boll.			Open—same boll.	
Open.	Partly open.	Open.		Open.	Open.	Base.	Top.	Middle.	Base.	Top.
1.56	1.62	1.34	1.55	1.48	1.30	1.22	0.87	1.16	0.93	1.00
1.63	1.61	1.71	1.57	0.84	1.32	1.24	1.06	1.40	0.94	1.07
1.59	1.75	1.13	1.53	1.57	1.45	0.78	1.34	1.23	1.18	0.70
1.77	1.40	1.22	1.53	1.61	1.10	1.30	1.23	1.46	1.12	1.08
1.77	1.23	1.16	1.35	1.60	1.33	1.17	1.30	0.81	0.97	1.17
1.56	1.34	1.13	1.53	0.98	1.60	1.04	1.50	1.09	1.09	1.12
2.07	1.41	1.17	1.55	2.07	1.50	1.00	1.18	1.26	1.03	1.15
1.47	1.29	1.43	1.77	1.68	1.31	0.88	1.13	1.32	0.98	1.06
1.50	1.61	1.40	1.36	1.58	1.54	0.89	1.07	1.27	0.96	1.07
1.38	1.56	....	1.45	1.69	1.51	1.24	0.72	1.20	0.92	1.13
1,19	1.29	....	1.47	1.60	1.61	1.03	1.33	1.12	0.96	0.96
1.75	1.37	....	1.10	1.48	1.56	1.25	1.00	1.27	0.72	1.05
1.63	1.54	....	1.65	0.83	1.22	1.24	1.29	1.51	0.91	0.95
1,62	1.66	....	....	0.88	1.60	1.26	1.40	1.36	1.16	1.09
1.54	1.40	....	....	0.97	1.36	1.33	1.39	1.24	1.14	1.19
				1.44	1.03	0.95	1.39	1.26	0.97	0.92
				1.44	1.50	0.96	1.27	1.11	1.11	1.07
				1.22	1.50	1.20	1.44	1.43	1.05	1.06
				1.06	1.51	1.30	1.27	1.26	1.17	1.12
				1.58	1.61	1.31	0.77	1.44	1.05	1.11
Av. 1.60	1.47	1.30	1.49	Av. 1.33*	Av. 1.42	1.13	1.18	1.27	Av. 1.08	1.05

It would be necessary to increase the number of these measurements to several thousands, to get any very specific information; but from what has already been done, we may very safely draw the following inferences:

The length of the perfect filaments taken from the same boll is very uniform.

* These measurements can hardly be considered as giving a fair representation of the true range of the length of the fibre. The staple is tender, and the specimen seems to have been roughly handled. In drawing out the fibre, a few very short fragments came out, which were not included in the measurement. The set is retained as it has its value, showing an extremely unfavorable case. It is presumed that all the low measurements were upon fragments.

In reality, some of the long ends of the fibres are broken before the cotton can reach the gin, and this uniformity no longer exists to the same extent.

The average length of the staple of mature Sea Island cotton, of the kinds examined, as it goes to the gin, must be between an inch and a half and an inch and three-quarters.

In extreme cases the length may vary four-tenths of an inch from the average; but the larger proportion is within one-fourth of an inch above or below the average.

The unripe cotton is not subject to any greater variation than the ripe.

There is a *probability* that the fibre taken from the base of the boll is the shortest, and that from the middle the longest, while that from the top is between the two, the variation, however, being very small.

As far as can be seen from a single instance, the short staple seems to be remarkable for its uniformity in length. The gentleman who forwarded this specimen supposed from its immaturity that it might show varied lengths of fibre—in reality it exceeds all the other specimens in equality. A slight examination of these cottons under the microscope shows that each has its distinctive character, and that the Sea Island may differ in its varieties as much as some Sea Island differs from some upland.

The adaptation of the different kinds of staple to different kinds of manufacture is much more intimately connected with the minute characters of the fibre than is generally known; for instance, the peculiar character of the Sea Island does not depend so much upon its greater length, nor upon its fineness, as upon its cord-like or "spiral" structure.

Again: the flat or ribbon-like varieties differ widely from each other, some of them showing, even in their flattened parts, an approach to the spiral structure.

Such peculiarities can only be described and made available after the examination of a large number of specimens, and these should include every kind of cotton, from situations differing as much as possible with respect to soil and climate.

Foreign cottons should be examined both before their introduction and after cultivation, with a view to ascertain the influence of climate. A few seeds of a remarkable specimen of the cotton from the Navigators' island have been distributed. A sketch of this fibre in its original condition you have seen. It will be a matter of much interest to determine what changes will be caused by culture in this country.

To those forwarding specimens for examination, it might be proper to mention that one or two bolls will, in most cases, be sufficient—one may be unripe, but the other should be in the proper condition for gathering. They should be dried before being put up, but not handled more than necessary. The name of the variety should be given, and the source whence the seed was obtained; the kind of soil upon which it was grown should also be described. It would also be desirable that the planter should state whether the specimen was considered as above or under the average quality of the crop. Poor and degenerate specimens, if the circumstances of soil, culture, &c., were well described, might yield much information. Even the contents of a single cell might be forwarded in a letter, if carefully detached.

It can readily be seen that the information collected at a very small cost, might, when properly digested, be of the utmost value to those interested in this staple, to the planter as well as to the manufacturer. It will give me the greatest pleasure to render any assistance towards carrying out your views in this matter.

Yours respectfully,

GEORGE C. SCHAEFFER.

Hon. CHARLES MASON,

Commissioner of Patents.

REMARKS ON THE COTTONS OF INDIA.

[From the reports of the juries of the Exhibition of the works of industry of all nations at London, 1851.]

The collection of raw cotton exhibited by the Honorable East India Company is, as might be expected, large and highly interesting. It consists of a series of samples of the indigenous cottons of various parts of the Indian empire, and samples of the cottons raised in the various government experimental farms during the last thirty years, illustrating the effects produced, and the improvements effected, by the numerous attempts which have been made during that period to improve the cotton cultivation of India.

In considering the native cultivation of cotton in India, it must be remembered that, besides the exports to Europe, very large quantities have every year been raised for home consumption by the native manufacturers, and for exportation to other Eastern countries, especially China; the latter alone having till within the last few years generally exceeded the entire annual quantity exported to Europe. Thus, during the ten years preceding 1833, the quantity of raw cotton exported from India to England was about 250,000,000 pounds; whilst in the same period the quantity exported from India to China, &c., was about 540,000,000 pounds. On comparing together the average total quantity of cotton imported into Great Britain in the years 1830, 1840, and 1850, from the United States and from India, it will be found that while the former during those three periods has increased in about the ratio of 500,000 bales, 950,000 bales, and 1,200,000 bales, the latter has increased in the ratio of 67,000 bales, 163,000 bales, and 300,000 bales; showing, therefore, that, large as the annual increased importation of American cotton into England has been, the increased consumption of East India cotton has, in proportion, augmented even more rapidly.

Of the chief varieties of native India cotton, it may be generally observed, that, though in some cases the fibre is beautifully fine, it is invariably short, generally badly cleaned, and too often injured, by careless collection, bad packing, and faulty inland transit. It must be borne in mind, that these short-staple cottons of India cannot be compared with the long-staple cottons of the New World; they are, in fact

quite different fibres—they must be treated in a different manner, and their uses are perfectly dissimilar. The question of how far long-staple cottons can be advantageously cultivated in India is perfectly distinct from that of improving the production of short-staple varieties. The real practical question to be considered is, not whether the East India cottons can be made to compete with the long-staple American cotton, but whether, by care and attention, by judicious cultivation, improved mechanical contrivances, and the application of skill and perseverance, it may not be possible so to improve the common East India cotton as to give to it those characters and properties which will render it of more value to the manufacturer, by enabling him to use it even more largely, and with greater profit, than he is able to do at present.

On examining the samples of the native indigenous cottons of India, the chief causes of their inferiority are evident: No care nor skill in the cultivation, of course, will render the fibre of short-staple cotton like that of the long-staple variety; but, in many cases, the fault is not the shortness of the fibre, but that the cotton has been ruined after it has been grown and ripened. Either by bad management the staple is broken, or by exposure to the weather, and by the addition of dirt and impurity of all sorts, its value is most materially diminished. The difficulty rests not so much with the cotton as with the cultivator and with the middleman. The indolent habits and the dislike of the former to trouble of any sort, stand more in the way of improvement than anything else; whilst the want of proper encouragement to the native to persevere, and, in some cases, the opposition of the Brahmin, combine to prevent any real progress. In those cases where care and attention have been paid, the native cottons sent over are excellent; and there is no doubt that their value will slowly and steadily increase in the English market, if the cotton be sent to market clean and in the state in which it is gathered.

From the samples of experimental cotton, illustrative of the various attempts which have been made to introduce the cultivation of American cottons into India, it is obvious that, though the introduction of Sea-Island and the other long-staple American cottons may, for the most part, be said to have failed, yet the cultivation and improvement of the New Orleans cotton in India, (which, though not the finest, is certainly the most valuable cotton in the world,) have been attended with very considerable success. The experimental cottons grown from New Orleans seed at the government farms from 1830 down to the present time, prove most satisfactorily that any quantity of good, sound, useful cotton may be imported from India, and that it only needs time and perserverance to give it a high place in the estimation of our manufacturers.

NOTE.—That Great Britain can be supplied with cotton by India, so far as regards the soil and the amount of light, heat, and moisture of that country, provided sufficient skill could be brought to the grand point of good cultivation, there cannot, for an instant, be a doubt. But, owing to difficulties of a social and political nature, India cotton, from its inferior quality, owing mainly to imperfect cultivation, generally finds but little favor in the eyes of British manufacturers. Its short staple renders it unfit for the iron claws of a machine, however suitable it may be for the delicate fingers of an Asiatic; and its foulness, owing to slovenly picking and packing, seriously diminishes the price it would otherwise secure.

It is well known that the London East India Company, for some years past, have directed their attention to this great national object. An abundance of funds have been supplied, and improved machinery sent to India, as well as experienced American planters, who have operated under the charge of intelligent agents; and still the result has fallen far short of what sanguine persons had anticipated. It has been supposed that the inveterate customs, national habits, fixed prejudices, local difficulties, and all that *vis inertiæ* which marks the Hindu population, would be overcome by the importation of a few paid agents and some first-rate cotton gins. No mistake can be greater. India is not, as is imagined by many, a conquered country, to be ruled as easily as an English county. Asiatic princes have given way before British soldiers, but the governed, at heart, remain what they ever were. The object of these people being to keep their subjects in a state of abject dependence on themselves, it is of the highest importance to their interests that no foreign government should be allowed to elevate their condition. In illustration of this, it may be stated that a quantity of the seeds of the New Orleans cotton-plant was obtained some time since and distributed among the villagers of Mysore. But it was found that the Brahmins discouraged the cultivation, as it would cause the disappearance of the native plant, and therefore the "evil eye" would be upon all their efforts. To insure the truth of this prophecy, men, in blanket coats, were sent into the fields at night, and were seen uprooting the young plants. From this it may be inferred that it is not the British government that can produce the necessary changes, and least of all an Indian government. Directors and capitalists may patronize, men of science may suggest, and culturists may execute, but all in vain, so long as things remain as they now are—under Hindu influences and foreign rule.

D. J. B.

CONDENSED CORRESPONDENCE.

Statement of Hon. E. CRAWFORD, *near Blakely, Early county, Georgia.*

Cotton, in this region, is much the most important product in reference to profit or income. Last year I estimated the cost of producing and preparing a crop of cotton for market, at the rate of about 6 cents a pound; when the sum is less than this, the crop does not pay common interest. If produced on soil of average fertility, the range of production in clean marketable cotton per acre may, I think, be stated at from 100 to 600 pounds, and the average not exceeding 200 pounds.

Statement of M. W. PHILIPS, *of Edwards's Depôt, Hinds county, Mississippi.*

The "cotton caterpillar" has been seen here for many years—not to do much injury before 1846. The "rust" has been seen here many years; I remember it well when a boy; but the "rot" was unknown to us, to any extent, except through report and reading, before 1852.

Though, as I said, the worm has been with us for some years, I have seen no damage by the rot before 1852–53. In 1845, I saw acres and acres of the cotton-plant shorn of every leaf—bolls destroyed and injured in all grades; yet I saw not a specimen of the "black" or "brown rot." Last year I examined hundreds of bolls, some with a mere speck, some without an external blemish; yet all the pods inside were in a state of decay. I examined as carefully as I was able for an external injury.

A friend living some ten miles from me, who is an observer, told me that the plant had set more fruit than it could mature, and that nature was only destroying the surplus crop. This could not be so in all cases, for plants within a few feet of each other had but few bolls injured, whilst others carried not a boll to maturity. Again, on land that was of a "mulatto soil," and inclined to rolling, had most rot; whilst level and "marsh land" had most rust. I have seen no more rot on parts of fields where the "boll-worm" depredated most, or where the caterpillar begun, than where they had not been. My friends and correspondents were, and are now, searching for seed where there had been no rot, expecting future crops to be ruined, as in about the year 1818. I have not done so, but have taken my pork-brine and used it freely on seed before planting, drying off with plaster, lime, or ashes. I have not had half so much rot. I do not attribute my escape to the salt, nor do I know anything of this matter.

I have seen the "rust" more or less in different lands for twenty years. Sometimes of a dry year, it would disappear after rain, or cease its ravages. Again, when on flat lands, of a wet season, it would cease in dry weather. This year my brother-in-law, A. K. Montgomery, near me, who has been more injured than any one on our rich level lands, tried sowing salt broadcast. He has had much less rust than usual, and has come much nearer making an 1852 crop than any one near him. I tried notonly salting my seed, but drilling in the row from two to four bushels to the acre. I have seen much less rust or rot; but there has been much less everywhere, so far as I have seen or heard. Here again I confess my ignorance, unless I contend—as I have less rust, and planted the same land more years without it; as I vary the crops on the same land more than others—it is rotation benefits me, and the land "tires" of the cotton-plant, which is only saying there is mystery about it all.

I have tried guano, bones in the crushed and dissolved state, superphosphate of lime, and gypsum, in various quantities; but this year has not been favorable for such experiments—none have paid this way.

North and South may keep up a muss as long as life lasts; but this one thing is a fixed fact—that, next to bread, cotton is of more importance to our country, aye to the world, than any one thing; and the general government could with propriety appropriate, say $10,000 for the express purpose of testing what is best for cotton culture. The world, including the cotton-growing negro, as well as the rest of mankind, now see that the cotton culture can be healthy even if full crops be made every year; and that, though the ablest civilian of our age thought we would be ruined by 3,000,000 pounds too much increased culture, a small planter was correct in saying our prosperity was dependent on full crops and fair rates. The cotton region can make a crop at a will to do business, at 8 cents, whereas other parts cannot live at less, perhaps, than 10 cents; which would bring in much competition from abroad. Let cotton be at 8 to 10 cents, and those countries requiring 10 to 12 cents a pound go to other work.

Statement of JOSHUA HARRIS, *of Welches's Mills, Cabarras county, North Carolina.*

Cotton, the great staple of this county, has fallen so short of the last crop, that there will be only about half as much made as was made here in 1852. A great frost made its appearance on the 18th of October, and killed it so badly, that what will even open will be of little value. I would say that there will be but 200 pounds of clean cotton to the acre. The price, at present, at the nearest market, is only $9 per hundred. Cotton is raised as far north as this; but we are on the line between a cotton and no cotton country. The seasons are too short, with cold springs, which render it difficult to get a good early stand.

Statement of A. M. HANNA, *near Danville, Montgomery county, Texas.*

The fact that I made 51 bales of cotton, (Dean seed,) 500 pounds to a bale, 1,800 pounds to the acre, and 17 bales to each hand, can be well authenticated by all of my immediate neighbors. I had seventy acres of "hog wallow" prairie land, of a black and stiff soil, cultivated chiefly in cotton, oats, sweet potatoes, and Indian corn.

I planted my cotton very early, preparing the land in the best manner, and had no drawbacks to contend with from crab-grass, insects, unpropitious weather, nor of any other kind. It was the second crop in the field, on which no cattle had been permitted to run, and had been made mellow and easy to work by copious rains and winter frost. It was well worked throughout the season with three hands, including myself, with four hands to save the crop.

The yield per acre of my other crops was 40 bushels of corn, 300 bushels of sweet potatoes, and 20 bushels of oats. No manures ever used.

FLAX AND HEMP.

Common flax is an inheritant of temperate countries, from the neighborhood of the tropics to the polar circle, wherever the temperature of the climate is not depressed by mountain elevations; but it is not

known to what region it owes its origin. It may be thought strange, perhaps, by some, that this plant should thrive in the hot valley of the Nile, and in regions so cold as those of Russia and Norway, in latitude 65° north; but this circumstance is obvious when we consider how rapidly this product completes the cycle of its growth, and that in the north of Europe it is an object of culture in summer, and in Egypt only in winter. In the latter, it is sown in December or January, in the fields just quitted by the overflowing Nile, and is harvested in April or May; in the north of Russia, it is sown in May, and harvested in August or September; the conditions of the temperature of the two places being nearly the same.

The history of this plant, which has long served as the medium of clothing myriads of human beings, of wafting ships from sea to sea, of conveying thoughts from man to man, from nation to nation, and of diffusing light and knowledge to the utmost parts of the earth, like many of our products, is involved in lost antiquity. Early mention is made of it in the sacred volume, where it is said that "hail destroyed the flax and barley," when Moses was striving in vain to move Pharaoh to allow the departure of the Israelites. The Egyptian mummies are wrapped in linen—an undeniable proof of the use of flax in the remotest past. It was also known to the Romans, as Pliny, who wrote more than eighteen hundred years ago, remarks on the wonder that so great a power should be developed from so small a seed as that of flax, in producing a plant which could be the means of bringing Egypt so near to Italy, in allusion to the fact that commerce and navigation depended principally upon its production; but, at the same time, grew angry, that men should venture to brave nature by setting sails on their vessels, and cursed those who invented the mariner's art, as well as those who brought it to pass that men should perish by it, not only on the earth, but on the sea, without finding burial.

Hemp, which is supposed to be a native of India, but long since acclimatized and extensively cultivated in various parts of Europe and America, also forms an article of primary importance in commerce, and is of extensive utility.

Both flax and hemp were introduced into the British North American colonies soon after their settlements by Europeans. The former appears to have been cultivated at New Netherland as early as 1626, as it is mentioned, among other products sent to Holland by the colonists on Manhattan island that year, as an evidence of their prosperous condition.

According to the records of the "Governor and Company of the Massachusetts Bay, in New England," the seeds of hemp, and flax were ordered to be introduced into that colony, in 1629. In about the year 1745, some emigrants from the north of Ireland came to Massachusetts and established an improved manufacture of linen and other "spinning work." Many trials had been previously made in that colony for raising hemp, but the soil was not considered sufficiently strong. Two acres of cow-pen land would produce a ton of fibre; but it soon exhausted the soil. Flax was cultivated in considerable abundance in that State soon after the war of independence, particularly at a distance

from the coast. Manufactures were established at Salem and Springfield, in about the year 1790, for making sail-cloth.

Hemp and flax were annually cultivated, spun, and woven, by Captain Matthews, of Virginia, prior to 1648. Bounties were offered for the production of hemp in that colony in 1651, and on flax in 1657; but on the cessation of the bounties the culture declined. In 1662, each poll in Virginia was required to raise per annum six pounds of linen thread. The Irish immigrants who came to Londonderry, in New Hampshire, in 1719, soon after commenced the manufacture of linen cloth and thread, which was afterwards entered into by others, and large quantities were sold.

In 1730, the Assembly of Pennsylvania passed an act for the encouragement of growing hemp, showing that some progress had already been made in its manufacture. The Irish settlers of that colony manufactured considerable quantities of linen, besides enough for their own consumption.

In 1733, the British Parliament granted to the patentees of Georgia, for the encouragement of the culture of wine, silk, cotton, wool, cochineal, flax, and hemp, £10,000; between that period and 1743, £120,000; in 1749, £5,324.

Early attention was paid to the cultivation and manufacture of flax and hemp in Ohio, Kentucky, and Indiana. Between November 24, 1810, and January 24, 1811, there were transported down the Ohio, in flatboats, 400 pounds of hemp, 479 pounds of tarred rope, 20,784 pounds of bale-rope, 154,000 pounds of rope-yarn, 1,484 pounds of thread, 27,700 yards of bagging, and 4,619 yards of tow cloth. Extensive factories had already been established at Louisville, Lexington, Shelbyville, and Frankfort, in Kentucky, where considerable quantities of cordage, bagging, &c., were made for transport and domestic use.

The Harmonists of Indiana erected a mill prior to 1796, in which they manufactured 4,000 pounds of flax and hemp in 1809. Since that period the rich lands of the Western States have been more or less cultivated with hemp, which is now produced as a staple crop.

The fibres of flax and hemp have never been produced in this country in sufficient abundance to enter into our foreign commerce, nor for domestic use in the finer articles of wearing apparel, except thread and lace. Liberal premiums have been offered by the American Institute of New York and other institutions, for the manufacture of finer fabrics; samples of which have been produced from time to time that reflected much credit on those who made them, and which were pronounced equal to any imported.

There were exported from New Jersey, in 1751, 14,000 pounds of hemp; from Savannah, in 1770, 1,860 pounds. The amount of flaxseed exported from Philadelphia, in 1752, was 70,000 bushels; in 1767, 84,658 bushels; in 1771, 110,412 bushels; from New York, in 1755, 12,528 hogsheads.

The amount exported from the British North American colonies, in 1770, 312,612 bushels; from the United States, in 1791, 292,460 bushels; in 1800, 289,684 bushels; in 1810, 240,579 bushels.

The quantities and values of flax and hemp and their products ex-

ported from the United States, of domestic growth and manufacture, within the last thirty-three years, are exhibited in the following table:

Years.	Hemp.	Value.	Flaxseed.	Value.	Linseed oil.	Value.	Linen cloth and thread.	Bags, &c.
	Cwt.	Dollars.	Bushels.	Dollars.	Gallons.	Dollars.	Dollars.	Dollars.
1820-21	....	....	264,310	420,202	16,370	....	....	....
1821-22	....	....	289,111	392,772	18,527	....	....	....
1822-23	....	....	232,761	262,314	13,594	....	....	....
1823-24	....	....	377,226	504,327	13,924	....	....	....
1824-25	....	....	234,042	234,845	9,022	....	....	....
1825-26	....	....	117,672	144,908	9,117	....	2,937	5,444
1826-27	....	....	124,287	188,606	9,673	....	11,084	5,364
1827-28	....	....	118,492	144,095	9,200	....	5,335	3,365
1828-29	....	....	68,758	113,040	5,322	....	2,166	14,954
1829-30	....	....	115,762	180,973	3,914	....	2,152	1,779
1830-31	....	....	120,702	216,376	8,643	....	231	2,599
1831-32	....	....	57,537	123,036	4,495	....	1,570	2,685
1832-33	....	....	117,292	228,300	3,159	....	5,964	18,985
1833-34	....	....	187,468	281,990	15,728	....	4,889	6,162
1834-35	....	....	228,863	451,886	2,370	....	795	1,575
1835-36	....	....	123,926	250,182	1,785	....	6,720	7,385
1836-37	....	....	33,147	50,553	4,660	....	18,422	29,898
1837-38	....	....	35,651	55,954	5,604	....	1,244	2,146
1838-39	....	....	66,781	161,896	3,253	....	2,010	2,047
1839-40	....	....	76,970	120,000	3,968	....	7,114	1,128
1840-41	....	....	32,243	50,781	10,072	....	2,764	10,636
1841-42	....	....	18,354	34,991	4,367	....	....	1,038
1842-43	....	....	35,002	49,406	4,185	....	....	326
1843-44	....	....	15,006	23,749	6,327	....	....	311
1844-45	....	....	178,007	81,978	7,416	....	950	13,812
1845-46	....	....	107,959	165,438	8,656	....	1,364	10,765
1846-47	....	....	968	1,346	6,701	....	477	5,305
1847-48	....	....	1,017	1,584	11,066	....	495	6,218
1848-49	....	....	4	4	7,797	....	1,009	4,549
1849-50	787	5,633	2,501	4,040	13,448	....	1,183	10,593
1850-51	4,769	29,114	9,185	18,988	20,193	....	1,647	6,376
1851-52	3,067	18,649	31,304	56,187	18,073	14,981	5,468	8,154
1852-53	2,413	18,195	3,932	7,719	18,266	15,468	2,924	13,860

According to the census returns of 1840, there were raised in the United States 95,251$\frac{3}{4}$ tons of flax and hemp; of 1850, 34,871 tons of hemp and 7,709,676 pounds of flax, besides 562,312 bushels of flaxseed; showing a diminution in the aggregate growth of fibre of about 56,000 tons. The amount of hemp raised in the Union in 1853, may be estimated at 34,000 tons; and that of flax, 8,000,000 pounds, besides 58,000 bushels of flaxseed; which, in reckoning the hemp at \$100 per ton, the flax fibre at 10 cents a pound, and the seed at \$1 25 per bushel, would be worth, in the aggregate, \$4,272,500.

CONDENSED CORRESPONDENCE.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Flax is raised with us more for its seed than for its lint. The general average of seed to an acre, sown broadcast, is five bushels. The substitution of cotton fabrics for those in which flax formerly entered largely into composition, is rendering this article, except for its seed, an object of very little attention to our farmers. Besides, it is considered a very great exhauster of the soil, and justly so, for it not only returns nothing to the earth, but the roots, when pulled up, leaves the ground exposed in perfect nakedness to the rays of the summer sun. The seed is worth here about \$1 25 per bushel.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

Flax, to get a good, fine, heavy coat of lint, should obtain its growth before the hot season comes on. It should be sown upon very rich and rather moist land, early in April. If it is desired to get a fine quality, suitable for good linen, it is necessary to sow quite thick, say three bushels per acre; but if it is only required for canvass or cordage, about two bushels are sufficient.

My estimate for an acre, based upon the experience of only three or four crops, is as follows:

Ploughing once	\$1 38
Harrowing twice	76
Seed, two bushels	2 00
Sowing	13
Pulling and binding	2 00
Threshing off the seed	1 50
Rotting by the dew	3 00
Dressing by hand 400 pounds, at 6 cents per pound	24 00
Total	34 77
Deduct for 10 bushels of seed, \$10	10 00
	24 77
Product per acre, 400 pounds, at 15 cents	60 00
Profit per acre	35 23

Statement of JOHN B. YOUNG *and* JAMES DE MOTT, *of Ovid, Seneca county, New York.*

Flax has been cultivated with us heretofore for the seed only, and the stalks burned; but the straw is now worth \$5 per ton, for the purpose of manufacturing into lint, and is sent East to be made into cordage, and for other purposes. This, however, is rather an experiment

than otherwise. Should it succeed well, it will give a new impulse to the cultivation of this crop.

Statement of JACOB KNOOP, *of Elizabeth, Miami county, Ohio.*

Flax has been cultivated with us pretty extensively, for the seed only. No use is made of the fibre, or lint. The price of flaxseed is from $1 to $1 25 per bushel. Average yield, about 10 bushels to the acre.

Statement of JAMES DURLEY, *of Platteville, Grant county, Wisconsin.*

A considerable quantity of flax was cultivated last season in this county, and turned out well. The average yield of seed to the acre was about 15 bushels, which is worth $1 per bushel at the mill.

Statement of GUSTAVUS DE NEVEN, *of Fond du Lac, Fond du Lac county, Wisconsin.*

Flax has been cultivated to some extent in this county, and an oil-mill has been erected near Fond du Lac. I have sown about two acres the past season; but I fail to be convinced that it will be as profitable as some other products. The yield of seed with me was about 8½ bushels to the acre, worth here about 88 cents a bushel. Quantity of seed sown, half a bushel to the acre. The lint is generally thrown away, but would pay sufficiently well if saved.

Statement of ALEXANDER O. MCGOWAN, *of Berlin, Marquette county, Wisconsin.*

An increasing interest seems to be taken in the cultivation of flax in this region. Considerable quantities were successfully raised in Waushara and Marquette counties, and it is considered a paying crop for the seed alone; 86 cents at home, and $1 06 at or near Milwaukie, having been offered per bushel.

From the information which I have been able to obtain regarding the growth of flax, last season was indefinite and unsatisfactory, because, necessarily detached and unsystematized, it must be, in so new a country as ours. My opinion of last year is thus far fully sustained, and I have no doubt but, if we had a few flax or scutch mills in every county, and a few spinning mills and bleaching greens in the State, where there is an abundance of water-power for every purpose, we should be able to turn out "Wisconsin linen," perhaps as good and as cheap as the universally admired "Irish linen." All we want is the encouragement of manufacturers; for cheap food and higher wages would soon attract men of energy and skill from the extensive manufactories of Ireland, who are acquainted with every process, and in a short time would be the means of retaining in this country the thousands of dollars that are now annually expended for linen abroad.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Hemp is grown to some extent in this neighborhood. It is not a very uncertain crop, and will yield, as an average, 700 pounds to the acre. Present price of hemp per hundred, $5; cost of production per acre, as follows:

Rent of land	$4 00
Cost of seed, and putting in the crop	4 00
Cutting and stacking	2 00
Rolling, &c	1 00
Breaking and cleaning for market, &c	6 50
Cost of 700 pounds	17 50
Market value of 700 pounds	35 00
Profit per acre	17 50

Statement of R. HUGHES, *of Fayette, Howard county, Missouri.*

Hemp, with us, requires the dryest and richest land in the State, to insure success. It is best to take new land, and not cultivate it in any other crop. It may be grown on good ground twenty consecutive years, with equal success, allowing for the variation in seasons

The best mode of preparing the ground is to plough deep, and, if dry, as early in March as you can. It should be harrowed as it is ploughed; and if there are clods, they should be pulverized. Let the land lie in that state until about the 20th of April; then plough as above, sow the seeds at the rate of 1½ bushels per acre, and harrow twice—first with a common harrow, and the second time with a lighter and finer one.

Hemp should not be cut too green, as the lint will be light. The leaves should commence falling, and the stalk be yellow. The common hemp-hook is the best instrument for cutting. The hemp-cradle is used by many, with which one hand will cut an acre per day; but the difference in time is more than lost in the waste of hemp, not cutting it low enough with the cradle.

A hand can save as much with the hook in a good season as he ought to break, or can break, in the cool weather, which is the only time hemp should be broken. A part of the crop should be put down to water in October, the balance early in November. Early watering will be the darkest, but the fibre the softest and strongest. The late watering will be the brightest, but the most harsh and brittle, and consequently not so strong. The average crop is sometimes estimated at 1,000 pounds per acre, which is often made, and occasionally more; but 800 pounds are nearer an average than a higher figure.

Hemp ground is often ploughed after the crop is cut and taken up, to prevent the growth of grass, which only occurs when the crop is failing. This course is evidently injurious to the land. It exposes it to the hot sun at a dry time of the year, from which it receives a weak-

ening, killing influence. The management would be to leave the land undisturbed until spring, with all the litter and stubble on the surface. The stubble, leaves, and under-hemp, will preserve the land from the scorching sun; also from the beating, washing rains in the winter. Then, when the hemp is watered, taken up, and put under the break, there will not be half the amount of dust. If hemp ground becomes too grassy to yield a good crop, the better plan is to sow it in wheat and Timothy in September, and red clover in the winter. Two years in that condition will make a preparation that will cause one acre to produce more lint than two while infested with grass.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Hemp is one of the most important crops of this State. I have no means of ascertaining the exact quantity raised in Missouri, as a good deal is shipped in other shapes than the raw material. The culture of this great article is increasing, and adding greatly to the wealth of our farmers. The comparative cheapness of our lands, with equal shipping facilities, will ultimately enable this State to outrival Kentucky in the culture of this great staple.

The average product of hemp here is 700 pounds to the acre, and the price varies from $100 to $130 per ton. The usual mode of estimating the quantity of well-grown hemp to an acre, is to note the height of the plant in feet—each foot giving 100 pounds. Thus, hemp nine feet high at maturity will turn out 900 pounds to the acre.

Statement of W. M. JACKSON, *of Fayette, Howard county, Missouri.*

Hemp grows well on our best lands, and is a certain crop. It generally yields from 700 to 1,000 pounds, and frequently 1,200 and 1,400 pounds, to the acre. We sow, early in April, from 1 to 1¼ bushels of seed to the acre; and commence cutting the early sowing the 1st of August. After cutting, it is shocked in the field, and is spread on the same ground to "water" in October and November. It is generally watered or rotted by the 1st of January. Then commences the laborious job of breaking, which requires stout hands. It is sold at the river, or baled and shipped to St. Louis.

The prices of hemp have varied within the last fifteen years from $65 to $120 per ton. At present, it is worth $100 per ton. It is a profitable crop at $100. A succession of crops may be continued without any diminution of soil.

Statement of H. L. BROWN, *of Fayette, Howard county, Missouri.*

The culture of hemp is on the increase, and does not impoverish the soil. It can be grown successively upon the same ground for many years without detriment to the land. The average yield per acre is 800 pounds, at a cost of 3 cents a pound.

CULTIVATION OF THE OSIER.

The uses to which the osier may be applied are so varied, that it would be useless to attempt to enumerate them here. Being an aquatic plant, and of a rapid and vigorous growth, it is peculiarly fitted for planting on the banks of rivers and streams, for restraining their encroachments, and retaining in its place the soil. The annual shoots, which are of different degrees of length, are used, with or without their bark on, for the different kinds of basket-making, wicker-work, &c. They may also be employed for binding up stalks, flax, and grain, instead of straw. The finer and smaller shoots may be used for tying up trees, shrubs, and vegetables, for the purpose of sending to market in bundles; for confining the branches of trees to walls or espaliers; for tying up standard trees and shrubs into shape; for making skeleton frames on which to train plants in pots; for tying bundles and packages; and for a thousand other purposes, which are familiar to every gardener, or will readily occur to him in practice.

The most vigorous-growing species, adapted for basket-making, is unquestionably the twiggy-willow, or common osier, *(Salix viminalis,)* and it is also the kind most generally cultivated for that purpose. It has no disadvantage, except that in cold, wet seasons, in a high latitude, and in a moist soil, it does not always ripen the points of its shoots. The other kinds, which perfectly ripen the points of their shoots in most seasons, are the red or purplish-twigged osier, *(Salix rubra;)* Forby's willow, or fine basket osier, *(Salix forbyana;)* the deceptive, or white Welch willow, *(Salix decipiens;)* and the stipuled or auricled-leaved osier, *(Salix stipularis.)* The best of these is, perhaps, Forby's willow. The three-stamened-flowered osier *(Salix triandria)* is nearly as vigorous as the common osier. The purple-twigged willow, *(Salix purpurea;)* the yolk-of-egg-colored willow, or golden osier, *(Salix vitellina;)* and the helix or rose willow, *(Salix helix,)* are very desirable species, where small, tough rods are required. A very valuable osier naturally abounds on the Great marsh on Grand island, in Niagara river; but the above-named species are considered as by far the most valuable.

Soil and situation.—The soil for basket willows should be of a deep sandy loam, well drained, and thoroughly prepared; and the situation ought to be low, level, and naturally moist; and if there is a command of water for irrigation, so much the better. It will succeed, however, on a somewhat dry soil, in which the shoots will not only be smaller, but harder, tougher, and more compact and durable, than when grown in a soil that is rich and moist. In dry soils, also, the growth of the plant is much slower than when it has been impelled by an extraordinary supply of water. The best situation, when the object is free and rapid growth, is along the banks of rivers and brooks, that pass through a level country, and on the small islands which frequently occur in the midst of streams; in hollows or swales, also, the soil of which is composed of rich, soft, earthy particles, and which can be laid dry, are the most eligible sites for converting into osieries; and if such can be occasionally soaked with water during the dry months of summer, the situation may be considered as perfect. Completely draining the site for a basket-willow plantation is the first step towards its formation

and the foundation of its success, and consequently, of the profit to be derived from it.

In preparing the ground for an osiery, if the soil be poor, it should be as well dressed with stable dung as if it were intended for a crop of barley or wheat. Lime, as a manure, has been tried; but it was found that the twigs became much fired, or spotted with a sort of canker, and in attempting to bend them, they readily broke at the cankered spots. In no case should a plantation of willows be attempted but in prepared ground; except, perhaps, where a few rows may be introduced upon the brink of a river, or on the top of the banks of ditches, which form in most instances the barrier of waters, where the soil can scarcely be dug or otherwise ameliorated.

Propagation and culture.—All willows may be propagated by cuttings, though some of the more rare Alpine kinds with difficulty take root. Some species also grow very readily from seeds. The cuttings for osiers, which may be grown in nurseries previously to their removal to their final situations, should be made of one-year-old wood, about a foot or sixteen inches in length, cut straight across at the lower end, and in a sloping direction at the upper end. They should be planted perpendicularly in the soil, to a depth of three-fourths of their length, with the earth firmly pressed to them, more especially at their lower extremities. The reason the lower ends of the cuttings are cut directly across, and not sloping like the upper ends, is, that they may form equal callosities all around, and consequently throw out an equal number of roots from these callosities on every side. It has been found by experience that when a cutting is inserted in a sloping direction, roots are protruded nearly equally through all that part which is buried in the ground, unless the soil has become more closely pressed against one part than another. In this case, the roots will there be protruded in greater abundance; and if the soil has not been pressed to the lower extremity, it would probably produce no roots at all at those points, but rot. The upper extremity of the cutting is cut in a sloping direction, for the purpose of shedding off the rain. The top end of the shoot, as far as it appears soft, being unripe, should be discarded, because such wood will only produce weak plants, and will not make so good roots the first season as the firmer parts of the shoots will do. Pieces of two-year-old shoots of the same length as above, and cut in the same manner, may also be used; but these are more expensive, and no better for the purpose than the former.

The distances at which osiers for baskets or wicker work, ought to be planted apart, are 18 inches between the rows, and 12 inches in the other direction. At these distances, 29,040 cuttings will be sufficient to plant an acre. These distances will not be found too near for at least five or six years; but after that period every alternate plant should be grubbed up by the roots, which would leave those remaining at two feet apart in the rows. The best season for planting cuttings of two-year-old wood, in a well-drained soil, is late in autumn, in consequence of which the buds will swell during the winter, and be ready to grow with vigor in the spring; but in a wet soil, and in climates where they are liable to be loosened by winter frosts, cuttings planted in autumn should be made firm a second time in the spring. The proper time to plant the slips of one-year-old wood, in a high latitude, is a few weeks previous to their natural period of putting out leaves. The cuttings may first be planted in a nursery, and removed the autumn or winter following, or they may be planted at once in the sites where they are finally to remain. In either case, if the soil is not sufficiently moist, due attention must be paid to give them water in dry weather.*

Management.—Osier plantations must be carefully cleaned and hoed every year. Nothing contributes more to the raising of a good crop of twigs, after due preparation of the soil, than keeping them clean. The stools should be annually attended to from the first year of cutting a crop of twigs, by clearing the rotten stumps and not allowing the plants to be over-crowded by the young shoots at their base. When these have become too numerous, they should be carefully thinned out, and also cut down, leaving only one or two eyes at the bottom of each, until they are reduced to such a number as the stool is capable of vigorously supporting until the fall of the leaf. A basket-maker finds one shoot of six to eight feet in length, of more value than four of three feet in length; and one of the former of these dimensions will not so much exhaust the stool nor the land as four of the latter.

The proper season for cleaning and thinning the stocks is in March or April, or a month or six weeks before the osier puts forth its leaves. The reason for choosing this period for the operation is, that if it were performed in autumn, the germs of the buds existing at the base of the small shoots, which have been cleaned off, would swell, in the course of the winter, and be liable to throw out shoots in the following spring; whereas, by delaying the cutting of these till the sap is in motion, the germs remain dormant, and the whole current of sap is taken up by the buds already formed. The cleaning of the plants may be done with a sharp knife, and if it has been regularly attended to from the commencement of the plantation, it is neither troublesome nor expensive. Indeed, this care is deemed necessary, were it only for guarding the plants from the ravages of insects.

Cutting and disposing of the crop.—The proper season for cutting the basket-willow is in autumn, directly after the fall of the leaf. The advantage of cutting at this period is, that the buds which are left to produce the shoots for the succeeding crop immediately begin to swell, and grow in strength during the winter, in consequence of which, they make much earlier and more vigorous shoots in the following spring. As soon as the rods are cut, they are generally tied up in bundles, three feet nine inches in girt; and if they are not intended to be used green—that is, with the bark on—they may be set on their thick ends, in standing water, to the depth of three or four inches, where they may remain during winter and spring, until the shoots begin to sprout, when they are ready to be peeled. Sometimes it happens that osiers are cut with the leaves on, in which case they should never be tied up in bundles, on account of the fermentation that would be produced by binding them closely together in that state. Therefore, they should be set up thinly and

* See Loudon's Arboretum, vol. iii, p. 1456, *et seq.*

loosely on their ends, with their tops leaning against a rod supported on two props.

The operation of peeling is so very simple that it may be done by old, infirm persons, at a stipulated price per bundle. The apparatus employed for the purpose consists of an iron fork, about 16 inches long, with tines or prongs, about half an inch in diameter, placed sufficiently near each other to pinch the osier rods, and tapering somewhat towards their tips. The shank, or large end of the fork, should be sharpened to a point, so that it may easily be thrust into the ground. When the shank of this implement is firmly inserted into the earth, or in a block of wood, the peeler sits down, taking a rod or twig, by the small end, in his right hand, and puts a foot or more of the thick end between the prongs of the instrument, which he then presses together with his left hand, while with his right he draws towards him the rod. By this operation, the bark of the large end will at once be separated from the wood, and by shifting or reversing the ends of the rod, and drawing it through the fork, the peeling will be complete.

The rods, when whitened or peeled, are usually tied up in bundles, the bands of which are 3½ feet long. In a peeled state they will keep better, to wait a market, than if left with the bark on; for it is stated that they never fail to produce a better return, notwithstanding the cost of the labor of peeling, than when sold immediately after they are cut from the stool. In Germany, and also frequently in Scotland, the osiers, after being cut and tied up in bolts, are stacked or kept in an airy shed; and when the bark is removed, it is effected by steaming or boiling them in water. Rods thus prepared are considered to be rather more durable than when the bark is separated, in consequence of the rising sap, and they may be worked up directly after cutting, instead of remaining several months in a useless state.

GRASS, HAY, AND OTHER FODDER.

The hay and fodder crops, including the dried blades, shucks, and tops of Indian corn, as well as the succulent corn-plants and other green forage, cultivated solely for *soiling* or for drying into fodder, chopped straw, the haulms of beans, peas, potatoes, &c., which are by no means inconsiderable, may be ranked among the most valuable of the United States.

In the early settlements of the Atlantic States north of Virginia, the cattle of the inhabitants were chiefly dependent upon the wild indigenous grasses—such as the white clover, herdsgrass, (red-top,) wire-grass, Indian grass, secretary grass, fowl-meadow grass, and the coarser herbage of salt marshes, beaver meadows, and other swampy grounds. In the Middle and Southern colonies, they foraged upon the wild herbage of the country in the same manner as the existing cattle do on the crab-grass of Florida, Carolina, and Georgia, or the buffalo, muskeet, and the grama grasses of Louisiana, Texas, and New Mexico, as well as on wild cane and the leaves, boughs, and the fruit of trees.

Fowl-meadow is described as growing in abundance around Massachusetts bay as early as the year 1629, with large, tall stalks and broad, rank blades, which were much relished by cows, horses, hogs, and goats, and upon which they thrived.

Secretary grass was used for pasture and hay as early as 1670, as will be seen by the following passage by Denton, in his "New York," published that year: "Towards the middle of Long Island," says he, "lyeth a plain sixteen miles long and four broad, upon which plain grows very fine grass, that makes exceeding good hay, and is very good pasture for sheep or other cattle; where you shall find neither stick nor stone to hinder the horse-heels, or endanger them in their *races*, and once a year the best horses in the island are brought hither to try their swiftness, and the swiftest rewarded with a silver cup, two being annually procured for that purpose."

The *crab-grass* or *crop-grass* of the South bears one or two cuttings a year, growing to a height of two or three feet, appearing in April or May, and makes good fodder.

Among the foreign grasses cultivated in this country, the Timothy (herdsgrass of New England) stands pre-eminent. It is said to have received its name from Timothy Hanson, of Maryland, who brought it from North Carolina in about the year 1770. About ten years after, it found its way to England, where it proved well suited to the soil and climate, and received the name of *Phleum pratense*, or "meadow cat's-tail grass." It has been cultivated as a favorite crop for a long time in Sweden and other parts of Northern Europe; but from what part of the world it originated, is at present unknown, as it is nowhere found in a positively indigenous state.

The next plant in extent of cultivation among our forage crops, of foreign origin, is the common "red clover," which has become widely naturalized, and is profitably raised by all good farmers. The precise period of its introduction is not known; but on the authority of Watson, in his "Annals of Philadelphia," John Bartram had fields of it on his place at Kingsessing prior to the Revolution; and according to Darlington, it was introduced into general cultivation in Chester county, Pennsylvania, between the years 1790 and 1800. About the beginning of the present century, clover-seed became an article of export. It was cultivated to such an extent in Suffolk county, New York, that more seed was carried to market from that county than from the whole State besides. It was not uncommon for a farmer to sell 30 bushels of this seed in a year, which, in many instances, brought him more clear profit than all the rest of the produce of his farm. In 1750, the best dairy farmers in Rhode Island cut two hundred tons of hay.

Near Frederick, in Maryland, meadows were irrigated artificially for growing hay, either before or soon after the Revolution, on which our indigenous white clover grew thick and fine. According to the census of 1840, the hay crop of the United States was 10,248,108¾ tons; of 1850, 13,838,642 tons; showing an increase of 3,590,533¼ tons. The crop of 1853 may be estimated at 14,500,000 tons; which, at $10, would amount to $145,000,000.

CONDENSED CORRESPONDENCE.

Statement of T. L. Hart, *of West Cornwall, Litchfield county, Connecticut.*

In laying down meadows, clover and Timothy are considered the best grasses. The quantity of seed should be four quarts of each to the acre. The best fertilizer for meadows is a top-dressing of swamp muck, prepared by being placed under the floors of stables, in the milking yards, in the hog-pens, or in a place prepared for the purpose back of the house, where all the suds and wash of the house during the year may be absorbed, and thus saving the best portions of manure the farm affords, which, in ordinary cases, is worse than lost. Any farmer who has peat muck near at hand, and will devote sufficient time to making and saving the above-named manures, may double the products of his farm in five years. After spreading this upon the surface, a dressing of plaster should be applied, at the rate of five pecks per acre.

Statement of B. V. Iverson, *of Columbus, Muscogee county, Georgia.*

I have now (November 25) a field of one hundred acres, as level as a floor, of a winter grass from 8 to 10 inches high, the seeds of which were sown late in September last, and which more than one hundred head of cattle, with horses, mules, sheep, and hogs, cannot keep down from this time to June next. This grass will keep them all fat throughout the winter and spring. It makes the cows give the greatest abundance of the richest milk, and the sweetest and yellowest butter. It enables a man to have fat beef, mutton, pork, turkeys, and chickens for his table, and will then (the stock being removed) go to seed, and yield from four to six tons of nutritious hay per acre. This grass no "freeze," however severe, ever hurts; no insect troubles it; no overflow of water retards it; no ordinary drought affects it. It reproduces itself on the same ground without re-sowing, enriching a field, besides grazing the stock and yielding its hay.

It does not spread, but is easily gotten rid of by ploughing under; and above all, this grass, with our great Southern pea to follow it, will give to planters the cheapest, the earliest, the simplest, and the most paying plan to restore worn-out fields, and refertilize those not yet exhausted, which the ingenuity of man can devise. These two crops will restore the most worn and exhausted field, and richly pay us all the time they take to do it.

This grass, on *very rich ground*, will grow four feet high, and I am in the bounds of truth when I say it will produce over 100 bushels of seed from an acre. The seeds are larger than those of any known species, being nearly as large as grains of wheat. It is equally as nutritious as barley, and stock of every kind, together with every species of domestic fowl, are fond of it. For sheep, it has no equal; for making hay, no grass can compare with it. In fine, I say, without the least reservation, that the *Ceratochloa breviaristata* (which is the botanical name of my grass) is without a rival in our climate and soil. The seeds of this grass I propose to sell the coming year, and have so advertised, at \$5 per peck.

Statement of Anthony M. Higgins, *of Wilmington, New Castle county, Delaware.*

On farms not designed for grazing, clover is mostly raised for hay, averaging from one to two tons to the acre. It is an essential element in the improvement of our land. Timothy, however, makes a superior hay; it exhausts the land more, hence is restricted; is invaluable for horses and dairy cows, and yields more abundantly per acre than any other grass. Next to this is corn-fodder for grazing cattle and milch cows. The Delaware river is lined with a long strip of embanked meadow, constructed at a heavy expense, also at considerable annual cost to keep in repair; these meadows are valued, as to quality, up to \$150 to \$200 per acre.

A large amount of hay is annually cut—herdsgrass, Timothy, and, of late years, rye-grass. Price for clover hay \$12 per ton; for Timothy, \$18 to \$20.

Statement of J. E. McClung, *of Bloomington, McLean county, Illinois.*

The best grass-seeds are found to be a mixture of clover and Timothy, in the proportion of one part of the former to three of the latter. A gallon of this mixture is sown upon an acre. It is important that the ground be thoroughly prepared for the seed by ploughing and harrowing. If the seed be sown with small grain in the spring, both should be brushed in together, which covers the seed to a proper depth, and leaves the ground in a good condition. I have succeeded in this manner in seeding my ground successfully by sowing my grass-seed with oats and flax; spring wheat answers equally well. Our prairie lands, without any stimulants, produce from one and a half to two tons to the acre. A little manure will increase the yield to three tons. The average price of hay is about \$5 per ton in the meadow.

Statement of William J. Phelps, *of Elmwood, Peoria county, Illinois.*

Clover and Timothy are our principal grasses. They produce well when separately sown, but make the best meadow and pasture when about equally mixed. The yield of hay to the acre varies much with the season, and may be set down at from one and a half to three tons. Since the introduction of "grass-cutters," a man and a pair of horses will cut about ten acres in a day; and with a revolving rake one horse can easily rake more than twice that quantity.

Statement of Edwin Winship, *of Winship's Mills, Clinton county, Indiana.*

Few crops pay better for the labor of cultivation than clover. It is sown extensively every year as a fertilizer, and stands high in the estimation of our people. It is frequently cut for hay in July, and

again in the fall for seed. The yield is from two to three bushels of seed to the acre; which has been sold in market for some years past at $5 per bushel.

Clover is also extensively cultivated for hogs, which are taken off the last of July, and the crop suffered to grow five or six inches high for turning under to manure the land for wheat, when it seldom fails to bring a good crop. Clover, when cut for hay, yields about 1½ tons per acre; but 3 tons are frequently grown.

Timothy is the principal grass grown here for hay, and produces one crop which averages 1½ tons to the acre, and a fine after-growth for fall pasture, upon which I keep my spring colts and calves. Hay is worth $5 per ton in the stack.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Clover is cultivated largely for meadow, grazing, and as a fertilizer. It is almost the only manure used in general or field crops. The hay, when properly cured, is nutritious and good for cattle, horses, and sheep. Indeed, it is eaten by all of them with avidity. In strong ground the yield per acre is about 2 tons.

Timothy, in good soil, when the season is favorable, will yield 2 tons to the acre, though 1½ tons is a good average crop. Timothy, however, is rarely produced in this locality free from blue-grass and red clover; and the former, though it may diminish the quantity, will greatly improve the quality of the hay.

In the latter part of August and early in September, we plough down a heavy crop of red clover, and sow wheat; the next year, plant corn, and the third year sow oats, and with them clover-seed enough to set the ground. If we have more clover land than we wish to sow in wheat, we plough under as above, cross-plough the following spring, and plant corn; then sow rye or plant some other crop; and again sow oats or other grain, with the requisite quantity of clover-seed. The fields are in meadow or pasture till the third year, when a crop of clover is again turned under by the plough. By this method our land is in a state of continual improvement. Land that we bought in a state of exhaustion from many successive crops of Indian corn, has, by this renovating process, been brought to a good if not to a high state of cultivation and improvement.

Statement of DANIEL FULTON, *of Bowdoinham, Lincoln county, Maine.*

Hay is one of our most important crops. Average yield, 1½ tons to the acre. Cost of production, $7. Average price, $11. Since the potato rot, corn has been more extensively cultivated than formerly, and good crops have been raised for several years past.

Statement of SAMUEL JOHNSON, *of Jackson, Waldo county, Maine.*

I am situated on the height of land between the Kennebec and Penobscot rivers. The face of the country is very broken. Much of the land is injured by a slate ledge running just under the surface, and often out-cropping. Where there is much depth of soil it is usually clayey and moist.

We are fifteen miles from Belfast, our nearest market, and the transportation thither costs $2 per ton. Labor in the summer season costs about $15 per month. Therefore, the character of our soil, the distance to market, and the high price of labor, at once call our attention to grazing. The ledgy lands are quite well adapted to mowing, and the more moist ones to the growth of fodder.

Where the land cannot be ploughed it is top-dressed, for which purpose any kind of well-pulverized manure, or ashes, is highly valuable. Plaster is sometimes used, but only in connexion with other fertilizers. Where land can be ploughed, I haul manure on the greed sward and turn it in, either in the fall or spring. I prefer the former if it is not a side-hill. I then lay the land down the first year, and usually sow oats with the grass-seed. The straw is useful for fodder, and the oats may be fed out or sold. In this way the land produces a valuable crop of fodder every year. I use the hoe as little as possible, and discard entirely the old routine of crops.

Statement of ARCHIBALD JONES, *of Frankfort, Waldo county, Maine.*

Among our native grasses, I would call attention to the "fowl-meadow," which grew wild at Madawaska before that place was settled by the Arcadian French. It flourishes best on "intervals," or meadows along rivers or streams, which in the spring are overflowed by back-waters or eddies, and receive a rich deposite of earth or mud. It also grows well where there is an overflow from the rise of water in natural or artificial ponds, provided the water runs off before the weather becomes too warm, and the land is well drained. If not, other water-grasses will prevail and force the fowl-meadow out. With an abundant spring overflow, with perfect drainage when the waters of the ponds or streams subside, fowl-meadow will give a crop of more value than any other grass. Water lying upon it all winter will kill it; but an occasional overflow by winter freshets is beneficial.

If this grass be cut three or four years before a portion of the seed scatters itself, it will disappear. A safe practice is, never to cut it for hay before the seed is ripe, which takes place before the stalks begin to turn. Where the seed naturally takes root in an open space, in two or three years it "tillers," or forms a bunch of numerous stalks, and is short-lived; but in cases where a meadow of this grass has been cut, two years in succession, earlier than the seed could scatter itself, by harrowing the surface and breaking the long fibrous roots, the plants will be multiplied from these roots. If the meadow be miry or soft, let it be harrowed when the frost is about half out.

In feeding out the hay, it is a good practice to save the seed-chaff, and scatter it over "swales," or moist upland mowing-lots, and over well-drained lowlands occasionally overflowed. In such situations it produces seed in abundance, and will readily take root among other grasses. Sown liberally over moist old mowing-fields, it will keep out much foul vegetation, which would otherwise be liable to work in.

It is another good practice for the farmer to cultivate a small patch of fowl-meadow, to ripen for seed to sow over such other mowing-lots as are mown too early to ripen the seed. It need not stand late, as, after reaping the tops for seed, the butts may be mown for hay.

As fodder for cows and sheep, fowl-meadow makes an excellent hay; but for horse-feed, with grain, it is too fine to keep the bowels of the animal properly distended for health. It here may be remarked that, however large the yield, of this grass never is coarse. As the butts are eaten with relish, there is no waste in feeding out. If the burden be heavy, it does not fall flat on the ground by its own weight, but "cripples" with the lower part on or near the ground, with the tops erect. If a summer freshet beats down this grass flat on the ground, new plants resembling "fiorin" start up from the joints, and increase the yield without rot or decay.

The butts, or stalks, of this grass, near the ground, being small, wiry, and full of joints, containing very little moisture, are easily dried and converted into hay; and, as the upper portions of the plant are small and limber, it is very little affected by rains when lying in the cock in the field. Hence it is very easily made into hay.

Statement of EDWARD STABLER, *of Sandy Spring, Montgomery county, Maryland.*

I will briefly give my mode of harvesting clover-seed with the mowing machine, and also the manner of preparing the seed for market. A large portion of my crop of seed-clover the past season was so fallen and lodged, that scarcely half the seed could be saved with the cradle; consequently, I was compelled to resort to the slow and expensive mowing with scythes, or use the machine. The trial with cradles resulted in breaking out the fingers, and leaving much of the best seed uncut; the scythe was both too slow and too wasteful.

The machine was set to cut rather higher than for mowing, and, by a side-delivery of my own construction, the seed was delivered at the side, and out of the track, in straight, loose bunches, in the best possible order for curing and taking up afterwards with almost the precision of clock-work, scarcely leaving a head standing to the acre, and literally leaving nothing for the rake to glean afterwards. It was completely cut and raked in about one-third the time the same hands could have properly raked it alone.

The seed is usually left from five to ten days in this state, in order to make it hull more readily; and a shower or two on it improves it both for the threshing and hulling operations. At a leisure time in winter, and in cold dry weather, I pass it through the common wheat-thresher to separate the heads from the straw. If in good order for threshing, the spike concaves are removed, and blank ones substituted in their places, which answers a better purpose—avoids cutting up the straw, and renders the raking much less tedious.

The next operation is the hulling. This is done either by running it two or three times through the same machine (spike concaves replaced) as fast as it can be forced in by a board fitting the opening, and having a short handle in the centre 15 or 18 inches long. It is then fanned, when the unhulled seed, falling near the fan, and being much reduced in bulk, may all soon be hulled by passing four or five times through the machine.

An efficient machine that will hull and fan at the same operation is a great gain; for the hulling alone is a short job compared to fanning. I used a hulling machine this year for experiment, instead of the thresher, (without fan attachment,) but lost considerable seed; perhaps a bushel or more from cutting the seed. It is a tedious, and a very annoying operation from dust, to hull with the thresher and fan afterwards; but all the portable clover machines with fans that I have seen cost from $75 to $100—too expensive for general use, and often cutting the seed. I am satisfied, however, after some years' experience with the crop, that an efficient and durable machine with fan may be made for about half the money.

My crop of seed this season, on seventeen acres, yielded 43 bushels cleaned and ready for market; besides sowing a large cart-load of partially hulled chaff, not considered at the time worth hulling over, but proved afterwards, by hulling a similar lot, to contain from three pecks to a bushel of seed. Without close attention considerable loss may occur in throwing out the chaff, or sowing the seed too thick in the chaff. The crop, at the present market value, is worth near $300, and did not cost me, all expenses included, over $15 to $20; two-thirds to three-fourths of this is chargeable to the in-door work.

The average yield on so many acres is unusual; the more so, as over half the ground had produced two crops of grass, and on several acres of this the clover-seed was quite light. I attribute the increase to the liberal use of lime; for, without it, the yield would not have been a peck of seed to the acre; at least, the land never produced any, to my knowledge, previous to my liming; nor, in fact, half a crop of anything else, except briars, broom-sedge, and sassafras. And what is quite as much to the purpose, this single crop of seed amply repays me for all the lime, bones, and other manures used in renovating the land. To judge by the general appearance of the crop, probably two-thirds of the seed, or some three to four bushels to the acre, was grown on about eight of the seventeen acres; it being the first crop of seed, and having 150 bushels of lime to the acre, in two applications; and on this portion of the land, doubling the lime has certainly more than doubled the product in grass-seed.

Statement of WILLIAM BACON, *of Richmond, Berkshire county, Massachusetts.*

Grass is much relied upon in Western Massachusetts, and is thought by many to pay as well as any crop. On "intervals" it is raised with little expense, while uplands require frequent re-seeding or top-dressing with compost to keep them in a profitable condition. Where lands are much descending, the latter course, with the application of gypsum, is best; for such lands, when ploughed, are always more or less washed; and water, when it levies a contribution on the soil, always takes the best.

The probable average yield of hay, in ordinary seasons, is a ton and

a half to an acre. Many meadows produce much more, and but few less than a ton. The smallest yield that will pay expenses depends on the cost of land, the value the occupant sets upon his time, facilities to market, amount of taxes, and probably other causes, so various and fluctuating that no definite cost or profit can be given.

Statement of H. L. BROWN, *of Fayette, Howard county, Missouri.*

Our land is unsurpassed for the growth of hay; no fertilizers being used. The best grasses for laying down in meadow are Timothy and clover. The best time for sowing Timothy is about the middle of August, by itself. The best time for sowing clover-seed is in the spring, after hard freezes. If sown upon the snow, as some recommend, there may come a warm spell sufficient to sprout the seed, when a hard freeze succeeding will kill it. I have known whole crops destroyed in this way. I have invariably had the best success in sowing with oats rather than with wheat. Hereafter, when I sow on wheat, I shall harrow afterwards, in order to give the roots sufficient loose dirt to withstand succeeding dry weather, which I have found often kills out more or less.

Statement of F. W. LAY, *of Green, Monroe county, New York.*

The vicinity of Rochester makes the raising of hay with us a very profitable crop. Clover is generally sown as a fertilizer, to be ploughed under, unless mixed with Timothy, which is now in great demand in our markets. I have never found clover hay injurious to horses; on the contrary, when properly cured, my horses have done the best upon it of any hay I raise.

I cure my clover hay, and indeed all other, as near as possible in this way: I cut my grass and immediately spread it, continuing mowing till about the middle of the afternoon, then commence raking with a horse-rake that first cut, and then roll it into large cocks. It remains in this state about two days to sweat, when it is drawn into the barn. The cocks, however, are sometimes opened previous to drawing, and at other times not, according as the hay is more or less damp. Unless the weather is very bad, I seldom have hay in the winter in any other than the best possible condition. I think many farmers are in an error in throwing open their barn-doors and letting the air come in too freely to the hay. I am convinced, by observation and experience, that the higher the barn, and the less circulation of air to the hay, the greener it may be put in, and the brighter and sweeter the hay will come out in the winter or spring.

Statement of JOHN B. YOUNG *and* JAMES DE MOTT, *of Ovid, Seneca county, New York.*

Clover-seed, for some years, has been cultivated with us with good profit. The average yield to the acre will exceed two bushels; and, on some soils adapted to its growth, it will frequently yield five bushels per acre; and if of the early variety, it is usual to take off a second

crop of hay, averaging about 1½ tons per acre. About the first of June, if not mown, it is pastured until the middle of July. The profits of the two crops may be estimated as follows:

1½ tons of clover hay per acre, at $6		$9 00
2 bushels of clover-seed per acre, at $5 50		11 00
		20 00
Cost of cutting and securing hay	$2 00	
Cost of cutting and securing for seed	2 00	
Cost of threshing and cleaning two bushels seed	2 00	
		6 00
Profit per acre		14 00

In this estimate nothing is allowed for the interest on land; but the fall feed and the seed-straw for stock will be more than an equivalent in value.

Statement of JOHN FITCH, *of Troy, Rensselaer county, New York.*

Great attention is now paid to raising hay with us, which brings in market a remunerating price. The product of our meadows is so various that no reliable average as to the amount grown to the acre can be arrived at. The yield ranges from one to three tons per acre, depending mainly upon the season, the quality of the soil, and the amount and class of manures applied to the land.

Statement of WILLIAM M. MACY, *of Quercus Grove, Linn county, Oregon.*

Among the grasses here there is a variety—the bunch-grass, wild red-top, wild Timothy, buck-grass, rye-grass, Oregon blue-grass, white clover, trefoil, &c., all of which are very nutritious and durable. The grass grows all winter, spring, and in summer, until August, when the dews fail, and the ground becomes dry; then it dries up and is cut for hay, at which time it is as valuable as at any other period, from the fact that no decomposition takes place, as is common elsewhere, by dews and rain. As soon as the rains in the fall come, it begins to revive at the ground, and to throw out the fringes of the blades. Timothy hay is worth $20 per ton.

Statement of ISAAC R. EVANS, *of Harrisville, Butler county, Pennsylvania.*

Clover is beginning to receive increased attention. The quantity cut is about a ton to an acre. The best time for sowing is in March, on wheat; or it does very well when sown with oats. We sow about 12 pounds of seed to the acre; if for hay or pasture, we add four or five pounds of Timothy seed. Timothy is the only grass we adopt in laying down land for meadow. We sow about a peck of clean seed on an acre. Hay cannot be grown for less than $4 50 to $5 per ton.

Statement of H. N. McAllister, George Buchanan, James Alexander, J. K. Shoemaker, *and* William J. Waring, *being that portion of their report which relates to grass and hay, on the "Oakwood Farm," near Bellefonte, to the Centre County Agricultural Society, Pennsylvania, as the result of their personal experience and observation.*

Clover is the only crop ploughed under for manure. This is very much practised in some sections of the county, and its expediency very much depends upon locality, the value of pasture and hay on the farm, the facilities for making or purchasing barn-yard manure, &c., &c. Clover, by its long tap-roots, which cannot be removed by scythe or cattle, not only mellows but fertilizes the land. Timothy does neither, and we would not recommend its cultivation, except in localities where hay, as in the vicinity of this place, commands a good profit.

Statement of Peter Gross, *of Schnecksville, Lehigh county, Pennsylvania.*

Hay is the great crop of this county. Timothy is the most approved grass, making the best hay; but in renovating land it is more beneficial to sow with clover.

Statement of Joshua S. Keller, *of Orwigsburgh, Schuylkill county, Pennsylvania.*

We can raise here two tons of hay to the acre, which is a common yield under favorable circumstances. It sells in the coal region from $12 to $25 per ton, according to its scarcity or plenteousness—say, on an average, from $16 to $18 per ton.

Statement of V. M. Bee, *of Greenville, Greenville district, South Carolina.*

I have different kinds of grass on high lands, near my stables, for the convenience of soiling. I have had the lucerne more than twenty years, and cultivate in drills, manuring between the rows; but I fear that our native blue-grass is rotting it out. I have also native meadow grass, herdsgrass, and orchard grass, all doing very well, and some clover, although I dislike it on account of its salivating the stock.

Statement of Joseph Bowditch, *of Fairfield, Franklin county, Vermont.*

Herdsgrass (Timothy,) clover, and red-top, (herdsgrass of the Middle States,) are the only grasses cultivated here to any extent—the former being our principal dependence for hay. We sow eight quarts of herdsgrass and from six to ten pounds of clover per acre. For the first two years we get about an equal quantity of each kind. Clover being a biennial, after the second year the herdsgrass greatly predominates. There is, however, a small quantity of clover produced continually, from the shelling of the seed and from top-dressing. Very little white clover is sown. The farm which I occupy was cleared from the forest and brought under improvement sixty years ago. I have had exclusive management of it for about one-half of that time, and there never was, to my knowledge, any white clover sown upon it; and yet, in the month of June, our pasture lands are thickly mottled with its white blossoms; and in dry seasons our hay largely partakes of it. Three thousand pounds of hay is an average yield per acre, although some lands produce four thousand pounds. A failure in our grain or root crop affects us but little; still, a slight falling off in our hay is materially felt.

As grass is the foundation of all good farming here, there is a general waking up to the importance of increasing its product. At least one-half of our manure is used as top-dressing for our mowing-fields. Some of them are never ploughed, being kept in a productive state by this method; yet the most of our dry land produces better by ploughing and newly seeding once in ten or fifteen years. Hay costs $3 50 per ton—namely, $1 75 to cut and secure, and $1 75 interest for land. It sells this year for $8 per ton.

Statement of Gustavus de Neven, *of Fond du Lac, Fond du Lac county, Wisconsin.*

Large quantities of hay are cut on our natural meadows or wet prairies of good quality, which is well relished by the cattle of the county, which thrive on it through the winter. The cost of production is about $2 a ton, taking into account the interest on the land. It sells for about $3. It probably does not go so far towards feeding as Timothy hay, which sells here for $4 or $5 per ton.

BEANS AND PEAS.

Pulse of various kinds, from the facility with which they are produced in almost every country of the globe, and the highly nutritive properties which they usually possess, have been a favorite food for man and animals among all nations and in every age of the world. Thus we find that the Athenians employed sodden beans in their feasts dedicated to Apollo, and that the Romans presented them as an oblation in their solemn sacrifice called "Fabaria." Pliny informs us that they offered bean-meal cakes to certain gods and goddesses in these ancient rites and ceremonies; and Lempriere states that bacon was added to beans in the offerings to Cama, not so much to gratify the palate of that goddess as to represent the simplicity of their ancestors.

The common garden bean came originally from the East, and was cultivated in Egypt and Barbary in the earliest ages of which we have any records. It was brought into Spain and Portugal in the early part of the eighth century, whence some of the best varieties were introduced into other parts of Europe, and finally into the United States.

The first beans introduced from Europe into the British North American colonies were by Captain Gosnold, in 1602, who planted them on the Elizabeth islands, near the coast of Massachusetts, where they flourished well. They were also cultivated in Newfoundland as early as the year 1622; in New Netherland, in 1644; and in Virginia, prior to

1648. French, Indian, or kidney-beans were extensively cultivated by the Indians of New York and New England long before their settlement by the whites; and both beans and peas, (calavances,) of various hues, were cultivated by the natives of Virginia prior to the landing of Captain Smith. Among these was embraced the celebrated cow-pea, (phaseolus,) at present so extensively cultivated at the South for feeding stock, as well as for the purposes of making into fodder and for ploughing under, like clover, as a fallow crop.

The common pea is supposed to have been indigenous to the south of Europe, and was cultivated both by the Greeks and Romans. Its introduction into the British North American colonies probably dates back to the early periods of their settlements by Europeans, as it is enumerated, in several instances, among the cultivated products of this country by our early historians.

The amount of peas exported from Savannah in 1755 was 400 bushels; in 1770, 601 bushels; from Charleston, in 1754, 9,162 bushels; from North Carolina, in 1753, 10,000 bushels; annually from Virginia, before the Revolution, 5,000 bushels; annually from the United States, twenty years preceding 1817, 90,000 bushels. The amount of beans annually exported during the last named period, from 30,000 to 40,000 bushels.

According to the census returns of 1850, the amount of beans and peas cultivated in the United States was 9,219,901 bushels. The quantity of 1853, exclusive of those raised by market gardeners, may be estimated at 9,300,000 bushels; which, at \$1 50, would be worth \$13,950,000.

CONDENSED CORRESPONDENCE.

PRUSSIAN LEGATION, BALTIMORE,
December 6, 1853.

SIR: Conformably to my verbal promise, I herewith send you two bundles, containing two varieties of "frijoles," or Mexican beans, with a description of their culture, growth, and use.

I see, in the last papers from my country, that they are cultivated there with great success, and are looked upon as a future substitute for potatoes. Every soil and climate seems to be adapted for their cultivation.

Very respectfully, your obedient servant

FR. V. GEROLT.

Hon. CHARLES MASON,
Commissioner of Patents.

MEXICAN FRIJOLES.

There are two varieties of frijoles cultivated in Mexico; the one small, of a black color, growing on the coast, and in the hot climate, (tierra caliente,) and the other of a brown color and a larger size, in the high lands, under the temperate and cold climate of that republic. They grow in small bushes, and yield abundantly. The time of planting them is the months of April and May. The frijoles are the principal food of the Mexican population. When ripe and dry, they are generally soaked in soft water three to four hours, and then cooked in water with chopped onions and pork, or lard, without salt.

The culture of frijoles has been tried for the last few years in Prussia with great success, where they have been recommended to the farmers as a substitute for potatoes. They are a substantial, healthy, and most palatable food. Like the potatoes in Europe, they are always met with at the tables of the rich and poor.

For a delicate dish, the following direction is used: Soak the frijoles in soft water for three hours, and boil them with chopped onions and lard, without salt, in the evening, until they are nearly done. The next day, take sufficient lard, put chopped onions in it, and when very hot add the frijoles with their gravy to it, and let them boil quickly for a quarter of an hour, seasoning with pepper and salt. Care must be taken not to let the gravy boil all away, as when dry they are not so savory.

F. V. G.

THE OREGON PEA.

BY A. B. ROZELL, OF LA VERGNE, TENNESSEE.

The Oregon pea was brought a few years ago from Oregon Territory. Whether it was found wild there, or was obtained from the Indians, I am not prepared to say. I obtained from the State of Mississippi, a year ago last spring, about a teaspoonful of seed, from the product of which I raised last season thirty bushels of peas. Had it not been for the cut-worm, the ravages of which were very great, I would have raised one hundred bushels.

The seed of this plant is very small—less in size than that of the "lady, or sugar pea"—and of a pale green color, with a white "hilum," or eye. It grows on a bush from five to six feet high, with five or six large branches near the ground, and they, with the main stalk, put out other branches, until the stalks would make a bunch as large round as a tobacco hogshead, or near it. It grows more like cotton than anything else I know of, only it is much larger, with branches not so horizontal. After leaving the ground a little, all these branches, with those which put out at every joint, bear from four to ten pods in a bunch, with about fifteen peas in a pod, which, as an article of human food, are superior to anything of the kind I ever ate.

The stalks and leaves, which are very large and beautiful, make perhaps the finest hay in the world—stock preferring it to any other—

and yield a greater abundance. The hay and pea together, are a better and a far cheaper food than can be raised from anything else in the United States, for horses, mules, cattle, sheep, and hogs. I believe I can raise more and better feed for my stock, from one acre of land, than I can from five of anything else I know of. It will grow on land so poor that it would produce little or nothing else; and tolerably poor land is better for it, and will produce more than rich land. This may appear strange to some, but it is nevertheless true. Rich land will produce more stalks, but not so many peas; in this respect it is like cotton. As an improver of the soil, I consider it far superior to clover, or anything known in Tennessee, when fed off on the ground and then ploughed in.

If seed is the object one has in view in raising this plant, let it be sown in drills $4\frac{1}{2}$ feet apart, one or two seeds in a place, one foot asunder along each drill. In the course of the summer, weed and cultivate with the plough or hoe, after the manner of raising bush-beans or Indian corn, For fodder or hay sow them broadcast, and lightly harrow them in, like wheat or other grain.

In short, taking this plant altogether, it is one of the finest and richest productions I ever saw; and I am satisfied in my own mind that it is the greatest acquisition to the farmers of the valley of the Mississippi, and the States adjacent, that has been introduced into this country—guano not excepted—for the last thirty years.

Statement of RICHARD E. HALT, *of Jacinto, Tishemingo county, Mississippi.*

The "Oregon pea" has been introduced into our section this season, and promises to do well as a hay, and is a better fertilizer than our common stock pea, for the reason that it produces double the amount of stalks and leaves on the same land, and appears to be well adapted to our climate and soil.

THE JAPAN PEA.

BY A. H. ERNST, OF CINCINNATI, HAMILTON COUNTY, OHIO.

The Japan pea, in which so much interest has been manifested in this country for a year or two past, from its hardihood to resist drought and frost, together with its enormous yield, appears to be highly worthy of the attention of agriculturists.

This plant is stated to be of Japan origin, having been brought to San Francisco about three years since, and thence into Illinois and Ohio. Its habit of growth is bushy, upright, woody, and stiff, branching near the ground, and attaining a height of three or four feet. The leaflets are large, resembling those of an ordinary bean, occurring in sets of three, with long quadrangular stems. The flowers, which are small and white, but rather inconspicuous, sometimes having purple centres, grow in thick clusters, nearly covering the principal branches of the plant, are succeeded by downy pods, from an inch to an inch and a half in length, each containing from one to three compressed oval

beans, when green, but unmarked, and of a buff color, resembling peas when dry. The stalks appear to be too woody for fodder in a dried state, though they may be used as such, together with the large thick leaves, when green. The excellency of the seed, at maturity, when properly cooked, for winter food, both for man and animals, has been fully tested, notwithstanding contradictory statements have been made.

This product will grow well on moderately fertile, as well as on rich soils, and may be planted in the latitude of Washington, one seed in a place, at the distance of three feet apart, from the last of April to the first of July. It seems to be well adapted to plant, as an after-crop, on land which has been cultivated with early potatoes or peas, or to supply the vacancies in a corn-field caused by birds or worms.

Statement of GUSTAVUS DE NEVEN, *of Fond du Lac, Fond du Lac county, Wisconsin.*

Peas, although not much raised here, I have no doubt would prove as valuable as any other crop. I threshed, last August, 11 bushels of peas, the product of a third of an acre, after gathering certainly more than equal to two bushels of green peas, making altogether 13 bushels, or at the rate of 39 bushels to the acre. They were sown broadcast on clean land, where potatoes had been raised the previous year. Quantity of seed used, three gallons.

When it is considered that peas are equal to corn for fattening pork, that they are a surer crop in this latitude, and that they do not require half so much labor, I think it would be worth while for farmers to raise them more extensively. Sheep thrive on the haulms, of which they are very fond.

Statement of M. W. PHILIPS, *of Edwards's Depôt, Hinds county, Mississippi.*

When a boy, living in my native State, South Carolina, I heard of much stock being killed by the cow-pea, dying in a day or so after being turned into the field. This is not the complaint in latter times, for I have not known the loss of but one animal in this way for twenty years. In 1844, I was the individual who called attention to this subject, up to which time no one had, publicly at least, thought of it. Understand, all ye who thus charge your hands with carelessness and inattention, that we generally lose our stock after they have had the run of the field for weeks—sometimes not until they have been penned—and even dying the succeeding May and June. I will here explain my own case, somewhat as I did nine years ago, with a general hint at later experience.

Hogs were collected from their range as soon as corn had been gathered, in September or October, and turned in the pea-field. Often for weeks they improved, and with me, invariably, until a moist spell of weather, such as will rot the frosted peas and sprout the sound ones. In a day or two after, the hogs look gaunt, "tucked up in the flank," and are so listless that I have seen buzzards picking holes in their backs and sides without their being stirred up. I have had hogs die in the

field two weeks after being fed on corn in the pen, and I have had them die as late as January and February. I have had milch cows die two months after being first in the pea field; and have lost, first and last, $1,000 worth of stock. A few years ago, I had a field of seventy-five acres in corn, of which thirty were sown with peas; the balance with pumpkins, or without anything. One of those moist, warm spells came on, and I had three small boys, well protected by blankets, stay in the field during the time, and kept the hogs from the peas, feeding them well. I lost not one that year. Generally, old hogs are not killed. Sows will lose their pigs, and sheep will cast their lambs; but young stock are almost sure to die. Upon opening the animal, we always find the stomach and intestines diseased, from irritation in patches, and a total destruction of the mucus coat—often being as dark as claret.

I have lost this year five milch cows, after being in the pea-field from twenty to sixty days, for which I might have taken $200, being improved stock. I have also lost two hogs after being in pen twenty days, after having had the run of a fifty-five acre field until pretty well gleaned, and then a forty-five acre one, where there was corn enough to last, with pumpkins and peas, until penned—near three weeks longer; having been fed on peas in October and November, and a few days in December.

I could name, perhaps, fifty planters in this county who have lost stock from peas since 1844. I cannot say what it is. We know they die from the pea-fields; and some stock of the same years, which had no access, did not die. Decayed sweet potatoes will kill horses and mules. Unsound corn has killed horses and mules with staggers and cholic. Spurred rye will soon destroy poultry. Then, why not diseased peas kill? Is there to be no analogy, and no other help but carelessness and inattention?

THE CULTURE OF COLZA AND RAPE FOR OIL.

FURNISHED BY LIEUT. THORNTON A. JENKINS, U. S. N., SECRETARY OF THE LIGHT-HOUSE BOARD.

The following article on the culture of colza and rape is an abridged translation from Schlipf's "Manual of Husbandry for the People," third edition, enlarged and improved. This author, let it be remembered, was a lecturer of the Royal Wurtemberg School of Agriculture at Hohenheim, and the manual in question was written for a competition founded at the association of German agriculturists at Carlsruhe, in 1840, and obtained the prize.

The culture of colza and rape, or cole-seed,* has been attended with remarkable advantages in the districts where they have been introduced. They yield the earliest crops that give the farmer a money return; furnishing him with fodder at a season when it is ordinarily scarce, and their harvesting occurs at a time when he is not usually overpressed for other work.

*Botanists readily distinguish rape (*Brassica napus*) from colza (*B. oleracea campestris*) by noting the leaves of the young plants, those of rape being smooth, while those of colza are hispid or bristly. The latter yields about one-third more oil, and is the plant cultivated on the Continent of Europe for fodder and oil. Rape, or cole, is principally cultivated in England. This distinction for light house purposes should well be considered. T. A. J.

Soil and exposure.—Rape or colza thrives principally upon a rich and deep soil, such as is suitable for barley and wheat; but more especially upon those which are mellow, marly, or calcareous. In a very light or a very stiff soil, they only succeed by heavy manuring. In wet lands, such as peat and moor grounds, they do not thrive at all. They answer in all the districts of Southern Germany except on the bleak mountain-sides. Unseasonable weather in spring, especially extreme changes from warm to cold, in April and May, is very prejudicial. Very cold and raw north and east winds are likewise very injurious when the ground is not covered with snow. Standing water is very hurtful to the soil.

Rotation of crops.—Colza agrees well with every other growth, and is especially good to precede winter grain, when it has thriven well. The best fore-crops are feed-rye, feed-vetches, and clover (or those crops used for soiling) on the three-field system.* It is sown usually in the summer field, so that it ripens for fallowing,† and the winter grain following it has then the advantage of a half fallowing. In a regular rotation, ordinarily, feed-rye or feed-vetches precede it.

Manuring.—Colza requires a very heavily manured soil, and more especially loves the liquid manure from the barn-yard or dung-hill. If the manure be applied immediately, the seed often ripens unequally; therefore it is better to manure the preceding crop. On the stiffer soils sheep dung, especially, is advantageous.

Preparing the soil.—Colza needs the utmost working and pulverization of soil, which it obtains very well from naked fallowing. After feed-rye, the ground can readily be prepared; and so, too, after clover, when only the first cutting has been taken. Thorough ploughing, harrowing, and rolling, are never lost, and are especially necessary when the seed is sown with a machine.

*This term has to be translated literally, for we have here no vernacular word for expressing a system, which, coming down from the time of Charlemagne, is yet prevalent in Germany. In this the farm is divided into three fields; the word field not being taken here to mean necessarily a single self-contained enclosure. The fields or divisions are classed into, 1st, winter crops; 2d, summer crops; and 3d, fallows. In this system there is no provision made for grass and hay, and therefore, as the straw from the two crops will hardly hold out unless manure is imported on the farm, the land will in time be brought to a very poor condition.

† The world *fallow* is used in several senses in agriculture. For instance, it is an adjective, a substantive, and a verb. Thus, we speak of land "lying fallow," which means sometimes unseeded, sometimes unploughed, and at other times (metonymically) neglected, or, in our phrase, "old fields." Again, a fallow is sometimes applied to mean only a "breaking up." Sometimes, and most frequently with us, it signifies a "fresh breaking up," to be ploughed over again. In some districts it seems to be understood as applicable to ploughing for a particular crop, (grain.) This employed in the text in what seems to be its primary sense, that of "breaking up" for a crop to be afterwards put in.

What is called in the next sentence "a regular rotation," is a version of the German word *Frucht-wechselwirthschaft*, for which we have in English no single corresponding word. Its principle is, that two crops of the same kind are not to succeed each other. Thus, for instance, a grain and straw crop, like wheat, is not to be followed by a crop of oats, but intervening will be clover or potatoes.

Different methods of cultivation.—Colza is raised in three different modes: 1. Drilled or sown with a seeding machine, which has very many advantages over the others; for the drilled seed, better protected against wet and cold, leaves room for the possible workings to keep the ground freer and cleaner of weeds; so, too, the proportionate yield is higher, for less seed is taken in machine sowing. They reckon for this six to seven pounds per acre in Baden; four to five pounds in Hesse; five to six pounds in Wurtemberg. With the machine the colza is seeded in the first half of August—often, in many places already, at the end of July; worked in the middle of September with the horse-hoe; and in October hilled once or twice with a hill-plough. If seeded too thick, it must be thinned late in the year. The machine, with one man, can seed in a day from six to seven acres. If the ground during winter has been oversoaked, good service is done by another hilling in the spring when it is dried.

2. Broadcast seeding is done at the end of July or beginning of August. The ground must be lightly harrowed and the seed covered in. Some pounds more of seed is required for this than for machine seeding. Care must be taken to make the casts uniform, so that the plants may stand at the proper distances. Since the introduction of seeding machines, broadcast sowing has grown very much out of vogue, as it is often liable to injury in unfavorable winters.

For transplanting or planting, the seed must have been put in during the latter half of July. The field on which the rape is to be planted can be sufficiently prepared if it has borne, just before, a straw crop. One acre of rape beds will cover two to three acres of plants.

3. On large establishments the planting is done in the beginning of October, with the plough, the plants having been drawn beforehand. A furrow is made, on the steep side of which the plants are set, from four to six inches apart. This setting is done by eight or ten grown boys or girls, who are stationed along the whole length of the furrow, each one having a certain distance to set in, and being supplied with the necessary number of plants. The plants thus set are covered by the return furrow, along which there is then a fresh setting. If any of the plants fail of being properly covered, they must be attended to. The cost of planting is from \$1 37½ to \$2 50 per acre. On small plantations it is done with the spade and dibble, which is more costly, but often pays well.

Harvesting.—The harvest occurs generally at the end of June or the first of July, and is commenced when the pods are brown, and half of the seeds are found to be of a dark-brown color. The duration of these harvests, most years, is very short, and therefore it is necessary to watch every day the grade of ripening. The cutting is regularly done with a sickle, and this in the morning, so that but few grains may fall out. Every two handfuls are laid on the ground, with the cut ends crossing and the pods spread out. These swaths are left in the field for some days, and after they are sufficiently dried, are hauled in upon sheets spread in the wagon. In order that the seeds may not be wasted in loading, a long sheet is spread on the ground by the side of the wagon. The harvest women take up the swaths carefully and lift them over this sheet, upon the wooden pitch-forks of the loaders. In

some parts of France colza is shocked in the field, the single swaths being laid in a circle, with the seed-ends toward the centre, so that the diameter is double the length of the stalk. In building up the shocks, which are made five or six feet high, this diameter is continually diminishing, so that the stalks require an inclination outward and downward. The shocks are left in this state until the seeds have fully dried, as is the case in eight or ten days. For hauling in, a sheet is laid by the side of the shock, upon which it is tumbled with pitch-forks. In some districts, however, the seed is threshed out in the field. When hauled in, it is left still some days on the barn-floor, in order that the seeds may entirely ripen. After threshing, the seed, partly mixed with husks and dust, is left upon the floor, spread out thin, (two to four inches high,) and turned over at first twice a day, afterwards once a day, until it is perfectly dried, which will be in eight or ten days.

Yield.—This is very variable, being subject to divers contingencies. It is reckoned per morgen.*

In Baden............	3—8—10	and 15—25	centner of straw.	
Hesse............	2—6	10—20	"	"
Wurtemberg......	2—7 scheffel	12—22	"	"

Drilled, sown, or planted seed usually gives a higher yield than broadcast. The yield of pods may be taken per morgen at from 5 to 8 centner.

The price of colza, or rape-seed, is subject to rises and falls, and fluctuates between 12 and 30 florins per scheffel.†

A ten years' average, from 1832 to 1841, gives as a mean price 23 florins, 19⅜ kreutzer. Light rape is bought usually at two-thirds, and often for one-half.

Weights and product in our measures:

		Weight.	Oil yielded.	Oil-cake.
Baden.....	1 bushel	$54\frac{3}{8}$—57 lbs.	$18\frac{1}{8}$—$20\frac{3}{4}$ lbs.	$31\frac{5}{8}$—$34\frac{3}{16}$ lbs.
Hesse......	"	$54\frac{1}{8}$ lbs.	$19\frac{3}{4}$—$21\frac{1}{4}$ lbs.	$33\frac{3}{8}$—$36\frac{2}{5}$ lbs.
Wurtemberg	"	$49\frac{1}{5}$—$50\frac{7}{8}$ lbs.	$16\frac{2}{5}$—$19\frac{11}{16}$ lbs.	$29\frac{1}{2}$—$32\frac{4}{5}$ lbs.

Summer rape.—This crop is much more uncertain than the winter, and ordinarily it is only tried to any extent when the latter has failed. It suits a light soil better, and succeeds upon those black and muddy, or those of dried ponds. It requires, like the other, heavy manuring; well working and good weather are both necessary. The seed is put in by the end of April, and there is allowed one-fifth of a bushel per acre. The yield is from 33 to 50 per cent. less than from the winter rape.

NOTE.—This plant, which is of the cabbage tribe, is extensively cultivated in various parts of Europe, for the sake of its seed, from which oil is extracted by grinding and pressure, and is used for the purposes

* The quantities in this paragraph become, when reduced to our measures, as follows:

	Per acre.		Per acre.		Average per acre.		
Baden............	14—36—47	bushels.	0.92—1.50	tons.	32½	bushels=1.21	tons.
Hesse Darmstadt	12—35	"	0.88—1.76	"	23½	" 1.32	"
Wurtemberg.....	13—46	"	0.88—1.60	"	29½	" 1.24	"

† These rates reduced to our measures are represented by 93¾ cents, and \$2 31 per bushel. The mean price is \$1 80 per bushel.

of illumination. It is extensively cultivated in England for the succulent food which its thick, fleshy stems and leaves supply to sheep and cows when other fodder is scarce. Large quantities of this seed are annually imported into the United States, at an expense of $3 or $4 per bushel, for feeding cage-birds.

The following sketch of the mode of cultivating this plant is condensed from the work of Rev. W. L. Rham, of England, one of the best practical writers of the day: Rape may be sown in spring as well as in autumn, and is sufficiently hardy to resist the winter's frost. Where the cultivation is on a small scale, the seed-bed is usually prepared by digging or trenching with the spade in a good loamy soil, neither too sandy nor too wet A large proportion of rotten dung is spread evenly over it, and dug in six inches deep, and the surface is raked fine. The seed is sown broadcast or in drills; the latter is the best method. It is then slightly covered with the rake; and if the ground will allow it, without risk of its being bound too hard in case of dry weather, it is well rolled or trodden with the feet. The seed must not be sown too thick; and the plants as soon as they have six leaves must be thinned to a distance of four or five inches in the rows, which will make them stronger and better furnished with roots. One acre of seed-bed will furnish plants for ten acres or more in the field. The seed is sown in July or August, that the plants may not run to seed the same year, which they are apt to do if sown early; and they are transplanted in September or October, on land which has already borne a profitable crop. Winter barley and rye, which are reaped early in July, are very proper crops to be succeeded by rape. The stubble should be ploughed two or three times to pulverize and clean it. A good coat of rotten dung should be put on, and the land ploughed in ridges, as for turnips. The plants should be put in on the ridges 10 inches apart. In transferring them from the seed-bed to the field, it requires great care, in taking them up, not to break the fibres of the roots; they should be raised with a fork, and placed gently, with the fine earth adhering to them, in flat baskets, and in a slanting position, so that the tops may be upward. In planting, the holes should be made with a large, thick dibble, that the plants may be introduced without doubling up the principal roots or breaking the fibres. The earth should be pressed to the root by a short dibble, inserted to the right or left of the hole made by the first dibble; or, which is better in stiff soils, a hole should be made, with a narrow hoe, of sufficient depth to allow the plant to be placed in it, and another hoe should follow to draw the earth to the plant. Thus two men with hoes and one boy will plant a row more rapidly than could be done in any other way. The man who fills up the holes places his foot by the side of each plant as he goes on, to press the earth to the roots.

An expeditious mode of planting rape is used in Flanders. A spade 10 inches wide is pushed vertically into the ground, and, by drawing the handle towards his body, the laborer makes a wedge-like opening; a boy inserts a plant in each side of this opening, and when the man removes the spade the earth falls back against the plants; the boy puts his foot between the two plants, and they are then fixed in their places. In this operation, the man moves backward; and the boy who puts in the plants, forward. No further attention is requisite till spring; the weeds are then carefully extirpated by hand and hoe, and where the distance of the plants admits of it, a light plough stirs the ground between the rows, throwing the earth towards the stems, so as to leave each plant in a little basin to catch the water, and conduct it to the roots. When the plants are invigorated with rich liquid manure, such as night-soil mixed with water, or the drainings from dung-hills, they become extremely luxuriant, and every trouble and expense bestowed upon them is amply repaid. The difference between a crop partially neglected and another carefully cultivated, often exceeds 50 per cent.

When the rape is transplanted before winter, it is much more productive than when sown in the spring. In the latter case it produces seed the same year, and is sometimes called "spring" or "summer rape." It is sown in drills, and thinned out by the hoe; and in favorable seasons a tolerable crop is obtained. It is generally sown on land which could not be brought into a proper tilth after harvest, and which would require the frost of winter to mellow it. Great crops of rape have been produced by merely paring and burning the surface, and ploughing in the ashes.

The rape ripens its seeds very unequally. The lower pods are ready to burst before those at the top are full. If the season is wet at harvest, much of the seed is lost; and, without great attention, some loss is sustained in the most favorable seasons. It should be cut when the dew is on it, and moved as little as possible. If the weather permits, it is threshed out on a cloth in the field; and as many threshers are employed as can be conveniently collected, that no time may be lost when the weather is fair. The seed is spread out on the floor of a granary, that it may not heat, and is turned over frequently. It is then sold to the crushers, who express the oil. The pods and small branches which are broken off in threshing, are much relished by cattle.

Ellis, in his "Modern Husbandman," published in 1741, recommends, as soon as the young rape plants appear above the ground, the sowing to each acre one of the following named substances, in quantities as indicated respectively: 12 bushels of peat ashes, 40 bushels of coal ashes, 60 bushels of wood ashes, or 20 bushels of soot; as any of these will not only tend very much to secure the crop against the slug, the worm, the caterpillar, or grub, but will keep off the power of frosts and the chills from wet, in hastening the growth of the infant plants in winter and spring.

D. J. B.

SUGAR.

Sugar, so extensively used in every country of the habitable globe, and forming, as it does, one of our chief staples, supplies its commercial demand mainly from the juice of the cane, which contains it in greater quantity and purity than any other plant, and offers greater facilities for its extraction. Although sugar, identical in its character, exists in

the maple, the coco-nut, and the beet-root, and is economically obtained to a considerable extent, yet it is not often sufficiently pure to admit of ready separation from the foreign matter combined with it, at least by the means the producers usually have at hand.

The early history of cane-sugar, like that of many other necessaries of life, is involved in great obscurity. It appears to have been imperfectly known to the Greeks and Romans, as Theophrastus, who lived 320 years before Christ, describes it as a sort of "honey extracted from canes of reeds;" and Strabo, who states on the authority of Nearchus, the commander of the fleet in the expedition of Alexander the Great, says that "reeds in India yield honey without bees."

Although India and Cochin-China are the countries usually cited as the native homes of the sugar-cane, where this plant grows wild, nevertheless, Roxburgh, in his "Flora Indica," declares that its indigenous habitat in the East Indies is unknown. It occurs in a wild state on many of the South Sea islands, especially in Tahiti, but in no part of the American continent, notwithstanding contrary statements have been made. It is true, a species of cane is found in Central America, apparently indigenous, which is rich in saccharine juice, and is very readily crushed by rollers; but it is not known with certainty when it was discovered, nor whether or not it is the result of self-sown seeds of some variety of the Eastern cane. The cultivated sugar-cane, let it be understood, very rarely produces seeds, although it sometimes occurs even in our Southern States.

The culture and manufacture of sugar, it is stated, were introduced into Europe from the East, by the Saracens, soon after their conquest, in the ninth century; and it is known that the Arabs caused the extension of the cultivation of this plant to Rhodes, Crete, and Sicily—nay, even to Calabria and Spain. It is also stated by the Venetian and Amalfian historians, that their countrymen imported sugar from Sicily in the twelfth century, at a cheaper rate than they could obtain it from Egypt, where it was then extensively made. The first sugar plantations established in Spain were at Valencia, but they were soon after extended to Granada and Murcia. Prince Henry, the navigator, carried sugar-cane from Sicily to Madeira. Towards the end of the fifteenth and the commencement of the sixteenth centuries, it was conveyed to the Canary islands, where plantations were formed, especially on Gomera and Grand Canary. From Gomera it was introduced into the West Indies by Columbus, in his second voyage to America, in 1493, and soon after became diffused over Mexico, Guiana, and Brazil. It was cultivated to a considerable extent in St. Domingo, in 1506, where it succeeded better than in any of the other islands. In 1518, there were twenty-eight plantations in that colony, established by the Spaniards, where an abundance of sugar was made, which, for a long period, formed the principal part of the European supplies. Barbadoes, the oldest English settlement in the West Indies, began to export sugar in 1646; and in the year 1676, the trade of that island required four hundred vessels, averaging 150 tons burden.

The common sugar-cane is very sensitive to cold, and is therefore restricted in its cultivation to regions either situated within or bordering on the tropics, where there is little or no frost. In intertropical America, it occurs at the height of 4,000 feet above the sea; and in particular places, under favorable circumstances, even over 6,000, especially on the elevated plateaux of Mexico. In Nepal, in Asia, it extends up the Himalayas 4,500 feet. It thrives best in a mean annual temperature of 77° to 84° Fahrenheit; but it succeeds even at 66° to 68°.

In the existing distribution of sugar-cane, as a field crop, in the United States, it is found as far north as 32° east of the Rocky mountains, although, from its flexibility or disposition to acclimatize itself, it is highly probable that it is gradually becoming more hardy, and eventually will endure an exposure and yield a profitable return much further north, along the borders of the Mississippi and some of its tributaries, than it has hitherto been produced. In most parts of Louisiana the cane yields three crops from one planting. The first season it is denominated "plant-cane," and each of the subsequent growths "rattoons." But sometimes, as on the prairies of Attakapas and Opelousas, and the higher northern range of its culture, it requires to be replanted every year. Within the tropics, as on the island of Cuba and elsewhere, the rattoons frequently continue to yield abundantly for twelve, fifteen, and even twenty-four years, from the same roots.

As before remarked, sugar, identical in its character, is obtained from other plants besides cane. But there are only two of sufficient importance to deserve mention here, namely: the beet-root and the maple. When Napoleon formed the gigantic, but neither practicable nor liberal, idea of intercepting all intercourse between the Continent of Europe and Great Britain, in order to destroy the commerce of that country, it became necessary to look for a substitute for this important product, only to be obtained on the Continent by the aid of an open trade. The discovery that sugar might be manufactured from the juice of the beet-root was therefore, of course, very welcome to him. He made every effort to stimulate the agriculturists to grow this plant. He encouraged the chemist to contrive the best method of preparing the sugar, and of applying to it the refining process. In 1810, there existed in his dominions two hundred beet-root manufactories, which annually delivered 2,000,000 pounds of sugar; but still, this was only one fifty-eighth part of the consumption in France. After the colonial sugar could again be introduced, the sale of beet-root sugar decreased; but its production subsequently increased to an extraordinary degree, through improvements in manufactures and its combination with agricultural systems, and annually yielded about 24,000,000 pounds. It again decreased in France after a tax had been laid upon sugar of domestic growth. The amount cultivated in that country between the 1st of September, 1852, and the 31st of August, 1853, was 75,275,236 kilogrammes, (165,680,790 pounds.) Its culture has been extended over Germany and Belgium, as well as some other European States.

The extraction of sugar from the maple is a valuable resource near every new settlement where that tree abounds; but it is obvious that this mode of obtaining sugar is only destined for certain stages of our national economy, and eventually gives way for the sugar of commerce produced by cane. On the authority of Beverley, in his "History of Virginia," it was made by the Indians prior to the arrival of Europeans; other writers say it was unknown to them, at least to certain

tribes. Some fifty or sixty years ago, Count Wingersky planted a large number of sugar-maples on his estate in Moravia, with the object of making sugar; from which he drew off the sap when the trees had arrived at the age of twenty-five years. He succeeded in obtaining a very fair article; but, in consequence of depriving the trees of their sap every year, they became sickly, and soon afterwards died.

The amount of maple-sugar made in 1811 in Ohio was 3,033,806 pounds; in Kentucky, 2,471,647 pounds; in East Tennessee, 162,240 pounds; in Vermont, 1,200,000 pounds; in the United States, in 1840, 35,105,705 pounds; in 1850, 34,253,436 pounds.

The amount of cane-sugar and molasses of domestic growth and manufacture, and their values, exported from the United States within the last thirty-three years, are denoted in the following table:

Years.	Brown sugar.	Value.	Refin'd sugar.	Value.	Molasses.
	Pounds.	Dollars.	Pounds.	Dollars.	Dollars.
1820-21	24,592	1,975	156,527	24,051	....
1821-22	8,593	805	177,065	26,320	....
1822-23	3,846	353	55,187	6,654	....
1823-24	5,960	434	57,908	7,195	....
1824-25	27,782	2,632	50,017	6,963	....
1825-26	57,625	4,964	168,991	27,043	621
1826-27	18,703	1,489	236,744	34,012	1,511
1827-28	54,035	4,095	269,291	38,207	601
1828-29	53,778	3,289	479,218	50,739	1,992
1829-30	37,646	2,975	1,586,220	193,084	3,968
1830-31	180,132	10,105	2,057,487	215,794	948
1831-32	154,160	11,232	701,962	74,673	2,493
1832-33	100,340	7,635	416,736	40,327	2,279
1833-34	108,087	6,461	2,355,754	219,153	5,934
1834-35	102,431	8,526	768,075	62,293	1,963
1835-36	128,119	12,342	1,442,989	165,648	851
1836-37	306,602	22,668	1,844,167	215,728	7,171
1837-38	408,802	30,487	2,610,649	249,671	6,620
1838-39	387,203	28,722	4,782,723	521,117	3,438
1839-40	769,908	45,940	10,741,648	1,214,658	9,775
1840-41	312,864	23,837	13,435,084	1,348,974	7,999
1841-42	166,533	8,890	3,430,346	291,499	19,040
1842-43	68,563	3,435	598,884	47,345	1,317
1843-44	187,118	12,363	1,671,107	128,594	3,923
1844-45	195,985	11,107	1,997,992	164,662	20,771
1845-46	109,295	7,235	4,128,512	392,312	1,581
1846-47	388,057	25,483	1,539,415	124,824	26,959
1847-48	135,006	8,891	3,378,773	253,900	5,563
1848-49	399,209	24,906	1,956,895	129,001	7,442
1849-50	458,839	23,037	2,786,022	285,056	14,137
1850-51	561,828	29,170	2,689,541	219,588	16,830
1851-52	401,620	24,057	2,096,770	149,921	13,163
1852-53	672,274	33,864	5,155,067	375,780	17,582

According to the census returns of 1840, the amount of cane-sugar made in the Union was 119,995,104 pounds; of 1850, 247,577,000 pounds; showing an increase of 127,581,896 pounds, besides 12,700,896 gallons of molasses. It was estimated that in 1815 the cane-sugar made

on the banks of the Mississippi alone amounted to 10,000,000 pounds; in 1850, it had reached the enormous quantity of 226,000,000 pounds, besides upwards of 12,000,000 gallons of molasses. The amount of cane and maple-sugar made in the United States in 1853–54 may be estimated at 545,000,000 pounds, which, at 6 cents, would be worth $32,700,000; besides 14,000,000 gallons of molasses and syrup, which, at 30 cents, would be worth $4,200,000.

CONDENSED CORRESPONDENCE.

Statement of the sugar crop made in Louisiana in 1853–54, *from P. A. Champomier, of New Orleans.*

Parishes.	Number of sugar-houses.	Number by steam-power.	Number by horse-power.	Number of hhds. sugar.
Rapides	43	37	6	18,994
Avoyelles	28	17	11	8,491
West Feliciana	19	18	1	8,551
Pointe Coupée	58	56	2	15,417
East Feliciana	13	13	....	3,549
West Baton Rouge	57	50	7	21,024
East Baton Rouge	53	49	4	12,701
Iberville	133	115	18	39,786
Ascension	56	50	6	30,760
St. James	85	67	18	33,736
St. John the Baptist	67	51	16	17,601
St. Charles	35	35	....	18,386
Jefferson	29	29	....	15,810
Orleans and St. Bernard	25	25	....	9,243
Plaquemines	45	45	....	25,042
Assumption—Bayou Lafourche	154	69	85	32,612
Lafourche Interior Bayou	77	55	22	24,081
Terrebonne Bayou	88	55	33	24,393
St. Mary, Attakapas	182	67	115	39,105
St. Martin...do	99	15	76	14,347
Vermilion, Lafayette	17	16	....	1,129
Lafayette	17	2	15	3,162
St. Landry, Opelousas	65	35	30	12,711
Divers small parcels made in hogsheads and barrels in different sugar-houses not reckoned.				
Cistern bottoms of 366,667 hogsheads brown sugar, at an estimate, say of 5 per cent	....	....	....	18,333
Total	1,437	956	481	*449,324

* Estimated at 495,156,000 pounds.

Brown sugar made by the old process	366,667 hhds.
Refined, clarified, &c., including cistern	82,657 "
	449,324

Statement of the sugar crop of Texas in 1853, from P. A. Champomier, of New Orleans.

	Pounds.
Brazoria	5,439,000
Matagorda	1,598,000
Wharton	531,000
Fort Bend	720,000
Total amount	8,288,000

TOBACCO.

Tobacco, from the extent to which it is cultivated, its importance to commerce, and the modes of employing it to gratify the senses, exhibits one of the most remarkable features in the history of man. From the solace only of the wild Indians of America, it has become one of the luxuries of the rich, and gives pleasure to the poor, throughout the habitable globe, from the burning desert to the frozen zone. In short, its use for snuff, for chewing, or for smoking, is almost universal, and for no other reason than a sort of convulsion (sneezing) produced by the first, and a degree of intoxication by the last two modes of usage. This plant is indigenous to tropical America, and was cultivated by the aborigines, in various parts of the continent, previous to its discovery by Europeans. Columbus found it on the island of Cuba in 1492, where he was invited by a chief to partake of a cigar. In 1486, Romanus Pane published the first account of it as growing in St. Domingo, calling it *choba*, *chobala*, and *giria*. Sir Richard Grenville found it in Virginia in 1585, when the English, for the first time, saw it smoked by the natives in pipes made of clay. It is believed to have been introduced into England by Raleigh's colonists on their return from Virginia, in 1586. Soon after the settlement of Jamestown, from the increased demand in Europe, and the peculiar adaptation of the soil to its culture, considerable quantities were raised, and numerous individuals, interested in the colony, contributed to induce that taste for it which had already been diffused among all classes.

In 1611, tobacco was first cultivated in Virginia by the use of the spade, previous to which it had only been raised after the rude manner of the Indians. In 1616, it was cultivated in that colony to so alarming an extent, that even the streets of Jamestown were planted with it, and various regulations were framed to restrain its production; but every admonition to the settlers was disregarded. James I. attempted, by repeated proclamations and publications, to restrain its use; but his efforts had very little effect, and the colonists continued to experience a more rapidly-increasing and better demand for this staple than for any other in the province.

In 1617, the prices varied from 37½ to 75 cents per pound. In 1621, each person was required to cultivate one thousand plants, of eight leaves, weighing in the aggregate 100 pounds. In 1622, there were made in the colony 60,000 pounds. In 1639, it was enacted by the Grand Assembly, "that all the tobacco planted this present year, and the two succeeding years, in the colony of Virginia, be absolutely destroyed and burned, excepting and reserving so much, in equal proportion to each planter, as shall make, in the whole, just the quantity of 120,000 pounds, stripped, smoothed, &c. In consideration whereof, the creditors of the planters were compelled to accept and receive 40 pounds of tobacco, so stripped and smoothed, in full satisfaction of every 100 pounds now due them." This plant, when its half inebriating and soothing influence recommended it to popular use, encountered much violent opposition by several governments, which also attempted to restrain its consumption by penal edicts. The Sultan Amurath IV. forbade its importation into Turkey, and condemned to death those found guilty of smoking.

The Grand Duke of Moscow prohibited its entrance into his dominions under pain of the "knout" for the first offence, and death for the next; and in other parts of Russia the practice of smoking was denounced, and all smokers condemned to have their noses cut off. The Shah of Persia, and other Eastern sovereigns, were equally severe in their enactments. Pope Urban VIII. anathematized all those who smoked in churches. In 1654, the counsel of one of the Swiss cantons cited all smokers before them; every inn-keeper was ordered to inform against those who were found smoking in their houses; and in the laws of Berne there is conclusive evidence of the serious light in which this, at that time, presumed crime was held. About this period, not only legislators in various countries, but philosophers (at least book-makers) entered into a crusade against tobacco. Upwards of a hundred volumes were written to condemn its use, the names of which have been preserved and their titles catalogued; and among them, not the least singular was the "Counterblaste" of the pedantic James, to which allusion was just made. But notwithstanding all opposition, smoking has spread not only through all polished, but savage countries; and instead of being "scorned and contemned by strangers," and wondered at by all forreine civill nations," the practice is countenanced by the rich and the poor, the learned and the gay.

Tobacco was cultivated in New Netherland as early as 1646, when it sold for 40 cents per pound. It was introduced into Louisiana by the "Company of the West," in 1718.

Some time previous to the war of independence, the culture of tobacco had spread into Maryland, Carolina, Georgia, and Louisiana, from which nearly all Europe was supplied; but at present most of the sovereigns of the Old World derive a considerable part of their revenue from the cultivation of this plant.

The amount of tobacco exported from Virginia in 1622, was 60,000 pounds; in 1639, 120,000 pounds; in 1758, 70,000 hogsheads; annually for ten years preceding the Revolution, 55,000 hogsheads; from City Point in 1791, 29,994 hogsheads; in 1795, only 9,475 hogsheads; from North Carolina in 1753, 100 hogsheads; from Georgia in 1722, 176,732 pounds; from South Carolina in 1783, 2,680 hogsheads; in 1795, 4,294 hogsheads; from Philadelphia in 1796, 3,437 hogsheads.

The annual exports from the British North American colonies for ten years ending in 1709, were 28,868,666 pounds; from 1744 to 1776, the average annual exportation was 40,000,000 pounds; from 1768 to 1770, both inclusive, 67,780 hogsheads of about 100 pounds each, or 67,780,000 pounds;* in 1772, 97,799,263 pounds; in 1780, 17,424,267 pounds; in 1782, 9,828,244 pounds.

The following table exhibits the quantity and valuation of tobacco, and its products of domestic growth and manufacture from the adoption of the constitution up to 1853:

Years.	Tobacco.	Value of tobacco.	Snuff.	Tobacco manufactured.	Value of snuff and tobacco manufact'd.
	Hogsheads.	Dollars.	Pounds.	Pounds.	Dollars.
1787	99,041	......	......	......	......
1788	88,595	......	......	......	......
1789	88,675	......	......	......	......
1790	118,460	......	......	......	......
1791	101,272	......	......	81,122	......
1792	112,428	......	......	117,874	......
1793	59,947	......	......	137,784	......
1794	72,958	......	......	19,370	......
1795	61,050	......	......	20,263	......
1796	69,018	......	......	29,181	......
1797	58,167	......	......	12,805	......
1798	68,567	......	......	142,269	......
1799	96,070	......	......	406,076	......
1800	78,686	......	......	457,713	......
1801	103,758	......	......	472,282	......
1802	77,721	6,220,000	......	233,591	......
1803	86,291	6,230,000	......	152,415	......
1804	83,341	6,000,000	......	208,139	......
1805	71,251	6,341,000	......	428,460	......
1806	83,186	6,572,000	......	381,733	......
1807	62,236	5,476,000	......	274,952	......
1808	9,576	838,000	......	36,332	......
1809	53,921	3,774,000	......	350,835	......
1810	84,134	5,048,000	......	529,285	......
1811	35,828	2,150,000	......	752,553	......
1812	26,094	1,514,000	......	588,618	......
1813	5,314	319,000	......	283,512	......
1814	3,125	232,000	......	79,377	......
1815	85,337	8,235,000	......	1,034,045	......
1816	69,241	12,800,000	......	576,246	......
1817	68,365	9,230,000	......	1,115,874	......
1818	84,337	10,241,341	......	1,486,240	......
1819	69,427	8,874,167	......	926,833	......
1820	83,940	8,188,188	......	593,358	......
1820–21	66,858	5,648,962	44,552	1,332,949	149,083
1821–22	83,169	6,222,838	44,602	1,414,424	157,182
1822–23	99,009	6,282,672	36,684	1,987,507	154,955
1823–24	77,883	4,855,566	45,174	2,477,990	203,789
1824–25	75,984	6,115,623	53,920	1,871,368	172,353

* Formerly, hogsheads of tobacco were much lighter than at present, owing to the less compact manner of packing, averaging only about 600 pounds prior to 1770, but gradually reached an average of 1,000 pounds. The present average of those of the tobacco-growing States is estimated at 1,200 pounds. Those of Kentucky often exceed 1,300 pounds each.

Years	Tobacco.	Value of tobacco.	Snuff.	Tobacco manufactured.	Value of snuff and tobacco manufact'd.
	Hogsheads.	Dollars.	Pounds.	Pounds.	Dollars.
1825–26	64,098	5,347,208	61,801	2,179,774	210,134
1826–27	100,025	6,577,123	45,812	2,730,255	239,024
1827–28	96,278	5,269,960	35,655	2,631,411	210,747
1828–29	77,131	4,982,974	19,509	2,619,399	202,396
1829–30	83,810	5,586,365	29,425	3,199,151	246,747
1830–31	86,718	4,892,388	27,967	3,639,856	292,475
1831–32	106,806	5,999,769	31,175	3,456,071	295,771
1832–33	83,153	5,755,968	13,453	3,790,310	288,793
1833–34	87,979	6,595,305	57,826	3,956,579	328,409
1834–35	94,353	8,250,577	36,471	3,817,854	357,611
1835–36	109,442	10,058,640	46,018	3,246,675	435,464
1836–37	100,232	5,795,647	40,883	3,615,591	427,836
1837–38	100,593	7,392,029	75,083	5,008,147	577,420
1838–39	78,995	9,832,943	42,467	4,214,943	616,212
1839–40	119,484	9,883,957	37,132	6,787,165	813,671
1840–41	147,828	12,576,703	68,553	7,503,644	873,877
1841–42	158,710	9,540,755	42,668	4,434,214	525,490
1842–43	94,454	4,650,979	20,455	3,404,252	278,319
1843–44	163,042	8,397,255	28,668	6,046,878	536,600
1844–45	147,168	7,469,819	44,399	5,312,971	538,498
1845–46	147,998	8,478,270	52,458	6,854,856	695,914
1846–47	135,762	7,242,086	37,051	7,844,592	658,950
1847–48	130,665	7,551,122	36,122	6,698,507	568,435
1848–49	101,521	5,804,207	49,888	7,159,397	613,044
1849–50	145,729	9,951,023	44,690	5,918,583	648,832
1850–51	95,945	9,219,251	37,422	7,235,358	1,143,547
1851–52	137,097	10,031,283	58,475	8,436,153	1,317,622
1852–53	159,853	11,319,319	39,641	10,561,692	1,671,500

According to the census of 1840, the amount of tobacco raised in the United States was 219,163,319 pounds; of 1850, 199,752,655 pounds; showing a decrease of 19,410,664 pounds. The crop of 1853 may be estimated at about 199,000,000 pounds; which, at 10 cents per pound, would be worth $1,990,000.

CONDENSED CORRESPONDENCE.

Statement of R. H. PHELPS, *of Windsor, Hartford county, Connecticut.*

The valley of the Connecticut, where I reside, is particularly noted for the production of tobacco; and I believe no part of the United States produces it of better quality, and quantity per acre. This crop has been on the increase for some years, and many of our farmers are discovering that they can procure more ready cash from this than from any other; indeed, a single crop will often bring more money than the same land can be sold for. The yield from one acre in this town has

been sold, in one instance, for $340. An ordinary crop will yield about 1,800 to 2,000 pounds per acre, and even 2,500 pounds are sometimes obtained. Our tobacco has of late years brought from 10 to 15 cents per pound, and in some instances 17 cents, delivered within two or five miles from the farm. Some of our farmers say that no more labor is required to produce an acre of tobacco for market, than two acres of corn. "Connecticut seed-leaf" generally stands highest in the market.

I have been inquired of from the South, whether the raising of tobacco will not eventually deteriorate our land, as it has done there. I answer no, so long as the soil is amply fed by manure, as it positively must be, to get crops good in quantity and quality.

The Connecticut mode of management is nearly as follows: The seed is sown as soon as the ground is free from frost; or if not, a quantity of bushes is burned upon the ground to warm it, and kill all the seeds of weeds, &c. It is then trodden down compactly, in order that the seeds, which are small, may come closely in contact with the earth. Guano is said to act with good effect in giving the plants an early start, which is to be attained if possible. In the field, a porous soil is preferred which has depth and strength, not tenacious with clay, nor containing a superabundance of water. From fifteen to twenty-five ox-cart loads of manure are spread upon the land about the first of May, and immediately ploughed under to a good depth. It remains in that condition until the 15th of June, or until the leaves of the plants are about the size of a silver dollar. A moist time is preferred to set out the plants, which are placed in rows about 3 by 3½ feet apart. The ground is then kept well hoed, and stirred with the cultivator and horse-plough until the size of the plants prevents further tillage. The large green worm is then the great enemy, and follows up its depredations until found and destroyed. A great deal of close attention is required in discovering this depredator, and a good flock of turkeys will sometimes be of as much service as a multitude of hands.

I have known a fine crop of tobacco raised by turning under a grass sward early in the spring, applying a dressing of manure, and harrowing it in, just before the plants are set in the ground. In case of a dry summer, the inverted turf will retain moisture sufficient to sustain the crop in vigor. When the blossoms begin to appear on the stalks they are topped or pinched off, and the "suckers" broken as fast as they appear. At maturity the plants are cut and remain on the ground until a little wilted, so that they will handle without breaking; they are then conveyed to the barn or shed, with tight roofs, and there suspended on poles. They hang until cured sufficiently for the leaves to be stripped and packed away for market.

I would say, in conclusion, that no good farmer, who desires to produce large crops of hay or grain, can successfully appropriate a large part of his farm to tobacco, unless he purchases or manufactures a great amount of manure, which must be applied in the cultivation of this hungry crop.

Statement of JOSEPH CORNISH, *of East Granby, Hartford county, Connecticut.*

The raising of tobacco has become a large interest in this county, especially in those parts lying on the Connecticut. The average product per acre is from 1,800 to 2,500 pounds. The value, when ready for market, is $12 per 100 pounds. Cost of production, $8 per 100 pounds, including manures. Guano is used as a fertilizer in its culture, with good results.

Statement of JOHN VARDEN, *of Washington City, D. C.*

Some nine or ten years since I obtained of the Commissioner of Patents a small parcel of Havana tobacco-seed, which I sowed, and placed the box containing them in the south windows of the National Gallery, with some flowers I was then cultivating.

The growth of these seeds I transplanted into a box, 4½ feet long, 10 inches deep, and 10 wide. Thus situated, the plant continued to grow, flower, and seed for five consecutive summers and four winters; and would, in all probability, have continued to flourish had I not cut it down.

Last spring I had living five plants from the seed of the old stalk. One of them, three years of age, had flowered two summers; and one of them, two years old, had bloomed one summer. The rest of the plants were started in the fall of 1852; and in the spring of 1853, they were transplanted into the open ground. These plants all grew finely, and reached the height of eight or nine feet; bearing leaves, which were of a bright golden yellow when matured, from 18 to 24 inches long by 12 to 16 wide. The plants have since died from exposure to frost.

Statement of EDWIN WINSHIP, *of Winship's Mills, Clinton county, Indiana.*

Tobacco is cultivated to a considerable extent in this State. The amount of labor required to raise it profitably is so great that its cultivation in many places is abandoned. It should be grown on very rich land, which will generally make from 1,000 to 1,200 pounds to the acre. Ordinary land will not make more than half that quantity.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Tobacco is raised very extensively in this State, and of various qualities. Its cost of production to the acre, in consequence of the care required in its culture, is greater than that of any other crop we raise, and its proportionate value is greater. The expense of an original outlay in houses, and the necessity of its culture on the most fertile lands, will prevent this crop from being a very general one with our farmers. It is an exhausting crop, while hemp, on the contrary, is considered a fertilizer; the same land being cultivated with the latter staple for a great number of years with increased production.

On the alluvial soils of this State the average product of tobacco is 1,200 pounds to the acre; on lighter soils, 1,000 pounds. The prairies

are not considered generally as very favorable to the production of the larger varieties of this plant, on account of the prevalence of high winds. The price now varies from $5 to $10 per 100 pounds.

Statement of H. L. Brown, *of Fayette, Howard county, Missouri.*

A great deal of tobacco is raised in this county, as it readily brings cash. The average yield can more nearly be estimated than that of any other crop, and may be put at 1,000 pounds to the acre. Cost of production, $3 per hundred.

Statement of D. C. Garth, *of Huntsville, Randolph county, Missouri.*

The crops which can be cultivated to the best advantage in this section, are tobacco, corn, and oats. The maximum yield is about 2,000 pounds to the acre; the average, about 1,000 pounds; and the smallest yield that will pay expenses, 500 pounds to the acre.

Statement of D. Nevinger, *of Farmersville, Montgomery county, Ohio.*

This county, for several years past, has produced $100,000 worth of tobacco per annum. The price has been rather too fluctuating for one to engage in its culture to any great extent. The crop of 1850 readily sold at an average of 10 cents per pound; in 1851, at about 4 cents; in 1852, at 7 cents per pound.

From the common Connecticut "seed-leaf," I raised, last season, 1,200 pounds per acre, which will sell, perhaps, for 10 cents a pound.

HOPS.

The hop, so extensively cultivated in the field for breweries, and so well known to every housekeeper for culinary use, appears to have been unknown to the ancients; although we are ignorant of the country from which it was derived. It was mentioned by Joan. di Cuba, in his "Ortus Sanitatis," as growing in Holland prior to 1485, when its properties and uses were well understood. Its culture was introduced into England, from Flanders, in 1524; but its strobiles were not used to preserve English beer before the latter part of the reign of Henry VIII. At first, there was a strong prejudice against them; and a century after, a petition was presented to Parliament from the city of London to prohibit their use.

This plant was introduced into the British North American colonies soon after their settlements by Europeans. It was enumerated among the products ordered by the "Governor and Company of the Massachusetts Bay in New England," in 1629. It was also cultivated in New Netherland as early as 1646, and in Virginia previous to 1648. The growth of hops was encouraged in the last named colony by legislative acts, in 1657. In 1680, the price of malt in Portsmouth, New Hampshire, was 4 shillings per bushel.

The quantities and valuation of hops of domestic growth, exported from the United States within the last thirty-three years, are exhibited in the following table:

Years.	Hops.	Value.	Years.	Hops.	Value.
	Pounds.	Dollars.		Pounds.	Dollars.
1820–21	319, 501	18, 498	1837–38	854, 106	53, 602
1821–22	283, 200	23, 025	1838–39	747, 164	72, 425
1822–23	249, 927	27, 124	1839–40	82, 086	11, 235
1823–24	389, 788	81, 810	1840–41	176, 619	28, 823
1824–25	117, 623	13, 865	1841–42	339, 181	36, 547
1825–26	388, 718	100, 668	1842–43	1, 182, 565	123, 745
1826–27	88, 460	8, 284	1843–44	664, 363	51, 550
1827–28	375, 058	25, 432	1844–45	902, 072	90, 341
1828–29	128, 482	6, 917	1845–46	287, 754	41, 692
1829–30	383, 060	30, 312	1846–47	1, 227, 453	150, 654
1830–31	265, 043	26, 664	1847–48	257, 016	17, 671
1831–32	184, 729	25, 448	1848–49	411, 164	29, 123
1832–33	468, 798	92, 963	1849–50	1, 275, 455	142, 692
1833–34	917, 600	164, 577	1850–51	110, 360	11, 636
1834–35	625, 684	90, 720	1851–52	238, 008	69, 042
1835–36	207, 548	25, 886	1852–53	245, 647	40, 054
1836–37	1, 096, 428	89, 705			

According to the census of 1840, the amount of hops raised in the Union was 1,238,502 pounds; of 1850, 3,497,029 pounds; showing an increase of 2,258,527 pounds. The amount raised in 1853, may be estimated at 3,000,000 pounds; which, at 15 cents, would be worth $450,000.

CONDENSED CORRESPONDENCE.

Statement of C. E. Potter, *of Manchester, Hillsborough county, New Hampshire, in behalf of the Committee on Root and Grass Crops, of the Agricultural Society of that State.*

The committee would suggest that, in their opinion, the more general introduction of hop culture would be of great advantage to the agricultural interests of the State; as most farmers could cultivate it with a very slight drawback upon their other agricultural operations, and the product is one that finds a ready market, and generally at a paying price. True, the prices are fluctuating; but it is questionable whether the average price of hops for the last forty-eight years, in New England—being about 13 cents per pound—has not paid a greater

profit than the growing of any other article of agricultural produce during the same period. Any land that will produce corn well, will grow hops; and an acre of roots well cultivated upon good soil, will produce 1,000 pounds; which, at the average price, would be $130 for the produce of an acre. General W. P. Riddle, a dealer in, and inspector and grower of, hops for the last forty years, informs us that the cost of raising a pound of hops, including cultivating, picking, curing, and pressing, is 5 cents. This would leave $80 as net profit upon an acre, or 1,000 pounds of hops, at the average price of hops for the last forty-eight years. Now deduct from this, say $30 upon 1,000 pounds, to meet the interest on fixtures, expense of marketing, the loss from keeping over, and all other risks, and put the net profit of an acre, or 1,000 pounds, at $50, and what other agricultural product grown among us can compete with the hop? Through the politeness of General Riddle, we are enabled to lay the following table before the society, showing the amount of hops raised per annum, and the prices paid for them, in New England, for the last forty-eight years:

Years.	Bales.	Pounds.	Average price in cents.	Value.
1806	910	378,221	15	$41,733 15
1807	1,167	369,496	11	40,644 56
1808	1,071	322,976	10	32,297 60
1809	993	280,063	10	28,006 30
1810	1,124	299,500	27	80,865 00
1811	1,519	416,050	7½	31,203 75
1812	1,267	322,913	1½	40,364 12
1813	967	243,242	22	53,513 24
1814	767	179,640	25	44,910 00
1815	1,434	331,673	30	99,501 90
1816	1,336	286,374	32	91,957 68
1817	3,087	729,862	34	248,153 08
1818	2,709	616,366	14	86,291 24
1819	2,834	656,902	5	32,845 10
1820	3,555	782,663	6½	50,873 09
1821	2,659	561,063	7½	42,079 72
1822	2,810	548,709	10½	57,614 44
1823	2,936	618,444	20	123,688 80
1824	2,720	575,030	10½	60,378 15
1825	3,054	621,241	15	93,186 15
1826	2,134	409,007	15	61,351 05
1827	3,766	752,140	7	52,649 80
1828	3,391	678,410	6	40,704 60
1829	3,179	632,806	5½	53,788 51
1830	3,874	769,456	11	84,640 16
1831	3,691	730,736	10½	73,439 46
1832	3,179	606,602	23½	142,551 47
1833	5,839	1,136,134	16	181,781 44
1834	6,151	1,174,599	14	164,423 86
1835	4,936	963,238	9½	91,507 31
1836	7,608	1,441,936	7½	108,145 20
1837	5,197	940,857	6	56,451 42
1838	3,562	663,766	15	99,564 90
1839	2,390	452,225	15	67,833 07
1840	2,892	534,404	30	160,321 20
1841	2,948	564,917	12½	70,614 62
1842	4,543	922,932	8	73,834 56
1843	3,329	640,085	6	38,405 10

Years.	Bales.	Pounds.	Average price in cents.	Value.
1844	4,060	773,362	9½	$73,469 39
1845	3,158	603,763	15	90 564 40
1846	5,625	911,768	8	72,941 44
1847	3,528	697,439	6	41,846 34
1848	3,680	745,916	7	52,214 12
1849	4,320	707,856	12½	88,482 00
1850	2,777	528,685	25	107,164 50
1851	2,678	537,668	25	109,417 00
1852	4,388	839,723	20	167,964 60
1853	3,496	640,076	30	192,022 80
	149,238	30,941,902		3,998,224 02

The average price of hops per pound for forty-eight years, is $12\frac{4}{5}$ cents.

The whole amount of hops grown in the United States for the year 1849, as computed in the census returns of 1850, is		3,497,029 pounds.
New England raised	707,743 pounds.	
New York raised	2,536,299 "	
		3,244,042 "
Balance for other States		252 987 "

From the above table it will also be seen that the price of hops during forty-eight years never has gone below 5 cents per pound, the actual cost of growing. Of what other agricultural product can the same be said, that is grown in New England? Then, this very year, and at the time of writing this report, hops readily bring 45 cents per pound, giving the enormous profit of $450 per acre.

HOP CULTURE.

BY LORENZO ROUSE, OF PARIS HILL, ONEIDA COUNTY, NEW YORK.

In looking over the Patent Office Reports, more especially those of the last six years, I am unable to find anything relating to the *hop crop* of the United States, either as to its amount, or the mode of cultivation.

The crop is one in which many of the farmers of this county, and of the adjoining counties of Madison and Otsego, are largely interested—more so, perhaps, than those of any other portion of the Union. Being favored with a soil happily adapted to the wants of the plant, most of those engaged in it have been quite successful in its cultivation, and the hop-growers of this region have already established a high reputation for the superiority of their crops, both as to quantity and quality.

While they generally produce an article that commands the very highest price in market, some, especially in the southern part of this county, have obtained yields which it is believed have never been exceeded, if ever equalled, in any part of the world.

The hop *(Humulus lupulus)* is too generally known to render an extended description of it necessary. Still it may not be improper to say, briefly, that it is a perennial plant, epiphytic in its character, with vines weak and slender, and sometimes growing to a great length, needing support, and readily attaching themselves to, and winding around, any suitable substance within their reach. For this reason, Dr. Webster supposes the name of the plant may have been derived from the word *hoop*, from its winding about or encircling whatever it attaches itself to. The strobiles, or blossoms, are cruciform, and grow in clusters on the upper portion of the vine. Under favorable circumstances these are produced in great profusion; so much so, indeed, that the plant has sometimes been considered as an emblem of fecundity. With this significance it was formerly used by the Russians at their nuptial ceremonies.

The blossoms, which may, at the same time, be also termed the *fruit* of the plant, are the only part of it that is valuable. They are quite bitter to the taste, and are slightly narcotic. They are considered of great importance in brewing, their tendency being to preserve malt liquors, and, as is supposed, to render them more salubrious.

The plant requires a climate rather cool and moist for its most successful cultivation; and for that reason, perhaps, it has been brought to greater perfection in England than in this country. Still, with deep tillage, on suitable soils, it is enabled to withstand successfully our American summers, if the ground is kept mellow, as the roots will penetrate to a great depth, and thus obtain the necessary supply of moisture, a superabundance of which would, however, be as injurious to this as to other plants.

The cultivation of the hop in this country may be considered as yet comparatively in its infancy. The quantity grown in England exceeds probably that of any other portion of the world of equal extent. Its importance there may be inferred from the number of acres in cultivation. I have not the means of ascertaining precisely what that is at present; but as far back as 1836, it was stated to be 55,422 acres, and it is presumed that it is fully equal to that now. The principal hop-growing counties are Kent, Surry, and Worcestershire. The latter has annually 4,000 acres devoted to the crop—a quantity equal, probably, to the entire crop of the State of New York, which is by far the greatest hop-growing State in the Union; the yield in this State, in 1849, having been, according to the census of 1850, more than five-sevenths of the produce of the whole United States. It would seem, however, that the cultivation is rapidly increasing in this country, there having been an increase from 1840 to 1850, of nearly 200 per cent. It appears also that nearly the whole increase has been in this State, which, from less than half a million pounds in 1840, returned more than two and a half millions in 1850; showing an average annual increase of 40 per cent. The entire crop of the United States in 1850, was 3,497,029 pounds. Of this quantity, 2,536,299 pounds were the product of this State, and the remainder, 960,730 pounds, was principally made up by the New England States, together with Ohio, Indiana, and Michigan. Nearly every State in the Union, however, contributed a portion; but in most of the Southern States the quantity was merely nominal.

It will be perceived from this statement that New York is the greatest hop-growing State of the Union; and it may not be improper to mention, in this connection, that she is also the greatest consumer, standing forward as she does in the manufacture of malt liquors, requiring the consumption of the larger portion of the hops she raises. In 1850, the breweries of this State produced 645,000 barrels of ale, beer, &c., which was more than one-third of the quantity returned for the whole Union. It would seem, however, that the supply of hops grown in this country is not all required for home consumption, as more than one and a quarter million pounds—a quantity exceeding the whole produce of the United States, except New York, in 1850—was exported during that year, about one-half of which went to the English market. But the export of 1850 was an unusual one as to quantity, and would furnish no safe criterion for an estimate, as is shown by comparing it with that of the succeeding year, in which it fell to less than one-tenth part of that amount.

This occasional foreign demand has a tendency to affect materially the prices in this country, and its irregularity produces great fluctuations in the market. Although hop-growing has generally proved profitable in this State, still this great variation in price renders the business one of more than ordinary risk. This has not only deterred many from entering into the business who would otherwise have been likely to have done so, but has also induced many growers to turn their attention to other branches of agriculture. While, therefore, there has been a rapid increase in the production during the last ten years, that increase is probably small to what it would have been, had there been more stability in the market, prices having ranged in that time from 6 up to 40 and even 50 cents per pound. Although the latter prices, if sustained, would have afforded the producer a very rich profit, still he feels no assurance that they will not, before he can prepare his field and mature his crop, fall to rates that will prove absolutely ruinous.

In the cultivation of hops, one of the most important things necessary is, the selection of a suitable piece of ground, not only as regards the soil, but also with reference to location. The soil should be both rich and deep. That depth of soil is of consequence, is evident from the fact that the roots not unfrequently penetrate directly downwards to the depth of three or four feet. They have also been known to extend laterally to a distance of twenty feet. Some cultivators, it is true, do not deem an unusual depth of soil of much consequence, and very many are of opinion that any good strong soil that is suitable for corn, may, by proper cultivation, be adapted to the wants of this plant. English hop-growers are of opinion that, in order to produce the best quality of hops, the substratum of the soil should be calcareous. With us, such a substratum is not so readily to be met with. It is evident, however, that such soils as are composed of, or contain certain necessary elements, essential to the growth of the plant, are best adapted to its successful cultivation. What those elements should be, can be best

ascertained by a careful analysis of the plant for the purpose of ascertaining what ingredients enter most largely into its composition. This has been done by one competent to the task, with the following result, viz:

Composition in 100 parts of the inorganic matter contained in the ash of the plant and blossom.

Silica	13.24
Chloride of sodium	7.73
Chloride of potassium	3.77
Soda	0.13
Potash	21.49
Lime	34.79
Magnesia	4.09
Sulphuric acid	4.63
Phosphoric acid	6.34
Phosphate of iron	3.79
	100.00

The quantity per cent. of these mineral ingredients that are contained in the plant is about 9, or, more accurately, 8.8 per cent. From this analysis, the intelligent cultivator will at once perceive what ingredients are more particularly essential in the soil, and make his selection accordingly; and should any one of them be wanting, he will be enabled to adapt his manures with reference to the supply of that particular deficiency.

The next thing to be considered is locality. The field should not be in an exposed situation; otherwise, much loss may be sustained by the poles being blown down when loaded; and even if this does not occur, the hops are liable, when near maturity, to be bruised, and the branches broken off, by high winds. The ground should also be level, or nearly so; otherwise, the high cultivation necessary, which should keep the ground constantly loose and mellow, will render it liable to wash and gully. For this reason, steep hill-sides should, by all means, be avoided. If practicable, the field should be selected at least one year previous to that in which the hops are to be planted, in order that it may be put in a proper state of cultivation, which can be most readily done by high manuring, and by thorough culture with some hoed crop. It would, indeed, well repay the expense to subject it to the best garden cultivation from the commencement.

The time for planting having arrived, which with us is usually about the first of May, the ground should be marked both ways with a line, or otherwise, so that the rows shall be perfectly straight, and crossing each other exactly at right-angles. Care, in this respect, not only adds much to the beauty of the field, but facilitates the cultivation. Hop-growers differ in opinion as to the distance which the rows should be made apart, ranging from six to eight feet; a medium between the two is, perhaps, to be preferred—such as will give 888 hills to the acre. When set in this manner, two poles will be necessary for each hill, and two, or at most three vines, will be allowed to each pole.

The plants may be procured from cuttings, or from the seed. Those procured directly from the seed are preferred in England to cuttings, as being more luxuriant in their growth when matured, and much less liable to be affected by the blight. Plants raised from the seed will not require to be poled till the third year, while those raised from cuttings will be ready the second year. The latter is the method almost universally adopted in this country. These cuttings, or layers, are procured without much expense, and are taken from fields already in cultivation, usually at the time of the spring dressing, by taking the head of the root, and the upper branches which form near the top of the ground, and are called runners. The head of the root is undoubtedly to be preferred, as being larger and more vigorous; but it is not always practicable to obtain a sufficient number of these, and the runners are therefore used with them, indiscriminately. These runners are full of joints, or eyes, and are cut in pieces containing two or three sets of eyes each. These are planted at the intersection of the rows in the field, by placing three or four in a hill at a little distance from each other, and may be laid down horizontally and covered with earth, or set in perpendicularly by making a small hole in the ground with a stick, and the earth then pressed around them. As the plants require no poling the first year, and do not produce any crop, the ground may be planted with corn between the rows. This will give three-fourths of a corn crop, which will be cultivated in the usual manner, and the hops hoed at the same time. Nothing more will be necessary the first year.

The field will be ready to be poled the second year, which should be done as soon as the frost is out, and the ground settled. The poles should be from 18 to 25 feet in length, according to the strength of the plants, and usually consist of cedar, pine, spruce, ash, or chestnut. Cedar poles are generally preferred, as combining both the desirable properties of lightness and durability. They are sharpened at the bottom with a regular taper, and firmly set in holes made with a heavy crowbar, two poles to a hill, standing about a foot apart, north and south, if practicable. The tops should be inclined a little apart, as this will give the vines more room, and prevent their becoming intertangled.

As soon as the vine is of sufficient length, it is coiled around the pole and fastened by tying, for which purpose a piece of woolen yarn is most suitable. This operation should be repeated from time to time as may be necessary. Two, or, if small, three vines are sufficient for a pole, and all extra vines should be cut off, or pulled up, so that the whole force of the plant may be directed to those on the poles. The ground should be kept perfectly clean between the hills by a free use of the plough or cultivator, worked both lengthwise and across the field, and the hills should be kept entirely clean and free from weeds and grass. This should be done without hauling dirt to the hills, as these should be left quite bare till after the disappearance of the grub, which frequently preys upon the vine just at the top of the ground, and will commonly be found to have finished his work early in July. Then the field may be hilled, after which it should be left till the picking season arrives.

The hop is an enduring plant, and it is said that some fields in England have been cultivated with it beyond the memory of man. Still it is deemed

best to renew the field once in about twelve or fifteen years, as the plant seems to lose its vigor in a few years after planting. The first crop cannot be expected to be a full one, as the plants have not yet attained maturity. After that, for some three or four years, the field will probably be in full vigor, and yield its most abundant crops; after which, a gradual decline will most generally be noticed, and a consequent falling off in the yield. This may be in some measure prevented, and the crop greatly benefited, by liberal manuring; and each hill should receive a good top-dressing of manure every year. This may be applied most conveniently in the fall or winter, while the poles are pulled.

The hills will probably not need grubbing the first season they are poled, but after that they should receive it annually. This should be done in the spring, by bringing the hill, which was formed by the dressing of the preceding year, to a level with the surrounding earth, or perhaps a little lower, and thoroughly cleansing it by removing all the unnecessary roots and superfluous shoots and runners. These should be cut off near the hill, in order that they may not take up the sap that should go to the vine. This grubbing is found to be highly advantageous, as giving the plant new vigor, and being conducive to its health and permanency. After the operation is completed, a little of the top-dressing should be drawn into the trench formed around the hill, and covered with fresh earth. The field will then be cultivated through the season as already described.

The hops having reached maturity, or nearly so, the operation of picking commences. This, to have the fruit in full perfection, should not be done till it is ripe; at which time the seed will be found to have changed from a bright straw-color to a pale brown, and will emit a fragrant smell. I am here reminded of what I have omitted to mention in its proper place, namely: that in hops the male and female plants are distinct, and it is necessary that a small number of the male plants should be interspersed among the others, in order to give that energy and vitality to the seed which is essential to the perfection of the crop. If due care is taken in this particular, a seed will be found at the bottom of each petal of the blossom possessed of a most pungent aromatic flavor. Attention to this particular is indeed necessary to insure flavor and character to the product of the plant, giving it that fine aromatic bitter which is most desirable, and which it will not otherwise be possessed of; the petal or leaf of the blossom containing comparatively but little of the astringent quality of the hop. This consideration is one which, I apprehend, is too frequently overlooked by the inexperienced cultivator, who sometimes rejects the male plants as barren, to the great injury of his crop. One of these plants in fifty would be a sufficient proportion; even a less number might answer.

But to return to hop-picking. With us hops are usually ripe about the 5th of September; but as it is better that they should be harvested rather green than be permitted to stand till over-ripe, liable to be injured by the early frosts, and as they cannot all be gathered at once, it is necessary in large fields to commence somewhat earlier—usually about the first of September—in order that the work may be completed in season. The picking is usually done by females. For this purpose girls are frequently engaged several months, and even a whole year, in advance; and when there are several hop-growers in the same vicinity, there will be a great demand for this kind of labor; making it sometimes necessary to look for it at a distance of twenty miles, or even more. It seems, however, to be a business that is quite popular with young persons; and many girls who would scorn to go out to service in any domestic employment, are quite ready to engage at hop-picking. The hop-picking season is indeed to them quite a carnival; and many things are tolerated in the hop-field that would be considered not strictly proper in any other place.

The hops are commonly picked in large boxes containing from 24 to 40 bushels. These boxes are divided lengthwise by a thin partition, and then subdivided into quarters. They are raised a little from the ground, and have handles at the ends to facilitate their removal from place to place as may be desirable. One man and four girls are allowed to each box. Each girl deposites the hops she picks in her own division of the box, and is paid for what she picks at the rate of from two to three cents per bushel. An industrious hand can pick 20 bushels in a day without difficulty. It is the business of the man, or tender, as he is called, to supply the boxes with poles, (which he raises from the ground as needed, cutting the vines about a foot high,) to see that the picking is properly done, to remove the empty poles, clear them of the vines, and stack them in a systematic manner. In picking, the hops should be kept free from stems and leaves, and all blasted or immature ones should be rejected. The boxes should be emptied at least once a day; at all events, no hops should be left in them over night. It is of great consequence that they should be dried as soon as possible after they are picked, as they are quite liable, if left together in any quantity, to heat and spoil in a few hours. They may be most conveniently conveyed from the field to the dry-house in large sacks.

The operation of drying is one of great nicety, for the strength and flavor of the hop are quite volatile. The hop-house, or kiln, should be of a size proportionate to the quantity of hops to be cured, so that they may not accumulate on hand. To avoid this, it will generally be necessary to keep the kiln heated both day and night. It is commonly built of an oblong form, and of two stories; the lower part being occupied by the kiln and the press-room, and the upper part by the drying-floor over the kiln, and by a room of about an equal size for storing the dried hops, which will of course be over the press-room. Kilns are sometimes built of bricks or stone of a circular form, with a round opening in the apex of the roof, surmounted by a movable cowl, or swinging ventilator, to enable the vapor of the drying hops to escape easily. If the building is of wood, the sides of the kiln should be lined with brick-work, or thoroughly lathed and plastered. It is found to be most convenient and economical to heat it with stoves, from two to four of which will be necessary, according to the size of the kiln. The drying-floor should be at 10 feet from the ground, that there may be no danger of scorching the hops in drying. This floor is formed of slats about one and a half inches in width, and the same distance from each other. These are covered with a strong coarse cloth of open texture, so as to admit of a free transmission of the heated air from the kiln below. The drying-room should be of comfortable height for a person to work in it; and the

sides should be lathed and plastered, that there may be no irregularity of the heat in different portions of the room during high winds. A good ventilator should be provided in the roof as described above. Openings should be left in the walls near the bottom of the kiln to admit fresh air from without; the draught to be regulated by means of flues, or sliding-doors. The cloth for the drying-floor should be well stretched over the slats and firmly nailed. On this floor the hops are spread to the depth of six or eight inches. The proper thickness will depend somewhat on the condition of the hops; if they are very full of moisture they should be laid on quite thin; but if gathered when fully ripe, and in fine weather, a depth of 10 inches will be allowed

The hops being spread as evenly as possible, the fires are immediately kindled in the kiln, and the temperature regulated to one uniform degree of heat. This, however, may be quite high at first, as there will at that time be but little danger of scorching the hops if the floor is sufficiently high. If the hops are rusty, or discolored from any other cause, it is usual to burn a little sulphur under them, which will bring them to a uniform appearance. This is done as soon as the hops are well warmed through, and feel somewhat moist. Great prejudice formerly existed against the use of sulphur in drying hops; but no objection is now made to it by the brewers, and it is generally thought that the use of it improves the appearance of all hops, and that it also facilitates the drying.

During the drying process, the fires should be kept up, and there should be a free supply of fresh air from below, sufficient to keep up a regular succession of heated air from the kiln, passing through the hops, and out at the ventilator, carrying with it the vapor expelled from the drying hops. This will be found far preferable to a still, dead-heat. As soon as the upper part of the hops appear to have felt the fire, the lower part may be considered as nearly dry, and will rattle a little. The heap may then be turned. Before this is done, the heat should be suffered to abate a little, and increased again after the turning is finished. I am aware that many do not turn their hops while drying, nor suffer them to be disturbed at all until they are ready to be removed from the floor. Still, the better opinion, I think, is in favor of turning, as tending to facilitate the drying and to render it more perfect by the more effectually exposing every portion of the mass to the action of the heated current of air, than would be the case were they allowed to remain as first deposited on the floor, containing many inequalities in density, even when the utmost care is exercised in their distribution. If turned at the right time, and in a careful manner, there need be no injury done to the hops. As has been already said, the drying process is one of great nicety, and no precise rules can be given in relation to it. Everything will depend on the judgment and experience of the person having charge of the kiln. They should be dried sufficiently, but at the same time not too much, and it will be for time to determine, by careful examination, precisely when the right period has arrived. To enable him to do this correctly, a little practical experience will be of more value than any amount of written instructions that can be given. When sufficiently dried, they should be allowed to cool off a little, if time can be afforded; otherwise, there will be great danger

that they will break in moving, or a portion of them shell off and waste. Ten or twelve hours are required to dry a kiln of hops. Two kilns may be dried in twenty-four hours by keeping the heat up through the night. A twenty-foot kiln will thus dry 400 bushels in a day, as they come from the vines, making about 750 pounds of hops when dry.

The hops being dried, the next process is to bale them. This should not be done immediately after they are taken from the kiln, but they should be allowed to lie a few days in the store-room till they become a little softened; otherwise, their extreme brittleness will cause them to be much broken in baling, and the sample be thereby greatly injured. The bales should be of symmetrical and convenient form, and should contain about 200 pounds. They are formed in a box or bin prepared for the purpose, in the press-room, of such shape as will give the desired size and form. Across the bottom and sides of this box the baling-cloth is first laid, and the hops are then let down into it from above, and trodden down as they are dropped in, until it is filled. Another cloth is then carried over the top, a follower applied, and the screws of the press turned down upon it until the whole is brought into a compact mass. The box is then taken apart, the cloth neatly secured round the bale, the screws are run up, the bale taken out and the ends cased, when it may be considered finished, and the same process is repeated in forming another. This method is, I believe, almost universally preferred in this country, but I understand that in England the press is seldom if ever used. The sack is suspended from the floor of the store-room by means of a hook, which also serves to keep the mouth of it open. The packer gets into the sack, and drawing the hops in as they are wanted, treads them down with his feet as closely as possible till the sack is filled. This method was formerly pursued in this country, but has been almost entirely abandoned by those who raise hops for market.

The yield of hops is so variable that it is very difficult to determine what may be considered as an average crop. Very much depends, of course, on the fitness of the soil, the quantity of manure applied, and the amount of cultivation. Then, again, very much will depend on the season. This year, for instance, has proved to be very unfavorable, the yield being only about one-third of a full crop. One hop-grower of my acquaintance has obtained but 12,000 pounds from grounds which last year produced 32,000; and another has only 4,000, where last year he obtained 16,000. The universal complaint is, that the crop has been very light. Taking one season with another, the range of different fields is from 400 to 2,000 pounds to the acre. Instances have, indeed, occurred occasionally, in which the latter quantity has been exceeded, and in one instance an average of near 2,800 pounds was obtained. In another case 2,886 pounds were gathered from a single acre, which is claimed to be the largest yield on record. One thousand pounds per acre may be considered as a fair crop; but the general average would no doubt fall below that, and would probably be about one pound per hill, or 888 pounds to an acre.

As to the cost of production her pound, it is probably still more difficult to make an accurate average estimate. It depends, in a great degree, on causes which affect the quantity produced per acre, and

will be found to vary in different localities, according to the price of building materials, the cost of poles, and the facilities for procuring a good supply of manure. A hop-house, including a suitable kiln, drying-floor, cooling-room, and press, sufficient for a field of ten acres, would cost from $300 to $800, according to the materials used, and the pains taken in its construction. Then, again, in some localities, poles can be obtained for $5 per hundred, while in others it is difficult to procure them at even double that price. Taking all things into account, it may be safely estimated that the expense of starting a good field, including the necessary fixtures, will be at least $150 per acre.

The annual cost of cultivation will vary from $75 to $150 per acre, according to the amount of labor expended, and the quantity and value of the manure applied. This estimate should be considered as including also the expense of picking, the interest on the capital invested, the depreciation of the value of buildings, and the decay of poles. The yield may generally be expected to be somewhat in proportion to the amount of judicious expenditure bestowed on the cultivation, and it will probably be a reasonable estimate to put the average cost of production at 10 cents per pound.

It may be proper to add a few words, before concluding, in relation to the profits of hop-growing. It has already been shown that the market for the article is probably more fickle than for any other agricultural production. The crop itself being a precarious one, liable to injury or destruction from a number of causes, nothing certain in regard to the amount of the crop, nor the price that can be realized for it, can be calculated on. After having incurred a great outlay of expenditure in preparing the field and necessary fixtures, and in taking every precaution that human foresight can suggest, for the purpose of insuring a good crop, the expectations of the most careful cultivator may be cut off by the grub gnawing at the root, or the fly preying upon the vines; or his *hopes*, as well as his *hops*, entirely blasted by the rust, blight, or mildew. Prices have indeed ruled sufficiently high, during the last three years, to give to the producer good returns, even with short crops. It should be understood, however, that the hop-growers do not often obtain the highest prices at which the article is quoted in market. Many of these sell on contracts for a term of years, and the high prices to which the article is sometimes run up, is not unfrequently the result of the operations of speculators at a time when there is but little of the article remaining in first hands. Still, it cannot be denied that, taking a series of years in connexion, hop-growing has afforded good profits—better, probably, than almost any other branch of agriculture pursued in this region. Whether it will continue to do so for the future, must be entirely a matter of conjecture. With a good crop, and good markets, it must necessarily be a good business; but without both these in conjunction, it would probably afford no better returns than any other crops.

INDIGO.

This plant, so important in yielding a blue coloring matter, is a native of Industan, but has become naturalized in the West Indies, and other parts of the torrid zone. It was formerly cultivated to a considerable extent in Georgia and some other portions of the South, but the supply from India, and other places abroad, seems to have discouraged its production in that section, and the planters have turned their attention to more profitable crops. Indeed, the amount has been so small, that it was not deemed worthy of note in the census for the last fifteen years.

Indigo began to be cultivated in Virginia prior to 1648. In 1718, it was introduced into Louisiana by the "Company of the West;" and into South Carolina, from the West Indies, by Miss Eliza Lucas, the mother of General Charles B. Pinckney, in 1741. For ten years preceding 1743, the British Parliament granted to the patentees of Georgia £120,000 for the encouragement of this and other agricultural crops. It was cultivated at St. Augustine, in Florida, prior to 1770.

The amount of indigo exported from Charleston, South Carolina, in 1731, was 100,000 pounds; in 1747–48, 134,118 pounds; in 1754, 216,924 pounds; in 1760–61, 399,366 pounds; for a few years preceding the Revolution, annually, 1,107,660 pounds; in 1792, 2,458 barrels; in 1794, 2,157 barrels; from Savannah, in 1755, 4,508 pounds; in 1760, 11,746 pounds; in 1770, 22,336 pounds; from Philadelphia, in 1796, 99,200 pounds; from the United States, in 1794, 1,550,880 pounds.

The quantities and valuations of indigo of domestic production exported within the last thirty-three years, are indicated in the following table:

Years.	Indigo.	Value.	Years.	Indigo.	Value.
	Pounds.	Dollars.		Pounds.	Dollars.
1820–21	1,004	714	1837–38	50	50
1821–22	3,283	2,399	1838–39	....	....
1822–23	2,990	2,314	1839–40	209	209
1823–24	818	836	1840–41	....	....
1824–25	9,955	7,034	1841–42	2,200	1,042
1825–26	5,289	3,922	1842–43	208	198
1826–27	13,589	8,358	1843–44	2,500	1,176
1827–28	2,684	1,496	1844–45	100	70
1828–29	....	....	1845–46	90	90
1829–30	1,140	827	1846–47	25	10
1830–31	....	....	1847–48	1,150	1,100
1831–32	....	....	1848–49	493	49
1832–33	300	180	1849–50	....	....
1833–34	102	148	1850–51	2,740	2,803
1834–35	1,031	1,060	1851–52	1,079	910
1835–36	1,065	1,020	1852–53	36	36
1836–37	....	....			

FRUITS.

When we consider the influence the cultivation of fruit exercises on the health and morals of a country, as well as on the wealth and luxury of the people, it may be truly said that he who devotes his life to the contribution and advancement of such influences confers as great a benefit upon them, and follows as honorable a calling, as the man who defends his country in time of war, or falls by the bullet or the sword. A productive orchard or a fruit garden is not only a luxury and a source of enjoyment to the farmer or man of wealth, but is essential to the health, comfort, and well-being of individuals of every class. It affords an amusement or occupation to be coveted beyond all others, and leads to nothing but good—to nothing sensual or vicious. It can give rise to no bad habits; but, on the contrary, will serve to protect a man from the allurements of dissipation and its consequent evils.

Our orchard and garden fruits have followed man from the earliest periods of civilization, and perhaps have been more studied, and consequently better known, than any other plants. There are two characteristics, however, concerning their cultivation, which are of great importance to cultivators. First, the liability of almost every sort to "sport" and produce varieties differing, in many cases, more from one another than they differ from other species. But let it be considered that when these varieties take place, they may not always tend to deteriorate the fruit, but may often result in an exchange of one good quality for another, or perhaps even exhibit an improvement in the qualities. For instance, we may at least expect to obtain early fruit from the seeds of that which is early, and from those of late fruit the reverse; and by parity of reason, from large or small, from sweet or sour, from juicy or dry fruit, we may also expect to obtain seedlings that will, in a greater or less degree, correspond to their origin—a result which it may often be an object for the prudent cultivator to secure. The second characteristic is, that nearly every class of fruit is remarkably subject to the attacks of insects and of disease; for trees, like animals, have inherent diseases, or a susceptibility to receive those peculiar to their species. Although insects are the direct source of many injuries to trees and their fruit, they are frequently met with in morbid parts, feculent or putrefying from previous malady, and may be regarded as the *effects* rather than the *causes* of disease; and accordingly should be treated in reference to these facts.

It may not be without interest to compare the valuation of orchard fruits cultivated in this country at different periods within the last fifteen years. In 1840, according to the census of that year, the value of orchard products was $7,256,904, besides 124,734 gallons of domestic wine. The census of 1850 gives $7,723,186 worth of orchard products, and 221,249 gallons of wine, showing only an increase of 466,282 in value of fruit, and 96,515 gallons in the production of wine; both of which are unquestionably too low. The amount of domestic wine made in the United States in 1853 may be safely estimated at 2,000,000 gallons; which, at $1, would be worth $2,000,000. Add to this $18,000,000 worth of strawberries, blackberries, raspberries, cranberries, and orchard products, the value of fruit, cider, vinegar,

and wine, of domestic growth and manufacture, would amount to $20,000,000.

FRUITS OF CENTRE COUNTY, PENNSYLVANIA.

By H. N. McAllister, George Buchanan, James Alexander, J. K. Shoemaker, *and* William J. Waring, *being that portion of their report which relates to fruits, to the Centre County Agricultural Society.*

The numerous exhibitions of fruit held of late throughout this and the other Middle States, have afforded full opportunities for comparing the appearance and merits of fruit grown in different districts. We have not seen nor heard of, within the limits of Pennsylvania, larger nor richer peaches, fairer and higher-flavored pears, handsomer and more abundant plums and cherries, than have been shown in Centre county. Apples and quinces are handsome and good, perhaps over an average in size; yet not so large as some we hear of in places out of the State. All these fruits grow with quite as little care as appears to be required in any other districts.

There is no doubt but that health, comfort, sociability, temperance, and good morals generally, would be promoted by making a choice fruit-garden as universal an appendage to a dwelling as a vegetable garden is now. But as yet, there is scarcely an approximation to such a supply. The chief impediments in the way of diseases, insects, &c., appear to be the following:

1. The crop is rather precarious, and some fruits bear only once in two years. In a good collection, however, there is always a supply of some fruit or other, even in the most adverse seasons, and meanwhile the trees are gathering strength.

2. Persons who own land, and ought to plant on it, say: "It is not worth while, for I may move away or rent, and in either of these cases I should receive no return for my outlay." This principle is generally acted upon, but it is none the less thankless, ungenerous, impolitic, and wrong.

3. Many who have planted more or less, say: "After raising an orchard, and caring for the trees through many years as for the 'apple of the eye,' when they at length begin to bear, the branches are broken and the fruit carried off by plunderers, whom the law calls but trespassers; or, what is worse, I am suddenly beset by swarms of idlers—summer friends—who take both my time and fruit, and leave me minus everything but the 'echo of their gentle voices.'" Perhaps there is no greater obstacle to the general culture of fruit than this. The owner of a finely laden tree feels a natural impulse to share its produce with his friends; but at the same time, he feels that his care, labor, time, and money, should give him the right to do with it as pleases himself; and when he finds this right unscrupulously and continually violated, his trees become a source of annoyance; and if he does not cut them down, he neglects them, and lets them go down themselves. Some-

thing might be done to correct this by legislative enactments, but more, perhaps, by the formation of village horticultural clubs.

4. Every kind of fruit is affected more or less by insects and diseases, and none flourish without care and culture. This is true; and it is the price we must pay for everything most necessary to our existence. The following account includes all the principal difficulties of this kind that we encounter in this region.

Apples.—The trees suffer occasionally from large sawyer worms, which eat the roots; from the bark-louse, or scale insect, on the branches, and from woolly and green lice, or aphides, which check the growth at the top. Caterpillars and blight do but little injury. The borer and canker-worm are unknown here. The carpocapsa or apple-worm in the fruit, is often very abundant and injurious. But the cultivator himself is often much more destructive than any of these easily repelled insects, by suffering animals to browse the leaves from young trees, or by removing them himself during the season of growth, under an untimely and mistaken idea of the propriety of "trimming up;" by neglecting to form the heads of his trees when young, and inflicting the most violent amputations after the branches become large; and, worst of all, by crushing through and cutting off the roots with a plough during summer. He, himself, out-Herods all the insects that can be found.

Pears.—The blight has scarcely appeared for several years past. Trees on healthy stocks, once fairly established, grow well, and the fruitful varieties are very productive.

Peaches.—The "yellows" has destroyed a large proportion of the trees, and the "curled leaf" has seriously weakened and injured the remainder by causing the growth to be unnaturally late; in consequence of which, the wood does not mature nor bear the winter well. This affection is so universal from the Atlantic to the Pacific, and has appeared so regularly for three or four years past, that I think it cannot be attributed to peculiarity of weather. It seems as inscrutable as the "potato rot." It was less injurious last spring than previously. The peach-worm is as common as ever. The application of a mound of ashes around the base of the stem during summer, and an examination in autumn, is the simplest and surest method of at once manuring the tree and securing it against serious injury by the worm. Budded trees of the larger improved kinds do not bear so well as seedlings while young and in vigorous growth; but when of full size, they often bear too abundantly.

Plums.—The common damsons, &c., lose their leaves in summer, and suffer in consequence, even more than the peach, by "curled leaf." But the strong-growing, large-leaved sorts are exempt from this blight; their robust habit seems to be proof against it. The "black knots" have done no injury here, but the curculio is very destructive; less so, however, in 1852–53, than previously. I have succeeded perfectly in warding off the curculio for several years, by allowing pigs and poultry to run in the plum garden during May and June.

Cherries.—The common morello is nearly extirpated by the "black knot." All other kinds do perfectly well here on all dry soils, but

especially on slate, and have no disease but a liability of some sorts to rot, if much rain occurs when they are ripening.

Grapes.—These grow freely, and bear profusely. The Catawba does not ripen freely in our elevated valleys without the aid of a wall, unless in very dry and hot seasons. The only injury from insects is committed by a large caterpillar, which eats off the leaves to the great detriment of the fruit. The York Madeira, when fully ripe, is our best grape; at least, I think the majority say so. The Isabella, Catawba, Clinton, and Muscadel, are severally preferred by many.

APPLES.

That the common apple-tree is a native of the Eastern hemisphere, we have the authority of the earliest writers in "Holy Writ," as well as of the naturalists of ancient Greece and Rome. Apples are mentioned by Theophrastus, Herodotus, and Columella. The Greeks, according to Pliny, called them *Medica*, after the country where they were first brought, in ancient times; but others conjecture that the term "Medica" was more properly applied to the citron and the peach, both of which are supposed to have been introduced from Media into Greece. That the *Epirotica*, from Epirus, were what we call apples, there can be no doubt, as they are described by Pliny as a fruit with a tender skin, that can easily be pared off; and, besides, he mentions "crabs" and "wildings," as being smaller, "and for their harsh sourness they have many a foul word and shrewd curse given them." The cultivated apple, however, probably was not very abundant at Rome in his time, for he states that "there were some trees in the villas near the city, which yielded more profit than a small farm, and which brought about the invention of grafting." "There are apples," continues he, "that have ennobled the countries from which they came; and our best varieties will honor their first grafters forever; such as took their names from Matius, Cestius, Manlius, and Claudius." He particularizes the "quince apples," that came from a quince grafted upon an apple stock, which smelled like the quince, and were called *Appiana*, after Appius, of the house of Claudius. It must be confessed, however, that Pliny has related so many particulars as facts, concerning the apple, (such as changing the fruit to the color of blood, by grafting it on the mulberry; and the tree in the Tyburtines country, "grafted and laden with all manner of fruits," which are regarded by modern grafters as physiological impossibilities,) it would seem that very little confidence could be placed in his statements of any kind. But what reason have we to doubt the authority of a man whose life was spent to the benefit of mankind, and whose death was caused by his perseverance in search of truth? Instances of grafting trees of different families upon one another, are also mentioned by other old authors; and even our Evelyn, of more recent times, states that he saw in Holland a rose engrafted upon the orange. Columella, a practical

husbandman, who wrote some years before Pliny, describes three methods of grafting, as handed down to him, by whom he calls the "ancients," besides a fourth method of his own, and a mode of inarching, or grafting by approach, "whereby all sorts of grafts may be grafted upon all sorts of trees." It would appear, however, that the art of grafting, at the period in which he flourished, was comparatively a modern invention, as it is not mentioned by Moses in his directions to the Israelites, when they "* * * * * * shall come into the land, and shall have planted all manner of trees;" neither by Hesiod nor Homer, although forming a part of the subjects on which they wrote.

The making of cider was introduced into Britain by the Normans, who, it is said, obtained the art from Spain, where it is no longer practised. This liquor is supposed to have been first known, however, in Africa, from its being mentioned by the two African fathers, Tertullian and Augustine, and was introduced by the Carthaginians into Biscay, a province unfriendly to the vine, on which account it became the substitute in other countries.

The introduction of the common apple-tree into the British North American colonies, dates back to the early periods of their settlements. The seeds of apples, and of various other products, were brought from England at the order of the "Governor and Company of Massachusetts Bay in New England," in 1629. On the 3d of April, 1632, Governor's island, in Boston harbor, was granted to Governor Winthrop, on condition that he should plant thereon a vineyard or an orchard. Apples were cultivated near Plymouth by the Pilgrims, soon after their arrival, and some of the original trees were standing there up to within a few years.

To Massachusetts we are indebted for the famous "Baldwin apple," so much esteemed for its good qualities and long keeping. It originated in Wilmington, near Boston, more than a century ago, in that part of the town now called Somerville, on the farm of a Mr. Butters, and was known for a time as the "Butters apple." As the tree was frequented and perforated by the woodpecker, it was also called the "woodpecker apple." Orchards were propagated freely from this tree eighty or more years ago, by Dr. Jabez Brown, of Wilmington, and by Col. Baldwin, of Woburn. By the sons of these latter gentlemen this fruit was brought into general notice, as the "Baldwin apple."

The first orchard planted in Rhode Island was at Study Hill, near Pawtucket, by Rev. William Blackstone, in 1636. It contained an apple by the name of the "yellow sweeting," famous in that day.

The apple was planted at Hartford, in Connecticut, previous to the year 1645. An ancient tree of the "Pearmain" variety is still standing on the Charter Oak place, in that city, which was brought from England, by George Wyllis, more than two hundred years ago.

The "Fisher apple" was brought to Portsmouth, in New Hampshire, by John Fisher, a merchant from London, in 17—. The original tree is still standing on the public farm of that city, in good bearing condition.

In 1741, apples were exported from New England to the West Indies, in considerable abundance. Prior to that period, one hundred hogsheads of cider were made from a single farm.

The common apple was grafted on wild crab stocks in Virginia, in 1647. The same year twenty butts of cider were made in that colony, by Richard Bennet.

A "Codling tree," sent from England about a century ago, by Charles Lord Baltimore to his son, Benedict Calvert, is now standing in full vigor at Mount Airy, Prince George's county, in Maryland.

The original "Newtown Pippin" tree is stated to have been the spontaneous production of a seed near a swamp in Newtown, Long Island, New York, more than a century and a half ago. It stood on the estate of Gershom Moore, and for a long time the fruit went by the name of the "Gershom Moore Pippin," so called in honor of its former proprietor. After enduring for more than one hundred years, this tree died, in about the year 1805, from excessive cutting and exhaustion. Its scions were in great request by all the principal amateurs and orchardists of the day, and engrafted trees of it are still to be met with in the neighboring towns, which have stood beyond the memory of man.

It appears, from Dodsley's London "Annual Register," that in the year 1768, the society for promoting arts, &c., at New York, awarded a premium of £10 to Thomas Young, of Oyster Bay, for the largest nursery of apple-trees, the number being 27,123.

The quantity and valuation of apples and vinegar, of domestic growth and manufacture, exported from the United States within the last thirty-three years, are indicated in the following table:

Years.	Apples.	Value.	Value of vinegar.	Years.	Apples.	Value.	Value of vinegar.
	Barrels.	Dollars.	Dollars.		Barrels.	Dollars.	Dollars.
1820–21......	68,643	39,966	....	1837–38......	20,157	41,121	5,241
1821–22......	63,689	48,499	....	1838–39......	23,470	50,875	3,745
1822–23......	53,606	30,429	....	1839–40......	23,396	55,131	6,401
1823–24......	27,055	46,813	....	1840–41......	25,216	48,396	12,957
1824–25......	32,354	53,662	....	1841–42......	14,239	32,245	10,908
1825–26......	15,695	27,370	5,801	1842–43......	15,412	32,825	7,556
1826–27......	30,648	35,828	8,182	1843–44......	22,324	51,465	8,315
1827–28......	13,839	22,700	5,884	1844–45......	54,022	81,306	14,375
1828–29......	8,193	15,958	5,953	1845–46......	30,903	69,253	17,480
1829–30......	14,458	23,727	6,690	1846–47......	45,300	92,961	9,596
1830–31......	16,375	31,148	7,178	1847–48......	38,719	88,944	13,990
1831–32......	6,928	15,314	4,677	1848–49......	47,694	93,904	14,036
1832–33......	17,075	33,262	3,347	1849–50......	11,215	24,974	11,188
1833–34......	25,276	41,849	3,805	1850–51......	28,842	71,367	16,915
1834–35......	9,745	20,959	4,540	1851–52......	18,411	43,635	12,220
1835–36......	22,235	39,668	3,634	1852–53......	45,075	107,283	20,443
1836–37......	20,594	40,990	4,313				

CONDENSED CORRESPONDENCE.

Statement of S. S. BOYD, *of Jacksonsburg, Wayne county, Indiana.*

Apples are the principal fruit cultivated in this county. They grow to great perfection, with but little attention after planting. The crop does not entirely fail oftener than once in five years. The cause of such failures is late spring frosts, which generally occur in May, after the apples are formed on the trees. I have now a collection of thirty-six varieties, mostly winter fruit; all of which are in good keeping, all obtained in this vicinity, and most of them valuable.

The best summer varieties cultivated here are the "Yellow June," "Sweet Bough," "Sour June," "Early Red," and "Summer Queen."

Of autumn apples, the best are the "Wine Apple," "Fall Pippin," "Rambo," and "Maiden's Blush."

The winter varieties are the "Vandervere Pippin," "Golden Russet," "Yellow Belle-fleur," "Cumberland Spice," "Smith's Cider," "Winesap," "Neverfail," "Rhode Island Greening," "Red Pearmain," "Romanite," and the "Butter Apple." Of all the varieties, none perhaps are such certain bearers as the "Neverfail" and "Vandervere Pippin."

The only disease to which apples are liable is the "black" or "bitter rot." No cause nor remedy is known. Rhode Island Greenings and Vandervere Pippins are most free from malady. The last season, however, was one of abundant and faultless fruit. Hundreds of bushels of apples rotted in the orchards, and few were sold, except to supply the demand in the towns and villages of this county. At the time of gathering, they sold from 20 to 25 cents per bushel.

In regard to keeping apples, I am satisfied from my experience that more apples rot from bein_ kept too close and warm during the winter than all other causes combined. I have a cellar through which the air circulates freely, where potatoes cannot be kept during the winter on account of freezing. Apples only freeze when the mercury is below zero; yet mine have kept remarkably well every season, whilst those in warmer cellars in the vicinity have frequently been destroyed by rot. The cold winter of 1851–52 killed many of the apple-trees in this region. Those of the age of from ten to fifteen years after transplanting suffered more than any others.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Of apples, we have fifty varieties in bearing; and the greater part of them do well. The "Jenneting" is a most important variety. The tree grows with usual thrift, and is nearly three weeks later in blooming than all others we have made trial of, and thus escapes the late frosts in the spring. The following varieties succeed best with us:

Summer kinds.—Striped June, Early Harvest, Carolina June, Summer Rose, Royal Pearmain, American Summer Pearmain, and Gravenstein.

Autumn varieties.—Rambo, Queen, Fall Pippin, Golden Russet, Spitzenberg, and the Belle-fleur.

Winter varieties.—Jenneting, Pryor's Red, and the Limber Twig.

The last mentioned is valuable as a very late keeper. The Newtown Pippin is also an excellent winter apple when it does not "spot."

Statement of H. W. HUNTINGTON, *near Trinity parish, Catahoula, Louisiana.*

The apple, when in a position to be shaded fully half the day, I have found to yield richly; and I have gathered from my trees the variety of pippin called by Coxe the "Monstrous," weighing half an ounce over two pounds, highly flavored, and juicy at that. In situations exposed to the sun throughout the day, the trees shoot up much in the form of a Lombardy poplar, bearing a juiceless fruit, which generally falls in an immature state.

Statement of D. A. FAIRBANKS, *of Augusta, Kennebec county, Maine.*

An orchard belonging to this city, of about two hundred trees, produced this year 250 bushels of grafted apples, which sold for $2 50 per barrel. This orchard is well situated on a southeasterly slope, with a hill on the west to break off the cold winds, and is enclosed by a tight high fence. For quite a number of years it has been pastured with hogs, to enrich and keep light the soil, and to eat the small apples which fall from the trees. Last year the same orchard had some 600 or more bushels on it.

The varieties in this orchard, and which thrive well in this climate, are—for winter use, the Roxbury Russet, Nonsuch, Rhode Island Greening, Baldwin, Talman Sweet, Blue Pearmain, and the Esopus Spitzenberg; for fall use, the New York Russet, Franklin Sweet, and the Fairbanks; for summer use, Sops-of-Wine, Moses Wood, and Summer Sweet.

The cost of transporting fruit from this county to the Atlantic market by navigation is 10 cents a barrel; by railroad, 44 cents.

Statement of ABRAHAM PREBLE, *of Bowdoinham, Lincoln county, Maine.*

Apples, in this vicinity, are the principal fruit crop. Our climate seems well adapted to their growth, and when properly cultivated they pay well for our labor. Thirty years ago few of us knew anything about grafted fruit. There were large orchards of native seedlings, and the fruit of so little value that some farmers, considering their orchards an incumbrance to the land, cut down large portions of them; many others neglected their fruit-trees, and nearly all of us failed to set young trees. About twenty-five years ago, grafters came from the West and set some scions in nearly every town in this county. After their grafting came into bearing we soon saw the great superiority of grafted over ungrafted fruit; and it awakened an interest, which has

been yearly increasing, for pruning, cleaning, and grafting old orchards, and setting out young ones. But we met with a difficulty in the want of nurseries; for Western trees came so high, that most of us could not afford to buy many of them. But now fruit-trees come cheaper, and we have plenty of nurseries at home; so that the number of trees set annually is fast increasing.

Caterpillars have troubled our orchards more or less for many years; but a little care in season will destroy them in the nest. Borers, in some neighborhoods, have done mischief; but they may be destroyed while in the tree by thrusting a limber wire into their holes.

To make orchards productive, and yield fair fruit after being grafted, the land should be kept loose and rich, and the trees scraped and yearly pruned.

Varieties.—We have engrafted a large variety of apples, from those which ripen in August to those that will keep the year round. Among our best summer varieties are the August Sweet, Sops-of-Wine, and Jenneting. The Pound Sweet, Kennebec Seedling, and Low Graft, are fine for fall. The two most valuable cooking apples are the Cat Head and King's Pocket, both very large and productive bearers. I have raised Cat Heads sixty of which made a bushel. Our orchards have been extensively engrafted with winter apples, particularly those which keep longest; so that at present there is a greater supply of winter than summer or autumn varieties. Baldwins, Rhode Island Greenings, and Roxbury Russets are considered the most valuable for long keeping and shipping. The trees are good bearers, hardy, and make fine tops. The Blue Pearmain is a very fine apple in some locations, but generally with us neither trees nor fruit do well. The Black Giliflower is an early winter apple, much admired by some. The Black apple lately originated in South Paris, Oxford county, in this State, and is highly recommended, but not sufficiently tested. The Golden Ball is also a very fine large apple, (keeping until March,) which lately sprang from the orchard of Mrs. Paul Bayley, of Sidney, Kennebec county. The trees are hardy and thrifty, and make large, handsome tops; but we have not sufficiently tested their bearing qualities. New varieties are annually brought into notice.

Cost and profit of an apple orchard.—One hundred trees planted on an acre of land will cost, on an average, $25. The land should be kept in a state of cultivation whilst the trees are coming into bearing. About $25 expended in care and labor, besides the crops taken from the land, will bring them into a bearing state. When an acre of trees is in its prime it will average 400 bushels per annum, provided the land is kept rich and loose, and the trees well managed. Average price, 66 cents per bushel. Our surplus apples are valuable for all kinds of stock, particularly to winter store-hogs. Sweet apples are worth about as much as potatoes.

Nurseries.—My method of cultivating young trees is to sow pomace from the cider-mill in the fall, in drills two feet apart. The two following seasons I keep the ground clear of weeds. In the fall of the second year I dig up the young trees and pack them in the cellar, covering the roots with earth. In the month of March following, when I have little to do, I take them into a room, with heat enough to keep comfortable, and graft them with the best varieties of fruit, bind and label each bundle with the name of the variety, and again pack the roots in earth in the cellar. When the stock is larger than the scion I split it in the middle, and cut the scion in the form of a wedge, inserting the scion in such a manner that the saps, wood, and bark come together on one side. I secure the scion by winding a few turns of twine around the stock to make it hug the scion; covering the wound with cement. When the stock and scion are of equal size, I adopt the whip-method of grafting.

As soon as the frost is out of the ground, make it rich with the best manures for corn; plough deep and fine; furrow four feet apart, two furrows in a row; and remove the trees from the cellar, keeping the roots from the sun as much as possible whilst transplanting. I place the trees 15 inches apart in the rows, bending the tap-roots in a horizontal position, and covering the other roots with fine earth about two inches deeper than they originally grew. As soon as I find the scions have taken, and have grown about two inches in length, which is generally about the last of June, I cut the twine by holding in my left hand a piece of wood with a notch cut in it to rest against the back of the tree to keep it steady; with a sharp-pointed knife in my right hand, with the edge upwards, I cut through the cement so as to cut off each turn of twine. If the twine is not cut, it will girdle and spoil the tree. Engrafted trees, managed in this way by a skilful hand, will do well; and more than seven-eighths of them will live and grow. Some of them will grow but little the first year; others, one, two, three, or four feet. The sprouts from the stock must be kept off, and when the scions are not inclined to shoot up, lash them to small stakes; otherwise they will be broken down. When mice are plenty, they will girdle and destroy the trees if something is not done to prevent them. To know each variety whilst in the nursery, I split stalks of cedar two inches wide, shave them smooth and paint them white, and then stick one where a variety begins and where it ends, and mark the names on them with black paint.

Statement of Henry Little, *of Bangor, Penobscot county, Maine.*

Although I am in the mercantile business, my favorite pursuit for many years has been to ascertain what choice fruits will best suit the climate of Maine, and more particularly the locality of Bangor and its vicinity; to introduce and disseminate such fruits as widely as possible on Penobscot river, and through the State. The reputation of many fruits will depend on their location. What may be strictly true of a fruit grown in Maine, may be as strictly false of the same variety if grown in Pennsylvania, or further south. In the one case, it may be first-rate; in the other, inferior in flavor. Therefore, in the selection of varieties, the pomologist should be influenced by the climate of his location. Our climate differs from that of England, yet it approaches nearer to it than most other States; for the fruits that best thrive in that country, grow in great perfection in Maine.

I know of no way that lands in this region can be used to so great a profit as by the cultivation of the finer varieties of fruits. No crops

command so high prices. For ten years past the average price in our market has been for apples $1 per bushel; for plums, the best varieties, $4 per bushel. For pears a still higher price. In this part of the State the demand is greater than the supply at these prices.

There is a lively interest awakened here on the subject, and we have in this city a flourishing horticultural society, which annually holds a highly respectable show of fruit; particularly of the apple, the pear, and the plum.

Grafting and budding.—There is annually, at the right season, much grafting and budding done. The grafting is not performed by splitting the stock, but by "saddle grafting," which is very popular here; for the trees grow perfectly sound at the junction, as the scions nearly all live and thrive when the grafting cloth is used. I here give the method that is adopted, which, as far as I can learn, is uniformly practised on this river. First, take six pounds of beeswax, one pound of rosin, and one pint of linseed oil, (no other than linseed oil should be used) and melt them well together over a slow fire. Then, while warm, with a paint-brush, spread the wax on one side of closely woven cotton cloth, which cut, when waxed, into strips as may be wanted, say half an inch wide and from nine to twelve inches long, according to the size of the stock to be grafted. I have used this grafting cloth with almost sure success for many years. It is very pliable, easily worked, and contains nothing that in the least injures the scion, or stock. No strings are necessary, and the work may be very neatly as well as quickly performed. These waxed strips may also be used in budding trees, also for covering wounds on trees. Some use more rosin than one to six pounds of beeswax; but rosin is not so pliable as beeswax, and the only reason I use any is for its adhesive quality. All stone fruits should be grafted very early in the spring. I have grafted plums and cherries with success when the snow was over a foot deep where the trees stood. It was in the month of March.

The Paradise stock is used for apples, though some engraft upon the Doucin stock. For dwarfing certain varieties of pears, the Angers quince is preferred for the purpose. For the cherry, the Mahaleb stock is employed. For plums, the Canada plum stock is mostly used; but it operates like the pear on the thorn or mountain ash—the scion outgrows the stock.

The cherry-tree should be grafted before the frost is out of the ground.

Pruning trees.—I think most people prune too much. The tap-root is cut off when the tree is planted, and all the branches, for at least six feet from the ground, and in some cases they are pruned so severely that a man on horseback could ride round them without touching his hat to the few limbs that are left. Thus the trees are treated with downright cruelty. The result is, the bodies of the trees are more or less affected with the "sun-scald." However we may respect the customs of our fathers and grandfathers, we are not obliged to copy their errors. To preserve the pear and other fruit-trees that have been deprived of their much needed dress and ornament, we wind the bodies with wreathes of hay, or shade them by cotton cloth from the ground upwards to the lower branches. Where this is done, in every instance it has afforded

a sure protection from sun-scalds. I have long been convinced of the great benefit of permitting all fruit-trees to branch near the ground, suffering them to form the shape of a pyramid. Mulching has been found very beneficial, more especially to newly planted trees. It is done by spreading refuse hay or straw, a few inches thick, over the roots of the trees.

Manuring trees.—In this and the other States of New England, where the lands are not rich, some of the farmers are in the habit of gathering fruit from their orchards, for a succession of years, without giving the soil any nutriment. In Maine, if we take heavy crops from the soil, we must enrich it in return, or it will soon be exhausted, and the fruit will surely deteriorate. With us, there is more danger of starving our fruit-trees, than of giving them too much food. I therefore see no good reason why we should manure our lands for crops of wheat, corn, and potatoes, and utterly neglect to enrich the soil for our crops of fruits. One of our farmers was asked why his apples were so much superior to those of the same variety raised by his neighbor? "Because," he replied, "I fat my apples by enriching the soil around the roots of my trees." There was good sense in the reply. These observations would not be called for, if we all had soils like the rich prairies of the West. We have in this State ample means to fertilize our soil, for growing fruits, by swamp or pond muck, in any quantity desired—lime, ashes, bones, and other fertilizers.

Under-draining land is beginning to attract attention; and so far as it is practised, it has in every instance been attended with great success. Perhaps it is more beneficial here than in other soils. Dwarfing fruit-trees has become fashionable, more especially in cities.

With us, the apple is the most useful of fruits. Its value is greatly enhanced by its long-keeping qualities. When the cultivator plants trees of varieties that will ripen in succession, he has this fruit in perfection the whole year. It is not only valuable for the dessert, but for culinary purposes, even in a dried state. Sweet apples are a wholesome food, and should be cultivated more extensively. I think that our farmers would find it much to their advantage if they would cultivate a greater proportion of sweet apples, for culinary purposes, as well as for feeding to stock.

Apples grown in this State are kept full a month longer than those raised in most of the other sections of the country. I therefore believe that Maine will, at no distant day, become one of the largest exporting fruit States in the Union. Immense quantities are commonly exported to foreign countries in ships owned here, which affords us every facility of adding to the cargoes our long-keeping apples. In this respect we have many advantages over our brethren of other States, which have less seacoast, and, with two exceptions, less navigation. Maine is indented along the seacoast with more than three hundred harbors, suitable for ships, steamers, and other vessels.

The varieties cultivated with the best success, in this section, are as follows:

Summer apples.—Bell's Early, or Sops-of-Wine; Drap d'Or; Early Harvest; Early Sweet Bough; Red Astrachan; Tetofsky; William's Favorite.

Autumn apples.—Beauty of Kent; Dutchess of Oldenburg; Fameuse; Gravenstein; Garden Sweet; Jewett's Red; Maiden's Blush; Norton's Melon; Orange, or Golden Sweet; Porter; St. Lawrence and Hawley (promise well.)

Winter apples.—American Golden Russet; Baldwin; Blue Pearmain; Danon's Winter Sweet; Domino; Golden Ball; Hubbardston Nonsuch; Jonathan; Lady's Sweeting; Minister; Mother; Northern Spy; Peck's Pleasant; Pomme Gris; Rhode Island Greening; Ribstone Pippin; Roxbury Russet; Tallman Sweet; Vandervere; Wagener (not fully tested.)

Our horticultural exhibition is annually held about the 20th of September. Every year there are sound apples of the previous year found on the tables. At the exhibition of fruits in 1852, a plate of sound apples were on the tables which were grown in 1850!

I will here remark, that where there is one apple-tree now growing in this State, there should be one hundred or more. When we have a surplus of apples, we can export them to Europe, and other parts where the apple is not grown in that perfection that it is with us, and where they command a price varying from $7 to $20 per barrel.

Ribstone Pippin.—This variety is only second-rate in Pennsylvania and other States south of New York. Here, as in England, it is generally considered our best winter apple. Hon. Ephraim Goodale, of Orrington, near this city, now eighty years of age, has cultivated it for fifty years, and his opinion of fruits has great weight with the public here. He thinks it has no superior for the climate of Maine. He received this variety, and the Sops-of-Wine, under the name of Bell's Early, by which it is known here, from the Hon. Dr. Vaughn, of Hallowell, who brought them from England. I have seen the Ribstone Pippin in great perfection in the gardens of Montreal. In 1850, Mr. Sharp, of Woodstock, New Brunswick, wrote to me for a selection of apple scions, suitable for the cold climate of that province. I accordingly sent him 1,000. He has lately written me that he has growing on his farm 28,000 apple-trees of the varieties I sent him—2,800 of which were of the Ribstone Pippin; 800 of the Rhode Island Greening; 700 of the Gravenstein; 650 of William's Favorite; 600 of the Red Astrachan; 500 each of the Dutchess of Oldenburg, Fameuse, Bell's Early, Northern Spy, and others. The Ribstone Pippin is peculiarly suited for a northern climate.

Maiden's Blush.—I never have seen this variety so beautiful in color nor so rich in flavor as those grown on the Penobscot.

Bell's Early, or Sops-of-Wine.—This has been for fifty years the favorite early apple of Bangor and its vicinity. When grown here, it is a first-rate fruit. It requires a rich soil. This variety and William's Favorite bring high prices in this market. I may here remark, that here and elsewhere a deep red apple is more saleable than any other colored one.

The *Dutchess of Oldenburg* was first brought here in 1847. One of the trees bore a dozen of handsome apples the same year. The tree and fruit on it sold for $4; since which time the variety has been extensively cultivated. It proves very productive; the trees bear young, and are fast growers.

Gravenstein.—This is deservedly the most popular autumn apple in this part of Maine. It was introduced here in 1828, and the first tree grafted with this variety, bore 20 bushels the twelfth year, and has since bore, in good fruit years, 25 bushels. It is extensively cultivated in this region, and the trees are fast growers.

Vandervere.—This variety was also brought here in 1828. It requires a rich, light soil. It is one of our best and handsomest winter apples.

Hubbardston Nonsuch.—This fruit has been cultivated on this river nearly fifty years. It sustains the highest reputation, and is one of the handsomest and finest flavored fruits in the catalogue of apples. It is not yet cultivated so extensively as the Ribstone Pippin in this vicinity.

Rhode Island Greening.—This apple cannot be dispensed with, as an old and very reliable acquaintance—a great and sure bearer.

Baldwin.—No apple is so extensively cultivated in Massachusetts as this. It is very partial to the place of its nativity, in Middlesex county in that State, where it grows in great perfection. When it was first brought to the Penobscot, it was hardly worth cultivation; but it grew better from year to year, both in flavor and color, until it is now classed among our best apples.

Northern Spy.—Thousands of trees are planted of this new variety, some of which have fruited. It requires high cultivation, and the trees are very thrifty. The specimens of fruit that I have seen are not equal to those grown in New York—they are variable. We have not cultivated it long enough to form a correct opinion of it.

William's Favorite.—No early apple commands a higher price than this in our market. Its size, color, and great beauty, also its mild subacid, rich flavor, combine to make it very popular.

Early Sweet Bough.—This variety is beginning to be extensively cultivated here, and, I believe, is generally considered the best early sweet apple. The trees are very thrifty and productive.

The foregoing apples are selected from the large number of varieties cultivated in this region. Were I to make a selection for Pennsylvania, Ohio, or other distant States, I could point out other varieties equal to, or superior to those cultivated with us. For instance, in New York, I could name the far-famed Newtown Pippin, the Esopus Spitzenberg, the Swaar, the Fall Pippin, and the Ounce apple, which do not grow here to that perfection they do in their native State.

Statement of Simon T. Ashton *and* Elijah Myrick, *Trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

We have an orchard of one hundred varieties of the apple, selected from the best nurseries. These are just beginning to bear, most of them giving promise to be equal to the recommendations of the best authorities, and agree well with the descriptions, as far as we have had opportunity to compare. They have not, as yet, been in bearing long enough for us to speak advisedly of their comparative or respective merits. In our older orchards we have some thirty other kinds of good apples.

Statement of C. F. MALLORY, *of Romeo, Macomb county, Michigan.*

Apples in this county are a profitable crop. They sell at from 25 to 50 cents per bushel, and are carried in considerable quantities to Detroit, and shipped to Chicago and other ports on the lakes. The cost of transportation from Detroit to New York is from 75 cents to $1 per barrel.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

This is emphatically the land of the apple. Every variety of fruit seems to flourish on this soil. Peaches succeed well, failing about once in four or five years. Plums generally bear well. The pear and cherry (except the morello) rarely succeed.

Statement of SAMUEL WEBBER, *of Charlestown, Sullivan county, New Hampshire.*

Apples are the only fruit cultivated here in sufficient abundance to be a regular article of sale. Good grafted varieties, in years of fair yield, have usually sold at about 50 cents a bushel; cider apples, at from 12½ to 17 cents; good cooking apples, from 20 to 34 cents per bushel The present season, the apple crop has almost entirely failed in this vicinity, and good fruit has sold for 70 to 75 cents per bushel.

Statement of F. W. LAY, *of Green, Monroe county, New York.*

Formerly, fruit was considered of little value in this county. Could the farmer raise sufficient for the consumption of his family, and annually make a few barrels of cider, it was all he wished or expected. Most of the early orchards were natural fruit, and from these have originated some of the best and most popular sorts; but latterly these trees have most of them been top-grafted with approved varieties; and railroads and canals have opened such a market with the Eastern cities, that no branch of business that we can pursue is so profitable as this. One dealer in this town has bought and shipped East, the present season, some 18,000 barrels of apples, at a cost of about $1 50 per barrel.

Probably, in no section of country in the world is there such interest in the cultivation of fruit as in the county of Monroe. Almost every farmer is planting out large orchards of apple, peach, and plum, while the extensive nurseries of Rochester and vicinity are continually pouring out their thousands of trees. There is such an increase in this business, that the questions are often asked: Can it remain profitable? Will not the market be glutted? I think not; for we have always found that as the business increases, new markets are opened, and more fruit is used. The nurseries of this county occupy several hundred acres of closely planted trees. The business is one of the best the farmer can engage in.

Statement of ROBERT L. PELL, *of the city and county of New York.*

The orchard on "Pelham Farm," in Esopus, Ulster county, contains 20,000 bearing Newtown Pippin trees, twenty-four years old. The fruit, by peculiar management in applying fertilizers to the trees, is produced in abundance every year, instead of every alternate year, as is usually the case. It is all picked by hand, sweated, and assorted into three qualities for market. The first quality is sold in New York for $6, and in Europe for from $12 to $30 per barrel. The second quality is also sold in New York for $4, and in the West Indies for $9 per barrel. The third quality is made into cider, which is refined on the estate, and is sold in New York at $4 per dozen bottles, or $44 per barrel. The pomace is placed under pressure after the first quality of the juice has been expressed, and the liquor, after being fermented and refined, is converted into vinegar, which readily sells in New York for 12½ cents per gallon, or $4 per barrel.

There are likewise on "Pelham Farm" one hundred varieties of choice apples, selected from all parts of Europe and America; forty-five varieties of hot-house grapes, six natives; thirty of peaches; thirty of plums; twenty of cherries; sixty of pears; ten of apricots; and ten of nectarines.

Some of these sorts were selected, first by purchasing all the varieties of the different nurserymen, planting them in the orchard or hot-house, and waiting until they bore fruit; then choice was made of the best.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Apples are cultivated in Central New York in large and increasing quantities, for the eastern market. They are delivered on the canal or railroad in barrels, by the wholesale dealer, at from $1 12½ to $1 37½ per barrel, the price varying with the quality of the fruit, the season, and the demand abroad and along the sea-board. The pippins, Rhode Island Greening, Seek-no-further, Pound Sweeting, Swaar, Spitzenberg, &c., are freely cultivated. The Baldwin, Bell-flower, and other fine sorts, are beginning to be cultivated. The season is scarcely long enough for the Newtown Pippin. A variety of long-keeping russets is also cultivated for home-market, which may be found on the stands in July. Our apple-trees are rarely injured by the winter or late spring frosts; nor do any of those insects which ravage the orchards in the Eastern States, invade them here, except the caterpillar. This insect, however, is a feeble enemy. The most economical mode of its destruction is to crush it with the naked hand as soon as a small web is seen. When, by oversight, it has acquired nearly its full size, the same prime instrument of nature is still best used to gather it into baskets or pails, after which they may be crushed by the foot on some hard and bare spot of earth. The mode of destroying these insects by hunting the nests in a clear and bright day in early spring, is neither so economical in point of time, nor so thorough in practice, as that above recommended.

Statement of Gershom Wiborn, *of Victor, Ontario county, New York.*

Grafting.—In grafting, the first thing to be considered is the proper time for cutting scions, which may be done at any time after the leaves have fallen in autumn, until the buds begin to expand in the spring. If it is necessary to cut them any length of time before you wish to set them, they should be buried in damp sand, saw-dust, or something of the kind, to keep them moist. When the trees are in the neighborhood, I do not cut the scions until the day that I am ready to set them. The next thing to be considered is the proper scions to cut, which should be fine, thrifty, straight-grown shoots of the last year's growth. The buds upon the last year's growth will grow young shoots, while those upon the second year's growth are blossom buds, and will not make twigs. The proper size of the scions will depend very much upon the size of the stocks to be grafted. If they are small seedlings—say half an inch in diameter, or less—you should cut the scions that are from one-eighth to one-fourth of an inch in diameter. For stocks that are from five-eighths up to one and a half inches in diameter, you should cut scions that are from one-fourth to three-eighths of an inch. The ends of the scions, where they get below these sizes, it is best not to use, for they are unsuitable to take the sap from the stocks, and seldom, if ever, live. March is the proper time to graft plums and cherries, and April for all other fruits. They may live, indeed, if they are grafted as late as May; but they will not make so fine a growth the first year, and, consequently, will be less able to withstand the scorching suns of mid-summer. When you are ready to set your grafts, cut your scions up into grafts about three and a half inches in length. For cutting and preparing grafts, use a keen-edged knife. To prepare a graft for setting, hold the scion in your left hand, and your knife in your right; place the blade upon the scion about one and a half inches from its lower end, which should be held towards you; then draw it in a straight line, smooth and level, to the centre of the lower end. Then turn up the other side of the scion in your hand, and cut it in precisely the same manner. One and a half inches of the lower end of the scion will then present the form of a flat wedge. Its upper part should have upon it two or three good buds.

The stocks to be grafted are next to be considered. In grafting young trees from three to four feet high, they may as well be inserted about a foot above the ground. Trees that are five or six feet in height are generally grafted about three feet from the ground. In grafting large bearing trees, select from twenty-five to thirty of the most thrifty, straight, smooth-barked limbs from different parts of the top. Those which are about one or one and a half inches in diameter are to be preferred. At the point where you wish to insert the scion find a clear place, free from limbs, bruises, or curls; then, with a fine, sharp saw cut it off, leaving it square and level on the top; next, with your knife dress off the edge of the bark, which will be a little rough from the saw. Then take your splitting-knife, which should be very sharp, (a common butcher's knife is a tolerable substitute,) and split the stock carefully down the centre. In doing this, be careful to divide the bark even and clean as you go, so that the edge of the bark on the wedge-like end of your scion will dove-tail into it and make a nice, close joint. It will be necessary to split in this way the stock one and a half inches, to correspond with the length you have the end of the scion. After making the split in the stock, and withdrawing the knife, you will need a little wedge made of hard wood, to crowd down the centre of the split and hold it open. Then put your scion into the split, and let the wood on the outer edge of the scion set even with the wood on the split edge of the stock; or, in other words, set the wood of the scion just within the wood of the stock, for then the bark on the scion will meet the edge of the bark on the stock. Next press the scion down firmly into the stock, and be very careful in the whole operation not to bruise the edges of the bark that meet between the scion and the stock. Then withdraw the wedge, and apply the grafting-salve, spreading a coat of it about one-eighth of an inch in thickness over the end of the stock where it was sawed off. Fit it down nice and tight over the edges of the bark and around the scions; then spread a strip down each side, over the split in the stock, so that the whole operation will be closed air-tight. This is necessary to prevent the sap from drying out and killing the scions. After the grafts are set, they should be looked to occasionally, as crevices will sometimes open between the bark and the salve and let in the air. The best salve is made by melting one pound of beeswax with six pounds of rosin in a pint of linseed oil.

Statement of Luther Baily, *of the United Society of Shakers, North Union, Cuyahoga county, Ohio.*

Increased attention is paid to the cultivation of fruit with us. Among the best varieties of apples, and those that appear to be best adapted to our soil and climate, are the Richfield Nonsuch, Baldwin, Seek-no-further, Esopus Spitzenberg, Rhode Island Greening, Golden Pippin, Swaar, and Egg-top. Present price of apples, $1 per bushel.

Statement of Jacob Knoop, *of Elizabeth, Miami county, Ohio.*

Much interest has lately been bestowed here in the cultivation of apples; and the choice varieties of the East have been introduced with good success. The specimens exhibited at our county fair cannot be excelled in any part of the Union.

The price of apples is from 25 to 50 cents per bushel. A considerable quantity is shipped to the South.

Statement of P. W. Gillett, *of Astoria, Clatsop county, Oregon.*

Fruit-growing, the most pleasant, as well as the most profitable, branch of agriculture, is receiving increased attention with us. Indeed, no expense nor pains has been spared in introducing and testing varieties. Oregon has now a splendid assortment of fruit, with a climate congenial to its growth. The summers are too cool, however, at the mouth of the Columbia, to produce peaches of a fine flavor; but the interior of the Territory has a climate adapted to the perfect development of the finest peaches, pears, and grapes.

Green apples are worth from $8 to $10 per bushel, and ready sale at that. At this rate one acre of land in apple-trees, allowing 14 bushels to the tree, which is a low estimate for trees of mature age, and forty trees to the acre, gives the enormous sum of $4,480 per acre. This is a matter of fact, and not speculation. It is true, our orchards, being young, yield but from one to eight or ten bushels to the tree; but it is the opinion of some of our wisest men that good winter apples will command, in San Francisco market, as high a price for the next thirty years.

Statement of H. J. Beyerle, *of Sugar Valley, Clinton county, Pennsylvania.*

Our valley is subject to early frosts, which often prove injurious to the fruit culture. Some few fruit-growers have practised a mode of preventing frost which I never saw in print, and which I look upon as being quite effective: they smoke their orchards by building fires among the trees. The reader will bear in mind that low valleys or plains suffer more from frost than high ones; and, further, that frosts never occur where wind is blowing, nor where the atmosphere is cloudy, but only on mornings when the air is calm and the sky clear. On such mornings smoke always moves sluggishly, and frequently settles at a height but little above orchard trees. By making fires in different parts of the orchard a short time before daylight, the smoke, in a measure, will cover the trees, and thus prevent frost upon the same principle as fog or clouds.

Statement of John Eichar, *of Greensburgh, Westmoreland county, Pennsylvania.*

Of apples, we have the Newtown Pippin, which stands unrivalled for late winter use. This variety commands a higher price in the English markets than any other. The Rambo is also an excellent fall and early winter apple. Besides these, we have the Pennock, Maiden's Blush, York, Golden Gate, and the Marietta Russet.

Statement of Raleigh W. Dyer, *of Prillaman's, Franklin county, Virginia.*

In this county we have apples, pears, cherries, damsons, currants, prunes, and quinces. They all do well except pears, which fail from the blight. There is not a farm among us but has its orchard, though the fruit heretofore has been of a poor and insipid quality. Our farmers are beginning to turn their attention to this subject, and within the last few years there has been a very perceptible change, both as to quality and quantity. The best fruit-trees and scions are now being sought after by our farmers with avidity. We have not, as yet, sent much fruit to market, owing to the distance we have to transport it; yet I doubt not that this section of Virginia will, in a few years, produce vast quantities for market. The most common disease of apples seems, also, to be the blight; which I think could be prevented by manuring and stirring the land about the trees, thereby destroying the larvæ of insects about their roots, and killing the caterpillar. The kinds in use are the Pearmain, the Yellow and Green Pippins, the June, Horse, John, Buckingham, Limber Twig, Long Stem, Sweeting, Queen, Turner Red, Cannon, and Rusty Coat.

As regards the best mode of improving orchard lands, we are, it seems, at great fault; though we all know that something must be done. I have become fully convinced that our stables, barn and stock-yards, (although valuable as far as they go,) do not and cannot be made to afford a sufficiency of manure, and that the farmer who depends upon this resource alone, so far from improving his lands, will find them giving way and lessening in value from year to year.

Statement of Edward Almond, *of Mountain View, Page county, Virginia.*

More attention is paid here to fruit than formerly. Apples are the principal crop, and, I think, very profitable to the farmer. Yellow and Green Pippins, Rawl's Jenneting, Milams, and Long Keepers, are most suitable for winter use and exportation. I have raised the Mammoth Pippin to weigh 1¾ pounds and measure 16 inches in circumference.

I plant the trees 40 feet apart, with the holes sufficiently large, so as not to cramp the roots. I mix about two shovelfuls of manure with the soil, and plant them two inches deeper than they grew in the nursery.

Statement of H. R. Robey, *near Fredericksburg, Spotsylvania county, Virginia.*

I have found very few kinds of apples originating north of Maryland which would keep well through the winter, when grown here. For fourteen years I have paid great attention to their cultivation, and have collected a great number of Southern apples that have proved to be good bearers as well as keepers, and the best table fruit. My present crop of winter apples is small, owing to the fact that all the orchards were formerly planted with Northern trees; and, with few exceptions, ripen in the fall and early winter. For instance, the Belle-fleur, a fine winter apple in Pennsylvania, ripens here in September and October.

The following list of Southern winter apples, nearly all from Virginia, can be classed among the best:

"Abram," of medium size, striped, and a sure bearer; "Beverley's Red," rather large and very good; "Waugh's Crab," large, yellow, and russet; "Rawl's Jenneting," rather large, rich, juicy, and good; "Limbertwig," medium, dull red, great and sure bearer; "Leathercoat," medium, good bearer, quality moderate; "Milam," dark red, good; "Brooke's Pippin," large, yellow, good bearer, and keeps the best; "Ogleby," large pippin-shape, best; "Prior's Red," rather large and good; "Strawn's Seedling," large, striped, very good; "Belle Pree," large, yellow, ripe in early winter; "Winter Cheese," medium

very rich, juicy and good; "Wellford," medium, yellow, very good; "Vandervere," medium, dull red, very good; quite different from the Northern Vandervere; "Hall's Red," medium, great bearer, one of the best; "Bonum," large, very good; "Wine-Sap," medium, dull red, good keeper.

The following kinds of Northern origin promise well: "Baldwin," on limed soil, early winter, good; "Danvers Winter Sweet," very good, keeps well; "Esopus Spitzenberg," variable on young trees; "Northern Spy," very promising; "Pearmain, Herefordshire," keeps well; "Long Island Russet," very promising; "Rhode Island Greening," very good; "Swaar," very good.

The apple-tree here is much healthier when trained with low heads, the lower branches pruned to protect the trunk from the sun. When young trees are mulched thickly with straw, corn-cobs, or any trash, say three feet wide around each tree, they suffer very little from drought. There are a great number of Virginia apples, which are scarcely known out of the State, that cannot be surpassed.

Statement of GUSTAVUS DE NEVEN, *of Fond du Lac, Fond du Lac county, Wisconsin.*

The raising of fruit-trees begins to attract considerable attention. My own experience induces me to say that apple, pear, plum, and cherry trees, will do well here. I have some apple-trees twelve years old from the seed, which produced last fall from two to three bushels of fruit each, some of them equal to good grafted kinds. Apple-trees, with common care, are remarkably thrifty and vigorous here. I think that an orchard ought to be ploughed every year, the land manured, and some low hoed crop cultivated between the trees, such as beans or potatoes, so as to keep the soil clean and mellow. If the land is kept in grass, which I consider unadvisable, it should be enriched and spaded at least once a year all round the trees about five feet distant or 10 feet in diameter, and kept free from grass and weeds, which is as expensive, and far less beneficial, than to plough the whole land.

Many farmers have set out orchards here within the last three years; but a number of them have done it in a careless manner, some digging small holes in grass land, putting in their trees, and afterwards leaving them to take care of themselves, or to the tender mercies of their cattle, which have given them the only pruning they ever received since planting. This course is wrong and injudicious, and must result in loss. Probably more than one-half of the trees thus treated have perished, and the remainder exhibit a sickly, stunted growth, the original tree frequently dying, and a bush of young shoots starting up from the roots, to be again browsed down the next season.

Fruit commands here a great price. I have sold all the apples I could spare, a majority of them natural fruit, for $1 50 per bushel, and could have disposed of hundreds of bushels at that price. It is probable that apples will not fall in price below 75 cents per bushel for at least six years; and when they fall to low prices, we will still have an extensive market for many more years in the Wolf river country and the Northwest, where fruit-raising must be much more uncertain than here.

Statement of J. A. CARPENTER, *of Waukesha, Waukesha county, Wisconsin.*

To prevent the depredations of gophers, ground-squirrels, cotton-tailed rabbits, and field-mice in our orchards, we protect the lower parts of the trunks of the trees by winding strips of old cloth or rye-straw around them to the height of 2½ feet above the ground, heaping up a cone of earth a foot high at the roots. Some tie around the trunks corn-stalks, laths, or barrel-staves, to save the trees.

Statement of JAMES H. WATTS, *of Rochester, Monroe county, New York.*

Rochester is celebrated for the growth of nursery trees, both fruit and ornamental. One thousand acres of land, if not more, are occupied by our nurserymen in the culture of trees in this vicinity, and they are sold to go as far as California, Oregon, and every part of our vast country. Some of the best fruits extant, both of apples and pears, have had their origin in Western New York, among which I would instance the following:

Northern Spy, Norton's Melon, and Early Joe, Ontariocounty; Wagener, Yates county; Baily Sweeting, Livingston county.

The Hawley, or Dowse, originated at Canaan, and is one of the best September apples; and, for a sweet one, I have never seen one superior to the Baily, which is a large, beautiful red apple, ripe from the 1st of November to December. It has the most saccharine matter in its composition of any apple I know of.

PEARS.

The common pear-tree is indigenous to Europe, Western Asia, the Himalayas, and to China; but not to Africa nor America. It is found wild in most of the counties of Britain, as far north as Forfarshire; on the Continent of Europe, from Sweden to the Mediterranean; and in Asia, as far east as China and Japan. It was the opinion of Loudon, however, that all the wild pears growing in England originated from the seeds of the cultivated sorts, accidentally disseminated by birds. In a wild state, it is always found on a dry soil, and more frequently on plains than on hills or mountains; and solitary, or in small groups, rather than in woods and forests. The varieties cultivated for their fruit succeed both in the temperate and transition zones of the two hemispheres; and it has been remarked that this tree, as well as the apple and the cherry, will grow in the open air wherever the oak will thrive.

The earliest writers mention the pear as growing abundantly in Syria, Egypt, and Greece; and it appears to have been brought into Italy from these places about the time that Scylla made himself master

of the last named country, although there is but little doubt that the Romans had several kinds of this fruit long before that time. Among the trees which Homer describes as forming the orchard of Laertes, the father of Ulysses, we find the pear. Theophrastus speaks of the productiveness of old pear-trees; and Virgil mentions some pears which he received from Cato. Pliny describes the varieties in cultivation, in his time, as being exceedingly numerous, and says that a fermented liquor was made of the expressed juice. "Both apples and pears," he says, "have the properties of wine, on which account the physicians are careful how they give them to their patients; but when sodden in wine and water, they are esteemed as wholesome." Again, he observes: "All pears, whatsoever, are but a heavy meat, even to those in good health, and the sick are debarred from eating them; and yet, if they are well boiled or baked, they are exceedingly pleasant, and moderately wholesome; when sodden or baked with honey, they agree with the stomach." According to Pownell, the cultivated pear was imported into Marseilles by the Phocæan colonists, some 600 years B. C.; and Whitaker thinks that it was introduced into Britain by the Romans; but at what period, although it is mentioned by all the early writers of that country, we have no account.

The introduction of the pear into the British North American colonies, dates back to the early periods of their settlements. The seeds were introduced by the "Governor and Company of the Massachusetts Bay in New England," in 1629. From these seeds, doubtless, sprung the venerable old pear-tree, still in existence, in the garden first owned by Governor Endicott, in Salem.

Another aged tree is still standing, in bearing condition, at the corner of the Third avenue and Thirteenth street, in the city of New York, which is stated to have been planted in the year 1646, by Peter Stuyvesant, then governor of New Netherland.

The pear was also introduced at "Peach Blossom Plantation," at Easton, Talbot county, in Maryland, in about the year 1730. The seeds were sent from England by Peter Collinson, a Quaker and a linendraper, of London, to his friend and former associate, George Robbins, then the proprietor of that plantation. Trees produced from those seeds are now found growing there in full vigor. Collinson, it may be remarked, was a great lover of animated nature and rural economy in every form. In a letter to Sir James Edward Smith, he declares that "every living thing called forth his affections." Among the numerous benefits he conferred upon the world, he introduced into England, and distributed in other countries, a great variety of the seeds of useful trees and plants, and otherwise contributed largely to the advancement of natural history, as well as to agriculture. His attention was early directed to the practicability of establishing "sheep walks" in Carolina and Georgia, after the plan of the migrating sheep in Spain; that is, in pasturing them on the mountains in summer, and transporting them to the lower country in winter.

The pear-tree was formerly cultivated to a considerable extent in this country, particularly in New England and Virginia, for making perry; but, at present, very little is manufactured, except on the banks of the Piscataqua and Salmon Falls rivers, in Maine.

CONDENSED CORRESPONDENCE.

Statement of S. S. Boyd, *of Jacksonsburg, Wayne county, Indiana.*

Pears, with us, have thus far been but an unprofitable fruit. The trees are subject to the blight, and hence do not attain a great age. The spring frosts also are fatal to the early-blooming pear-tree in this region.

Statement of Micajah Burnett, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

We cultivate the pear in this county to some extent; but, owing to some unknown cause, our trees have been almost free from blight for the last fourteen years. The Dentrick, Bartlett, White Doyenné, Seckel, and the Louise Bonne de Jersey, are the most valuable varieties we have in bearing.

Statement of Abraham Preble, *of Bowdoinham, Lincoln county, Maine.*

But little attention has been paid here to the cultivation of this fruit till quite lately. During the last and the present year, several persons have purchased foreign pear-trees, mostly worked on quince stocks, which are now on trial. From what I have seen of the few old trees among us, I think they will do well.

I have about twenty standard trees grafted on pear stocks, nine years from the seed and seven from the graft, which are very thrifty, and apparently hardy. They have borne some very fine specimens the first two seasons; among which is the Fulton pear, which originated in Daniel Fulton's orchard, in this town. It is an October pear, hardy, and an enormous bearer, very rich, and not large. The French winter pear, weighing nine ounces, and the Bartlett, seven ounces, do well.

Statement of Henry Little, *of Bangor, Penobscot county, Maine.*

The varieties of pears cultivated with the best success in this section, are as follows:

Bartlett, on quince or pear stocks.
Beurré d'Amanlis, on quince.
Beurré d'Anjou, on quince.
Beurré d'Aremberg, on pear stocks.
Beurré Bosc, on pear stocks.
Belle Lucrative, on quince stocks.
Dutchess d'Angoulême, on quince.
Doyenné d'été, on quince or pear.
Dunmore, on pear.
Fulton, on pear.
Flemish Beauty, on pear or quince.

Glout Morceau, on quince.
Golden Beurré of Bilboa, on pear.
Louise Bonne de Jersey, on quince.
M'Laughlin, on pear.
Napoleon, on quince.
Passe Colmar, on quince.
Seckel, on pear, grafted high up the tree.
St. Ghislain, on pear.
St. Michael or White Doyenné, on quince.
Tyson, on pear.
Urbaniste, on quince.
Vicar of Winkfield, on quince.
Rostiezer, on pear.
Winter Nelis, on quince.

Bartlett.—No pear is so universally popular with the multitude as this. If pear-trees are found in any garden in New England, one or more Bartletts are sure to be among them. In this I admire their taste, and I go with the mass. It is a first-rate fruit on the pear, quince, and the mountain ash. It is a fast grower and a sure bearer.

Louise Bonne de Jersey.—This also is a great favorite with the public, and deservedly so. It is beginning to be extensively cultivated, and is decidedly better on the quince than on the pear. Flavor first rate.

Flemish Beauty.—This fruit is rightly named. No pear is more thrifty than this, either on the pear or quince. It is very productive, and unites as many good qualities as any other pear. It is extensively cultivated.

Vicar of Winkfield.—This is not a first-rate table fruit, yet it is one of the most productive of pears on the quince. It is reliable, the fruit large and fair, and we are sure of a bountiful crop of saleable fruit. This variety is generally found in every fruit garden.

Beurré d'Amanlis.—This is also a prodigious bearer and grower on the quince. It is hardy in this climate, the fruit large, and the quality very good.

Doyenné d'été.—This is a new early pear of the best quality. It sustains a high reputation, and is a great and early bearer, on the pear or the quince.

Statement of SIMON T. ASHETON *and* ELIJAH MYRICK, *trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

We have had great difficulty in making the pear-tree grow on our clayey soil. After persevering and experimenting fifteen years at least, we have discovered a specific. We tried all the special manures our experiments or reading suggested, until, observing the effect of urine on an unthrifty apple-tree, we were induced to try it on some pear-trees which were unthrifty in spite of iron, ashes, lime, bone-black, and high manuring. The result was, that the trees shot up a growth as luxuriant as weeds in a hot-bed. Those which had rarely made an inch of growth in a season, grew scions from 18 inches to 3 feet even, in the summer following the application. The mode of treatment should be

as follows: The trees should be well and carefully set out, the soil made good by the application of iron, lime, or leached ashes. As soon as the buds are fairly opened, take of urine from the water-closet about two quarts and sprinkle it around each tree; stir the surface of the earth a little, so that it may be well mixed, and also to prevent the forming of a crust by rapid evaporation. A cloudy day is the best time for this operation, as it retards the escape of the volatile salts. In about a month, another application may be made in the same way. After this, it is only necessary to repeat the operation on those trees which may not have yielded satisfactorily to the first treatment. Care should be used not to over-stimulate, as this, of course, would be dangerous.

Our pear orchard consists of one hundred and twenty trees and fifteen varieties, the earliest and latest included. They are all treated in this manner, and the result is all the success that could be wished, and more than was even hoped for. The full effect of this form of ammonia is not to be seen the first season after setting.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Pears are cultivated here in considerable quantities, but with much less certainty and cheapness than apples. The adaptation of soil, climate, and culture, seems much more difficult than that of some other fruits. The culture, however, is rapidly increasing. With us, some few localities produce the old Virgouleuse in perfection; but it is usually brought into our market from the western part of the State, where it flourishes well. We have always a tolerable supply of this fruit in its season. The worst liability of this tree is often the sudden death of its large branches. The cause is now, I believe, in discussion among our pomologists. The fruit is sold in our market from the lowest mark up to $5 and even $6 per bushel.

Statement of H. R. ROBEY, *of Fredericksburg, Spotsylvania county, Virginia.*

Our soil and climate are well adapted to the growth of the pear. I have never seen a case of blight. They do well in almost every kind of soil, but best in a clayey loam. The trees are found to do far better when trained with low heads, so as to preserve the trunks from the sun. My finest trees—20 to 25 feet high—have their lower branches only three feet from the ground; and when they are loaded with fruit, the lower ones bend to the earth. The bark on the trunk is nearly as smooth as a young tree in the nursery.

The following kinds are good only when engrafted on the quince stocks:

Louise Bonne de Jersey.
Dutchess d'Angoulême.
Glout Morceau.
Beurré Diel.
Easter Beurré.

Golden Beurré of Bilboa.

The following succeed on pear stocks:

Buffum.
Bartlett.
Butter or Virgouleuse.
Beurré d'Aremberg.
Beurré Oswego.
Beurré d'Amanlis.
Beurré d'Anjou.
Dutchess d'Angoulême.
Inconnue Van Mons.
Liberole.
Fondante du Bois.
Fondante de Automne.
Flemish Beauty.
Josephine de Malines.
Louis d'Orleans.
Lawrence.
Madeleine.
Winter Nelis.
Napoleon.
Nouveau Poiteau.
Seckel.
Tyson.
Triomphe de Joidoigne.
Urbaniste.
Van Mons Léon le Clerc.
Taylor.

Many of these pears do equally well on quince stocks. Some kinds, however, will not grow on the quince without double work.

PEACHES, APRICOTS, AND NECTARINES.

"The facility of raising the peach from the stone," remarks a modern writer, "has probably tended to its general diffusion throughout the world. This fruit has steadily followed the progress of civilization; and man, from China to Peru, has surrounded himself with the luxury of this and of the other stone-fruits, very soon after he has begun to taste the blessings of a settled life. There are still spots where ignorance prevents portions of the human race from enjoying the blessings which Providence has everywhere ordained for industry; and there are others where tyranny forbids the earth to be cultivated and produce its fruits. The inhabitants of the Haouran, who are constantly wandering, to escape the dreadful exactions of some petty tyrant, have neither orchards nor fruit-trees, nor gardens for the growth of vegetables." "Shall we sow for strangers?" was the affecting answer of one of them to Burckhardt. "One of the greatest blessings," continues he, "that can be conferred upon any rude people, (and it is a blessing

which will bring knowledge, and virtue, and peace, in its train,) is to teach them how to cultivate those vegetable productions which constitute the best riches of mankind." The traveller Burchell rendered such a service to the Bachapins, a tribe of the interior of Southern Africa. He gave to their chief a bag of fresh peach-stones, in quantity about a quart; "nor did I fail," says the benevolent visitor of these poor people, "to impress on his mind a just idea of their value and nature, by telling him that they would produce trees which would continue every year to yield, without further trouble, abundance of large fruit of a more agreeable flavor than any which grew in the country of the Bachapins."

It is not certain in what part of the globe the peach-tree was originally produced; for, although we have early accounts of its being brought to Europe from Persia, it does not follow, from thence, that it was one of the natural productions of that country. Pliny relates that it had been stated to have possessed venomous qualities, and that its fruit was sent into Egypt by the kings of Persia, by way of revenge, to poison the natives; but he treats this story as a mere fable, and considers it the most harmless fruit in the world; that it had the most juice and the least smell of any fruit, and yet caused thirst to those who ate of it. He expressly states that it was imported by the Romans from Persia; but whether it was indigenous to that country, or sent thither from a region still nearer to the equator, we have no information. He adds, that it was not long since peaches were known in Rome, and that there was great difficulty in rearing them. He also informs us that this tree was brought from Egypt to the Isle of Rhodes, where it could never be made to produce fruit; and from thence to Italy. He says, moreover, that it was not a common fruit either in Greece or Natolia. No mention, however, is made of it by Cato. Pownall, in his "Roman Provinces," makes it a Phocæan importation to Marseilles; and evidently it was cultivated in France at an early period, as Columella, in his account of this fruit, says:

> "Those of small size to ripen make great haste;
> Such as great Gaul bestows, observes due time
> And season, not too early, nor too late."

Dr. Sickler considers Persia as the original country of the peach, which in Media is deemed unwholesome, but, planted in Egypt, becomes pulpy, delicious, and salubrious. According to Royle, it grows in Persia both wild and in a state of cultivation, and flourishes on the Himalayas at elevations of 5,000 to 6,000 feet above the sea.

The *nectarine* is considered by some as a distinct species; but there can be no doubt on this point, as the peach itself is believed to be nothing more than an improved or fleshy almond, which bears a similar relation to the peach and nectarine, as the crab does to the apple, and the sloe to the plum. To prove that the peach and nectarine are essentially the same, it may be mentioned that the fruit of both have been found on the same branch; and even various instances are recorded where the fruit had the smooth surface of the nectarine on one side, and the downy skin of the peach on the other.

The peach was introduced into the British North American colonies soon after their settlements by Europeans. The stones were ordered

by the "Governor and Company of the Massachusetts Bay in New England," in 1629.

Both the peach and nectarine, as well as apricots, are mentioned by Beverley as growing abundantly in Virginia in 1720. Some of the former are represented to have been 12 or 13 inches in circumference. They were raised so easily that some cultivators planted orchards of them purposely for feeding hogs; while others made a drink of them, called "mobby," which either was drunk as cider, or distilled into brandy.

Peach-trees, as well as those of the quince, are mentioned by Colden as having been killed by frost, in the province of New York, in 1737, but the apple and pear-trees were not hurt by the cold.

The peach was introduced into Louisiana by the Spaniards prior to its settlement by the French, where it has been since grown spontaneously, and, in many respects, apparently indigenous.

This tree was introduced on "Peach Blossom" plantation, at Easton, Talbot county, Maryland, by George Robbins, in about 1735. The stones were received from Peter Collinson, of England, together with the seeds of the pear.

CONDENSED CORRESPONDENCE.

Statement of S. S. BOYD, *of Jacksonsburg, Wayne county, Indiana.*

But few peaches have been raised here for the last fifteen years. Before that time, whilst the soil was new, they were produced in abundance, with no other labor than planting the trees in the corners of fences and other waste places. Now, by the "yellows," the peach-tree borers, and the cold winters, the trees, if planted, will seldom live to the age of eight years; and in that time, perhaps, not produce one crop of fruit—the buds being winter-killed or destroyed by late spring frosts.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Peaches are not extensively cultivated with us, owing to two causes, namely: the uncertainty of the crop, and the effects of the grub in the root of the tree. No effectual remedy has yet been discovered against the fly or insect that deposites her eggs at the root; and the only certain way of saving the tree is to examine for the grub, after it is formed, and remove it with a wire, brad-awl, or the point of a knife.

The fruit has been winter-killed or destroyed in the bud but twice within the last twenty-five years. We cultivate a number of good varieties; but the Gross Mignone, Heath, Melocotones, and the Rare Ripe, are in the best estimation here.

Statement of H. W. HUNTINGTON, *near Trinity, Catahoula Parish, Louisiana.*

The peach-tree, with us, if neglected, will have its fruit destroyed by a worm, which is brought into being as it approaches maturity, and feeds upon its pulp and kernel until it falls to the ground. The worm afterwards makes its way into the earth, and comes out a moth in the spring, depositing her eggs in the germs of the young fruit, and thus destroys the hope of the cultivator.

A remedy in this case is found in keeping swine in the orchard, which will eat every peach as it drops, and the worms are of course destroyed.

Statement of HENRY LITTLE, *of Bangor, Penobscot county, Maine.*

The peach is not cultivated in this State except by a very few, in sheltered situations, as it is not suited to our climate. The habit of the tree is to grow late in autumn, giving the wood last made no chance to ripen, and the frost is sure to kill down the twigs 10 or 15 inches.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Peaches are seldom cultivated here with success. Occasionally, in a sheltered spot and a favorable season, a hardy seedling, and sometimes a worked tree, produces well. Further trial with home-raised seedlings, and the use of the plum as a stock on which to bud, may result favorably; but, thus far, results have been sufficiently discouraging, and not the less so from the fact that our markets are flooded with fine peaches from New Jersey, at very reasonable prices, during the months of August and September.

The obstacles to peach culture in this region are especially three:

1. The "peach worm," which is very troublesome in light sandy soils. It is, however, very readily and cheaply resisted by the watchful cultivator.

2. The "severity of the winter's cold." The question, whether the disastrous result is secured by the effect of the cold purely, or by the sudden succession of subsequent warm weather, is of little importance to the cultivator. It is enough for him to know that death to the fruit-buds of his peach-trees usually follows a few exposures of 12° or 15° Fahrenheit below zero. The occurrence of a single depression of 22° below zero, early in the morning of December 27, 1851, was most undoubtedly followed by the almost instantaneous death of three-fourths of the fruit-buds on some four hundred trees in my garden.

3. The "curled leaf," which, after all, is the most fatal obstacle to peach culture here. Quite commonly the cold of winter spares buds enough for a fair crop of fruit, and the month of April opens with fair prospects, which are perfectly blighted before its conclusion. Prematurely warm weather late in March, or during the month of April, swells the buds almost to bursting. Then succeeds cold weather, holding them in check sometimes, as in 1851, for thirty-six days. When vegetation finally recommences, the juices of the tree are in a morbid

state; most of the buds that had been previously so excited never open at all; and those that do, exhibit a sickly, stinted foliage, which speedily falls, presenting the phenomenon of the "curled leaf." Some writers refer it to insects; but these are seen in the final catastrophe, and are the plunderers merely of the morbid vegetation. It is especially worthy of remark, that sudden and severe chills, occurring in mid-summer, often cause a slight show of this disease. So well are the causes of curled leaf ascertained, that little is risked in predicting its speedy appearance, while, as yet, not a trace of it is seen.

Statement of GERSHOM WIBORN, *of Victor, Ontario county, New York.*

This part of the country is particularly distinguished for its nurseries of fruit and ornamental trees, and for its large and splendid orchards. Among peaches, the early Crawford does remarkably well with us. That variety seems to be rather taking the lead. It has thus far proved to be high-flavored, and a great and uniform bearer. Peach-trees, while leafing out in the spring, often suffer from severe frosts and cold winds. This evil can be partially remedied by planting the orchard on high and dry land; for there the trees will become hardy, and the late spring frosts do not settle. The depredations of the peach-grub are a serious trouble. The only reliable remedy is to dig around the trees where you see the gum oozing, and find and kill the grub. The great enemy and pest of the stone-fruits, however, is the curculio. It destroys annually immense quantities of plums, cherries, apricots, nectarines, and sometimes peaches. I tried last spring to prevent their getting upon the trees by tying around the trunks rings of cotton batting; although I succeeded in capturing quite a number of them, enough got to the tops of the trees to do the mischief.

Statement of PETER GROSS, *of Schnecksville, Lehigh county, Pennsylvania.*

The peach-tree with us has been gradually losing its health and vigor for some years past. The only remedy I have yet found to preserve them in a healthy condition is, to remove the earth at the root of the trees in the month of March, and tie some flannel or any old woollen stuff around the lower part of the trunk of each tree. Then put about two pounds of hen manure on the roots, and replace the earth. The flannel ought to extend into the ground as far as the roots will allow, and about six or nine inches above the surface of the ground. I have pursued this course for some years, and find it an entire protection against the borer and worms.

Statement of JOHN EICHAR, *of Greensburgh, Westmoreland county, Pennsylvania.*

A good many peaches are raised here—about as many as supplies the home demand. They are more or less affected with the "yellows" every year. An application of lime and ashes to the roots, and washing the trunk with soap-suds, will generally revive them. A greater profit can be realized from a peach orchard carefully managed and

attended to, than from any other crop that can be grown. A farmer in northern Ohio bought one hundred acres of poor land, at $15 per acre, and planted the entire farm with peach-trees. The third year, the crop sold paid for the land and trees, together with all expenses for labor, &c.; and the past season he has realized over $20,000 as the reward of his enterprise.

Statement of H. R. ROBEY, *of Fredericksburgh, Spotsylvania county Virginia.*

Peaches do well here, and the "yellows" are not known. The fruit grows as large and the quality is as good as in any section of the country. The varieties originating here are not so liable to have their bloom destroyed by frost as those coming from the North.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Apricots are scarcely cultivated here, except occasionally in city gardens. The tenderness of most varieties, and their liability to the attacks of the curculio, together with the lack of enterprise, have been reasons for this unfrequency. The fact that a few varieties, as the Breda and the Black, are really as hardy as the apple, and that the curculio may be resisted by cheap and effectual methods, should encourage their culture; and the more so, because this fruit fills a gap between the cherry and the peach in the succession of early fruits.

PLUMS.

The common domestic cultivated plum is believed to be indigenous to the South of Russia, Caucasus, the Himalayas, and to many parts of Europe. In England, and in some parts of the United States, it is sometimes found in hedges; but never truly wild. This species and many of its varieties are cultivated for ornament, or their fruit, in all the temperate countries of the habitable globe. Faulkner, in his "Kensington," makes the plum a native of Asia, and an introduction into Europe of the crusaders. Gough, in his "British Topography," says that Lord Cromwell introduced the "Perdrigon plum" into England in the time of Henry VII.

The introduction of this tree into the British North American colonies, probably dates back to the early periods of their early settlements. The stones were ordered from England by the "Governor and Company of the Massachusetts Bay in New England," in 1629.

Several valuable and interesting varieties have originated in this country, among which the Bolmar or Washington plum stands conspicuous. The parent tree is said to have been purchased in a market in New York, about the end of the last century. It remained barren for several years, till, during a violent storm of thunder, the entire trunk was severed to the earth by lightning, and destroyed. The part re-

maining in the ground afterwards threw up several vigorous shoots, which were allowed to remain, and finally produced fruit. Trees of this variety were first sent to England in 1819, to Mr. Robert Barclay, of Bury Hill; and several others were sent to the London Horticultural Society in 1821, by Dr. Hosack, of New York.

CONDENSED CORRESPONDENCE.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

We have twenty-five varieties of plums, of the finer kinds, in bearing. The curculio is occasionally very destructive to this crop; but the past season it was almost wholly exempt from it. The trees were loaded to the utmost capability of their bearing, with the finest fruit. Many of the Duane's Purple, Washington, and the Yellow Egg plum, measured from 6 to 6½ inches in circumference. The Washington, Duane's Purple, French, Yellow Egg, Imperial Gage, Green Gage, and the Lombard, are the most profitable varieties of any which we as yet have in bearing. One tree, only seven years from the graft, of the Yellow Egg variety, produced nearly four bushels of beautiful, sound fruit.

The best remedy for the curculio is to plant the trees in the poultry yard, or in a lot where the pigs are reared. In either case, the larvæ will be destroyed before they can enter the ground.

Statement of H. W. HUNTINGTON, *near Trinity, Catahoula Parish, Louisiana.*

The common plum, both red and yellow, is grown here abundantly; but no efforts of mine, protracted through twenty-five years, have been successful in the cultivation of the finer varieties of the North.

The plum is exclusively attacked by the caterpillar, which entirely eats the leaf, soon after which the fruit withers and drops.

Statement of HENRY LITTLE, *of Bangor, Penobscot county, Maine.*

Bangor is acknowledged to be the headquarters of the plum, as much so as it is the great emporium of buying and selling lumber. The plum is cultivated extensively on the banks of the Hudson river, as well as in Montreal, (Canada,) and its vicinity; but never have I seen it grown in either of these places, nor elsewhere, in greater perfection than in this city. Here the trees bear bountifully, and require less care than other fruit-trees. Nor does curculio injure the plum crop in Maine so much as in other States. For years past the trees on this river have annually required support on account of the great weight of fruit on them, which should have been thinned out, but people generally neglect it.

The following varieties are popular in this market:

Autumn Gage, (late;) Apricot, (early;) Bingham, (large;) Bleecker's Gage, (large;) Coe's Golden Drop, (late;) Columbia, (very large;) Corse's Nota Bene; Diapree Rouge, or Mimms, (large;) Duane's Purple, (large;) Drap d'Or; Early Favorite, or Rivers' No. 1, (small;) Emerald Drop; Frost Gage, (late;) Green Gage; Hudson Gage; Hulings' Superb, (shy bearer, very large;) Imperial Gage, (noted bearer;) Imperial Ottoman. (early;) Jefferson, (large;) Kurke's, (large;) Knight's Green, (drying;) Lawrence's Favorite; Lombard; McLaughlin (originated in Bangor; large and handsome;) Orange, (large;) Penobscot, (large;) Peach Plum, (large;) Purple Favorite; Purple Gage; Red Gage, (small;) Royal Hâtif, (early;) Reine-Claude de Bavay, (late;) Sharpe's Emperor, (handsome, large;) Smith's Orleans, (large;) St. Martin's Quetsche, (late;) Thomas; Washington, or Bolmar, (large;) Washington Seedling, Ives', (large;) White Magnum Bonum, or Yellow Egg, (large;) Yellow Gage, (large.)

I should judge that, for two years past, every acre of well cultivated plum trees in this city has yielded an income of from $300 to $400 annually. I make this estimate by the plum crops in my own garden.

Washington.—This is a very desirable first-rate plum, a great bearer, is extensively cultivated, and is a popular market fruit in this city. Our soil and climate seem to be peculiarly adapted to this variety.

McLaughlin.—This new plum originated in Bangor, and is more extensively cultivated here than any other; yet scions have readily sold here for $1 50 per dozen, and in 1851, the demand was more than could be supplied at that price. For trees of this variety, our nurserymen receive from $1 to $10 each, according to size, and they are ordered from all parts of the Union. What is favorable to the plum is, the call is greater in this vicinity than from abroad. The trees are of very rapid growth. I have had them grow over seven feet in a single season. They bear well, and the fruit brings the highest prices in our market.

Green Gage.—This variety is considered indispensable, even in a small collection. It originated in France over three hundred years ago. It was called "Reine Claude," in compliment to the Queen. It was long afterwards brought to England by a man of the name of Gage. His gardener called it the "Green Gage," by which name it is known in England and the United States. It is considered one of the richest of plums.

The Imperial, Bleecker's, and other Gages, are excellent plums, but they will not command such high prices in the market as the larger ones—say, the Washington, McLaughlin, Columbia, Duane's Purple, Diapree Rouge, Coe's Golden Drop, Jefferson, and Ives's Washington Seedling—some of which are inferior in flavor to the smaller-sized plums.

Statement of SIMON T. ASHTON and ELIJAH MYRICK, *trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

We raise prodigious crops of plums, consisting of the Green Gage, Imperial Gage, Jefferson Gage, and other varieties. The ravages of the curculio are prevented by scattering air-slacked lime on the trees once a week for six weeks, beginning soon after the fruit is discoverable. When the dew is on, or a damp day, is the most favorable time, as the powdered lime will stick better when the trees are moist. It should be thoroughly sprinkled on every part of the tree until it has a white and wintry appearance. We have tried other remedies, but this requires by far the least labor, and succeeds the best.

We have transplanted some plum-trees in a poultry yard, to see what effect the fowls would have in preventing the ravages of the curculio. So far, the experiment gives promise of success, but a further trial will enable us to speak more decidedly.

Statement of C. F. MALLORY, *of Romeo, Macomb county, Michigan.*

The curculio has destroyed nearly all of our plums for the past two years. The only remedy which has proved effective is, to sprinkle flour of sulphur over the trees about the time the fruit is setting, and once or twice afterwards. We are not much troubled with mildew or blight.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Plums grow exceedingly well in Central New York—better, perhaps, whether we regard the health of the tree or the flavor of the fruit, than in many other places in the same parallel, East or West.

The diseases and evils to which the plum is liable are mainly three:

1. "Mildew" on the foliage, and rot on the fruit. This evil is occasioned apparently by that combination of heat and dampness of the atmosphere familiarly called "muggy weather." It is usually contemporaneous with mildew in grapes. Such weather occurring in August, rots the fruit more or less on all soils; but it is only on sandy ones that the foliage is mildewed and falls prematurely, often leaving the fruit but two-thirds grown. The probable remedy would be mulching the soil, so as to moderate the intensity of the heat and diminish the rapidity of growth, so as to produce a less succulent state of the wood. Trees well planted in a dry, generous soil, and then left without much culture, while the grass is permitted to cover the ground around the trees, would probably be found usually to escape, since such a course would produce a slow, hardy growth. Occasional moderate culture might be allowed early in the season.

2. The "black knot," which is virtually a disease or cancerous affection, has been variously charged to a diseased state of the sap, and an insect, as the curculio, or something else. It is here a terrible scourge to all plum-trees standing in dry, sandy soils; nor do those situated in clayey soils wholly escape. A tree attacked by it, and neglected a short time, often becomes irretrievably ruined. The disease, which at first usually attacks the extremities of the young branches, begins to affect the body; notwithstanding, at this state of progress, if the knots be cut out deeply and faithfully, the malady returns again, bursting even from the denuded heart-wood, as though the whole circulation of the tree were prevaded by a spreading cancerous disease. Its affecting particularly trees growing on a soured soil, seems favorable to the idea that it is caused by insects, since a rich soil is most congenial to their habits. It is also, with me, most likely to affect the Bleecker and the Elfrey Prune, both free-growing sorts. This fact would seem favorable to the "poison sap" theory, since a rapid growth would be most liable to injury from atmospheric changes; but the Prince Imperial Gage, an equally rapid grower, is scarcely affected by it. Thus the free growth of a tree seems an ambiguous fact. If the affection is caused by the sting of an insect, there is, I doubt not, a resulting depravation, in extreme cases, of the whole circulation, causing an exudation of diseased juices where there were probably no stings inflicted. A tree very badly stung, seems doomed, since no removal of the excrescences will save it.

Captain James Mervine, of our city, thinks he has discovered an insect which causes the "black knot." The insect is about an inch long, color pale yellow, with four wings, hind-legs like the grasshopper; using its wings only for calling its mate, which it does by rapid vibrations, causing a shrill note. The abdomen of the female is larger than that of the male, and covered with a concealed sting, one-fourth of an inch long, with which it makes a dozen or more perforations for the deposite of its eggs; the cells being placed longitudinally, each egg being accompanied by an acrid poison. These eggs are deposited mostly in September. The cells are varnished over with a water-proof substance of a dark, glazed appearance. The limb, on being split, exhibits the young in the larva state, in the month of June. The excrescence does not appear until after the escape of the insect. It is caused by the sap being arrested in its circulation by the poison infused.

The curculio.—This, after all, is the great enemy to successful plum cultivation, especially in sandy soils. Though many specific remedies have been published, it still continues its ravages as formerly. Yet few persons, comparatively, have ever seen the cause of so much mischief; though any one, by going under the tree with an inverted umbrella, in the month of June, may readily catch one or more of these insects by a sudden jar of the tree.

Two comparatively old remedies for the curculio will, in general, be found reliable—first, the plan of destroying it by "the free admission of swine and poultry about the tree, until midsummer;" second, "the use of a spread sheet attached to a frame."

Statement of H. R. ROBEY, *of Fredericksburg, Spotsylvania county, Virginia.*

Plum-trees, with us, are healthy, and grow well; but the curculio allows very little fruit to ripen; and the same may be said of the apricot and nectarine, unless the ground is paved under the trees.

Statement of GUSTAVUS DE NEVEN, *of Fond du Lac, Fond du Lac county, Wisconsin.*

For raising plums, this county will probably be unsurpassed. The trees make the most astonishing growth; I have seen shoots of one year's age eight feet long; six feet is quite common. The whole timbered country is full of wild plum-trees, which answer well as grafting-stocks. A common error is to set grafts too high upon these; the graft outgrows the stock, which is of slow growth, and after a few years the tree becomes top-heavy, and is liable to be broken down by the wind. This is prevented by grafting but a few inches above the roots, and working the soil up to the place of union.

The curculio is a most destructive insect to the plum, and I know, as yet, of no satisfactory preventive to its depredations. Shaking the tree with a sudden jerk early every morning, while the insect is torpid, dropping it upon sheets spread below, and crushing it, is the best method I know of; but many escape the operation, and much of the ruit is destroyed, or made worthless, by this depredator.

Good plums, with us, are sold from 8 to 12½ cents per quart

CHERRIES.

The common cherry-tree is regarded by ancient authors as a tree of Asiatic origin; but whether it is truly indigenous to any part of Europe, several modern writers differ in opinion. Pliny states that it did not exist in Italy till after the victory which Lucullus won over Mithridates, king of Pontus, sixty-eight years before the Christian era. He tells us that, "in twenty-six years after Lucullus planted the cherry-tree in Italy, other lands had cherries, even as far as Britain, beyond the ocean." He mentions eight kinds of cherries as being cultivated in Italy at the time he wrote his "Natural History," which was A. D. 70. "The reddest cherries," says he, "are called *apronia;* the blackest, *actia;* the Cæcilian are round. The Julian cherries have a pleasant taste, but are so tender that they must be eaten when gathered, as they will not endure carriage." The Duracine cherries were esteemed the best,* but the Picardy and Portuguese cherries were most admired. The Macedonian cherries grew on dwarf trees; and one kind is mentioned by the above-named author which never appeared ripe, having a hue between green, red, and black. He mentions a cherry that was grafted, in his time, on a bay-stock, which circumstance gave it the name of *laurea;* this cherry is described as having an agreeable bitter flavor. "The cherry-tree," continues he, "could never be made to grow in Egypt, with all the care and attention of man." According to Abbé Roiser, Lucullus brought into Italy only two superior varieties of cherry; the species which were the origin of all those now in cultivation being, before his time, indigenous to Italy, and to the forests of France, though their fruit was neglected by the Romans. It is affirmed by Faulkner, in his "Kensington," that the cherry was introduced into

* It was the opinion of Loudon that the Julian and Duracine cherries, mentioned by Pliny, were varieties of the Cerasus sylvestris.

Britain about A. D. 53. Gerard, in his "Herbal," published in 1597, figures a double and a semi-double variety of cherry; and of the fruit-bearing kinds, says there are numerous varieties, among which he mentions the "Morello or Morel," and the "Flanders or Kentish cherries."

At present, the common cherry is extensively cultivated as a fruit-tree throughout the temperate regions of the civilized globe; but it does not thrive in very high latitudes, nor within the tropics, unless grown at considerable elevations. It is found in Russia as far north as latitude 55° or 56°; and ripens its fruit in Norway and East Bothnia, as far as latitude 63°. It is also found in the North of Africa, and on several islands in the Mediterranean, but it does not attain so large a size in the last-named places as in higher latitudes.

The introduction of the cherry into the British North American colonies dates probably back to the early periods of their settlements. The stones, among other seed, were ordered to be imported from England by the "Governor and Company of the Massachusetts Bay in New England," in 1629. Some of the oldest trees known to exist in this country are at Yonkers, near New York, and are said to have been planted in about the year 1650, by Frederick Philipse, the founder of Phillipsburgh, the former name of that place. At Point Pleasant, in Bristol, Rhode Island, on the estate of Robert Rogers, there also exist several old cherry-trees, which are believed to have been planted over two hundred years.

CONDENSED CORRESPONDENCE.

Statement of S. S. BOYD, *of Jacksonsburg, Wayne county, Indiana.*

Of cherries, the common "Red" and "Black Morello" grow well, and bear in great abundance. Recently, attention has been directed to the better varieties; some of which promise a rich reward. The "Early Mays," particularly, are hardy trees, and seldom fail to bear most bountifully of fine early fruit.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The cherry is free from disease, and nowhere, perhaps, is the fruit produced in greater perfection than in this locality. We have a "Heart" tree, which does not exhibit the least sign of disease or decay; the top of which is 55 feet in diameter, and which, at the distance of five feet above the surface of the ground, girts eight feet.

The Graffin, Belle de Choisy, May Duke, and English Morello are the surest crop; but the Heart and other varieties do well. We have the Bigarrean, Black Tartarian, and other varieties, not yet in full bearing, which promise well.

Statement of HENRY LITTLE, *of Bangor, Penobscot county, Maine*

The cherry, with us, is not so abundant as the plum. The Kentish, or Early Richmond, is more extensively cultivated than any other variety. This is a sure and a great bearer, and is grown with little care. It is also the hardiest of cherries.

Among others cultivated, there are the following: Black Eagle, Black Heart, Black Tartarian, (tender,) Bigarreau or Yellow Spanish, Belle de Choisy, Coe's Transparent, Downer's Late Red, Downton, Elton, Knight's Early Black, May Duke, Roberts's Red Heart, Sparhawk's Honey, Sweet Montmorency, Belle Magnifique, (on trial.)

Statement of SIMON T. ASHTON *and* ELIJAH MYRICK, *trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

Out of sixty choice varieties of the cherry growing on our ground, the "Look no Further," or *Ne cherchez plus* of the French, is decidedly the best. This cherry, for the very desirable qualities of great productiveness, sweet and delicious flavor, extraordinary size, and beauty of appearance, is unequalled. Some that we measured were three inches in circumference. This fruit was sent to the Massachusetts Horticultural Society exhibition last summer, and the sample was superior to the carefully-culled specimens of the finest cherries on the tables. This cherry was obtained from the royal gardens of the Luxembourg, in Paris, and imported to this country by Samson V. S. Wilder, formerly of Bolton, Massachusetts, in 1815. Although we find this an indifferent grower in the nursery, yet it makes a stately tree, with rich and luxuriant foliage.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Cherries are extensively cultivated here. Fine varieties are plentiful in our city market, at from $2 to $4 per bushel.

The curculio, black knot, and the bursting of the bark, are n t yet considerable evils in the culture. The greatest obstacle to the healthful growth of the tree is found in a sun-scald on the southwest side of the tree. The obvious remedy is enveloping the trunks up to the large limbs with straw, or any loose substance which will shut off the direct rays of the sun. The use of two narrow boards nailed together and set at right-angles against the tree is still better, as they do not shut out the air, nor diffuse light; nor do they afford a harbor for insects. And what is still better, let the tree be headed low, so that it will early shade not only its own body, but also its roots, from intense heat. Such a mode in the cultivation of fruit-trees in a climate so hot as ours is very important. I find that most fruit-trees headed so low that the direct rays of the sun never strike the soil immediately about the roots, except in the early morning or near sunset, do better than when otherwise trained.

QUINCES.

The quince is supposed to have been originally a native of Sidon, a city of ancient Crete, now the island of Candia; but it is much more probable that it was only first brought into notice in that city. It is considered, at present, as indigenous to the south of France, particularly on the borders of the Garonne, and to Germany, on the banks of the Danube. It was known to the Greeks and Romans, and both nations held it in high estimation. Columella says: "Quinces not only yield pleasure, but health." He speaks of three kinds: the "Struthian," the "Must Quince," and the "Orange Quince." Pliny mentions many kinds, some growing wild in Italy, and others in cultivation, so large that they weighed the boughs on which they grew down to the ground. He also says that some were of a green and others of a golden color, the latter of which were called *chrysomela.* The only kind that was eaten raw, he states to have been raised by grafting the large quince upon the stock of a smaller variety called *struthla.* "All kinds of this fruit," continues he, "are grown in boxes, and placed within the waiting-chambers of our great personages, in which men wait to salute these personages as they come forth every morning." It appears, from the same author, that quinces were used to decorate the images of the gods, which were placed in sleeping-chambers, round the beds; whence it follows that the Romans did not think that there was anything either injurious or unpleasant in their smell. He gives directions for preserving the fruit by excluding the air from them, or boiling them in honey; or, by plunging them in boiling honey—a practice in use with this and other fruits, in Genoa, at the present day. He also writes much on the medicinal qualities of this fruit. "Quinces," says he, "when eaten raw, if quite ripe, are good for those who spit blood or are troubled with hemorrhage." The juice of raw quinces he states to be a sovereign remedy for the swollen spleen, the dropsy, and difficulty of taking breath, particularly to those who cannot conveniently breathe except when in an upright position. The flowers of the quince, either fresh or dried, he tells us, are good for inflamed eyes.

The introduction of the quince into the British North American colonies probably dates back to the early periods of their settlements by Europeans. The "Governor and Company of the Massachusetts Bay in New England," ordered the seeds to be imported from England in 1629. This fruit is mentioned as growing in Virginia, in great perfection, as early at 1720. Colden speaks of it as having been killed by frost in 1737 in the province of New York.

CONDENSED CORRESPONDENCE.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The quince-tree, when planted in a good soil, thrives well with us, and bears good crops. It requires no further care nor attention than an

tree. The "Apple-shaped" or "Orange Quince" is most highly d here. We sometimes propagate it in the nurseries for the of dwarfing the pear.

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ement of HENRY LITTLE, *of Bangor, Penobscot county, Maine.*

quince is grown in the western counties of the State, also on Kennebec river, to a limited extent; but the climate is too severe in the northern counties for the quince or the peach. It will be recollected that our State has, from east to west, over 300 miles of sea-coast, extending nearly from latitude 43° to 48°, or about one degree further north than Quebec. There is, therefore, and will ever be, a great difference in climate between the northern and southern portions of Maine.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Quinces are coming rapidly into cultivation here. Twelve years ago there were not more than half a dozen bearing trees in and about this city. Now, many families raise their own. The supply of our market with this fruit has usually been from the western part of the State. They are retailed here to private purchasers, at from 31 to 50 cents the peck, according to the supply in market. Deep and rich soil is found best for the culture of this fruit. Mulching in dry summers is also found useful. The use of salt, once considered indispensable, is now, I think, entirely abandoned. The liabilities of this fruit to injury are few; occasionally, during a mild winter, its young wood is killed in spots where it is too much sheltered. It is also sometimes injured by the borer. Practically, however, this insect is disregarded.

GRAPES AND WINE.

The wine-bearing grape of Europe has long been celebrated in the Old World, and may be traced back to the remotest antiquity. Its cultivation was probably among the earliest efforts of human industry; for we read that one of the first acts of Noah, after being saved from the deluge, was to begin "to be an husbandman, and planted a vineyard;" thus plainly indicating that the planting of a vineyard, even at that early day, was deemed one of the primary and most important acts of him who tilled the earth. From that period, the grape, among fruits, has been what wheat is among the Cereals, or the potato among farinaceous roots; and, like them, in every country where it would thrive, has been cultivated with pre-eminent care.

According to Humboldt, the vine grows wild on the coasts of the Caspian Sea, in Armenia, and Georgia, and it is naturalized, at least, in most of the temperate regions of the globe. Dr. Sickler, of Germany, in his "Geschichte der Obst-Cultur," has given an interesting

account of its migration to Egypt, Greece, and Sicily. From the latter, which is regarded as one of the oldest seats of civilization in Europe, it has been stated that it found its way into Italy, Spain, and France, and subsequently into Britain. On the authority of Strabo, the vines of Languedoc and Provence produce the same kind of fruit as those of Italy, which undoubtedly sprang from the same origin. At about the year 85, the culture of the vine had become general in the Southern and Middle Departments of France, and gradually extending itself over the other parts of Gaul, when Domitian, being informed of the great scarcity of grain in the Roman dominions, imputed it to the vast increase of vineyards in Italy and the provinces, which he thought was the cause that rendered agriculture too much neglected; and deeming also their existence to so great an extent as an incitement to sedition, from the encouragement they gave to intemperance, he issued an edict prohibiting the planting of any new vineyards in Italy, and ordering the whole (some historians say one-half) of those in the provinces to be destroyed. This privation lasted about two centuries, during which no vineyards could be planted without permission of the Emperor; and the provincials did not receive permission to replant them until about the year 280, when Probus, after numerous victories, which gave peace to his empire, manifested a great desire to encourage agricultural pursuits in all the provinces, and rescinded the edict of Domitian. The renewal of this privilege appears to have been received with great satisfaction; for tradition still retained in the memory of the Gauls the great advantages that species of culture had afforded them; and the vines of Sicily, Italy, Greece, the Archipelago, and Africa, were again transplanted to the provinces of Gaul, and became the parents of the innumerable varieties which now cover with vineyards the territories of France. This species has existed for ages, in a wild state, in the woods and hedges of Provence, Languedoc, and Guienne, where it differs from the cultivated vine, in having smaller and more cottony leaves, and very small fruit, rather austere than sweet. These wild vines, which were called *labrusca* by the Romans, are still known in the south of France by the names of *lambrusca* and *lambresquiero*. The vines which are found wild in America, let it be understood, are very different from these, though, if cultivated, doubtless some of them would improve in quality, equal, if not superior, to the grape of the Old World.

The extent of territory over which the vine culture may be advantageously diffused in this country, has long afforded a theme of much speculation. It early attracted the attention of the first colonists, who not only attempted to form vineyards of the European vine, but to make wine from our own native grapes. Although the subject has been zealously and sedulously pursued at various periods since, all those dwelling on the easterly half of the continent who have made trial of the foreign grape have never been able to bring their designs to perfection; and most of those who have tested their skill in our native varieties, have only met with partial success; yet a degree of perseverance and enthusiasm seems to have pervaded all the votaries of this delightful pursuit, and a warm and mutual interchange of views and sentiments have existed among them, which has been comparatively unknown in

other species of culture. Although the operators in recent times, from being interspersed over so great an extent of territory, are consequently more widely separated, still the connecting link, by a friendly co-operation in one common cause, may justly and appropriately assimilate their united exertions to that joyous period in the history of France when, during the reign of Probus, thousands of all ages and sexes united in one spontaneous and enthusiastic effort for the restoration of their vineyards. Indeed, when the far greater limits of our domains are considered, the combined efforts of our fellow-countrymen cannot fail to produce effects even more important, from the great extent of their influence, and cause each section of our Republic reciprocally to respond to the efforts of others, with all their attendant advantages and blessings.

The earliest attempts to establish a vineyard in the British North American colonies, was by the "London Company," in Virginia, prior to 1620. By the year 1630, the prospects were sufficiently favorable to warrant the importation of several French *vignerons*, who, it was alleged, ruined them by bad management. Wine was also made in Virginia by a Captain Brocas, in 1647; and in 1651, premiums were offered for its production. On the authority of Beverley, who wrote prior to 1722, there were vineyards in that colony which produced 750 gallons a year.

In 1634, the yearly rent of Governor's island, in Boston harbor, was a hogshead of wine. That island had been granted to Governor Winthrop, April 3, 1632, on condition that he should plant a vineyard or an orchard thereon.

Beauchamp Plantagenet, in his "Description of the Provinces of New Albion," published in London, in 1648, states that the English settlers in Uvedale (now in Delaware) had vines running on mulberry and sassafras trees, and that there were four kinds of grapes. "The first," says he, "is the Tholous Muscat, sweet-scented; the second, the great Foxe and thick grape, after five moneths reaped, being boyled and salted, and well fined, it is a strong red Xeres; the third, a light claret; the fourth, a white grape, creeps on the land, maketh a pure, gold-color wine. Tenis Pale, the Frenchman, of these four made eight sorts of excellent wine; and of the Muscat, acute boyled, that the second draught will fox (intoxicate) a reasonable pate, four moneths old; and here may be gathered and made two hundred tun in the vintage moneth, and replanted, will mend."

An attempt to establish a vineyard near Philadelphia was made by William Penn, in 1683; also by Andrew Dore, in 1686; but neither succeeded.

In 1769, the French settlers on Illinois river made upwards of 100 hogsheads of strong wine from the American wild grape.

In 1804, a Swiss colony settled at a place called "New Switzerland," on the Ohio river, now Vevay, in Indiana. By the year 1810, they had eight acres planted with vines, in full bearing, from which they made 2,400 gallons of wine, then said to be very good. Since that time, their vineyards have been considerably extended.

According to the census returns of 1840, the wine crop of the United States amounted to 124,734 gallons; of 1850, 221,249 gallons; showing an increase of 96,515 gallons. The amount made in 1853, including New Mexico and California, may be estimated at 2,000,000 gallons, which may be valued at $2,000,000.

CONDENSED CORRESPONDENCE.

Statement of JAMES S. WAITE, *of San Gabriel, Los Angelos county, California.*

The grape culture in this county has received the most attention from Mexicans, although it has been pursued to a considerable extent by Americans. There are three varieties of grape cultivated—two black, and the muscatel or white. I have had but little experience in the management of vineyards, and hence can say but little about them.

Large quantities of grapes are annually sent to San Francisco and the mines. Last season not far from 1,500 tons were exported from this county, the entire product being estimated at 2,000 tons. They are carefully picked from the vines, and packed in saw-dust, which preserves them from bruising in the transportation.

Statement of HON. E. CRAWFORD, *near Blakely, Early county, Georgia.*

The Skuppernong, Warrenton, and the Devereux grapes, are natives—the first of North Carolina, the latter two of Georgia; and all of them certain and prolific bearers. Successful attempts have been made at wine-making from these grapes; and there is no doubt that if our cultivators could realize as much, or more, money from the production of this excellent beverage as from cotton, that vile fluid, whiskey, would soon be unknown among us.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The Catawba and Isabella do well here, and the fruit is equal to any of the kinds produced in this latitude. We have but little experience in wine-making; but some of our acquaintances, who raise it, succeed in the business, and consider it profitable. It is an easy matter to produce the grape, and many farmers, in consequence, have it in abundance for family use. So far as my experience goes, the Catawba and Isabella are the only varieties that can be profitably cultivated in this region.

Statement of HENRY LITTLE, *of Bangor, Penobscot county, Maine.*

We raise under glass the Black Hamburg, Chasselas, and others of the fine foreign varieties. In open culture, we plant in this city the Isabella, Clinton, Black Cluster, and White Sweet-water.

Several other varieties are planted on trial. The Isabella is too late in ripening for this State. The others do somewhat better. We are searching for good early-ripening varieties.

Statement of EUSEBIUS WESTON, *of Bloomfield, Somerset county, Maine.*

Wines have been manufactured here of a delicious flavor from red currants, and some from the black. I take clear, well-picked currants, press out the juice in a common cheese-press, and add to it about the same quantity by measure of good cold water; I then add about 20 to 25 pounds of good white sugar, and stir it thoroughly; set it in a cool place to ferment, leaving the bung out to work off the vegetable matter remaining; fill the barrel, and bung it up tightly. In this way my wine remained good for five years. Others have cheap sugar and more water, which is attended with less cost and less value. My wine I sold for sickness, and it was highly approved. At the present price of sugar, such wine may be manufactured for $5 per barrel, and will sell, when made, at $1 per gallon.

Statement of DAVID BRUMBAUGH, *of Marsh Run Mill, Washington county, Maryland.*

Not much attention has been paid to the cultivation of the grape in this county; but from the success within the last few years, in a small way, I am fully convinced that our soil, climate, and location are admirably adapted to its culture, being less liable to disease than in many other parts of the country, or in Europe.

The common Fox grape, with all its varieties, is found growing spontaneously over the county; and a variety of the Catawba is thought by some to be growing spontaneously, and in great abundance, on the Blue Ridge, which separates this county from Frederick. The Catawba and Isabella are the favorite varieties, being hardy, full, and constant bearers.

There has not been much wine made yet, except in a small way; but that has been pronounced by good judges to be equal to the wine made on the Rhine.

Statement of SIMON T. ASHTON and ELIJAH MYRICK, *trustees of the United Society of Shakers, at Harvard, Worcester county, Massachusetts.*

We have several varieties of native table grapes, which we think only need be known, to become favorites. These are called the Harvard Seedling, Black Cluster, Sage Grape, and Early Amber—the last mentioned being the sweetest and most admired of all. A committee of the Middlesex Agricultural Society, on their tour of inspecting farms, called here and tasted this variety, and pronounced it the best native they had ever met with, each of them immediately ordering a vine. There is but one opinion with all who have tasted this grape. It ripens early in September, sufficiently early to be out of the way of ordinary frosts, and needs no protection. The other kinds are valuable, but not so sweet, especially the Black Cluster, which bears large, compact, beautiful clusters that would be very attractive as a market fruit—perhaps more valuable, on account of its fine clusters, for the market, than even the Amber. These varieties all ripen within a short time of each other. The Harvard Seedling and Black Cluster were raised in this town from seed. The Sage is a very large and good grape, though some object to its foxy taste, while others are the more fond of it. This grape is already somewhat extensively known as we have supplied orders for the vines from several different States; but the Amber is taken as readily at $2 each, as any others at $1. We have been in the culture of native grapes for twenty years, and have extensively attempted the cultivation of the Isabella and Catawba, but have utterly failed in these choice varieties on account of their late ripening. We have now some twenty sorts recommended for the cultivation in open air. The four varieties named above are the most select of all we have raised or seen.

Statement of ANTHONY MILLER, *of Portland, Calloway county, Missouri.*

My observations have led me to the belief that the "rot" in the grape depends on a weakness in the vine, even when the ground is rich and well-manured. This disease, consisting only in weakness, befalls the vines soon after they bloom. Following this notion, I thought of a remedy, which consists of the following: I take fresh cow manure, (without straw, leaves, &c., being mixed with it,) which I mix in a ditch, or in a large hogshead, with slops, wash-water, &c. I stir it once a day until it begins to ferment, and leave it standing several days, and then it is ready for use. When I have no cow manure, any other animal manure, mixed with the offals of tobacco, ashes, lime, and rain-water, will answer the same purpose. Of this fluid I pour about a gallon around the roots of every grape-vine, making a small ditch, five or six inches deep, around the vine, to keep the fluid from running off. When it has soaked into the ground, I cover up the ditch with earth. A month after the blooming of the vine, I repeat this again. In this manner I have kept my grapes sound.

This remedy can be tried without expense or much trouble, and on a few vines at a time, until the owner convinces himself of its usefulness. I take it to be the only thing which will preserve the grape against the influence of dews, rains, or other unknown causes which may hurt the health of the vine.

Statement of JAMES L. MINOR, *of Jefferson City, Cole county, Missouri.*

Wine is produced in this State, by our German population, in very considerable quantities. It is of the character of the Rhenish wines, and is generally made from the Catawba grape, which flourishes under the culture of this class of wine-growers. The vine is usually grown on hill-sides, sometimes so steep as to require terracing; the culture of the grape, and the manufacture of wine, being the same here as in the vineyards of the Rhine.

The cost of manufacture I am not able to state, as it varies with the thrift, skill, and conveniences of the producer. The value of the wine here is generally $1 per gallon.

Statement of FREDERICK MUNCH, *of Marthasville, Warren county, Missouri.*

The "rot," almost the only impediment to be struggled against by American wine-growers, is clearly and doubtless nothing else than a mildew, befalling the whole plant, the leaves and tendrils, as well as the berries, caused by a sudden change in the temperature of the atmosphere, as a cool night, followed by a hot and sultry day. Such changes are of frequent occurrence here, and make our climate what we call "chilly." All vegetables are not equally affected alike—some more, some less, and others not at all. Even among the different varieties of the grape, there is a difference in that respect. Vines of a spongy texture, with a thick pith, easily growing from cuttings, such as the Catawba, Herbemont, Isabella, &c., as well as most of the foreign vines, suffer most. Those of the opposite qualities are less delicate, and must be chiefly propagated by grafting or layers, and ordinarily stand our climate well. To the latter belong the Halifax, and all the native vines of the Mississippi valley, all with a highly-colored juice, which makes a dark-red wine.

Although I admit that the Catawba is unsurpassed for the superior wine it yields; yet I say again, if wine is to become in this country anything more than a luxury for the rich; if we design to raise a wholesome, recreating, and, at the same time, cheap beverage, to which everybody may have access, we must not merely rely on the Catawba. From one stock of the Halifax, I raised this year two gallons of wine, while my crop of the Catawba was nearly a failure. Some of my neighbors had better luck, probably because of more sheltered situations. On the whole, the yield of this year was considerably more abundant than of the two preceding, and the quality promises to be excellent. Next year, I shall have about half a dozen new varieties, natives of the Mississippi valley, and cultivated by me with a great deal of care, to bear for the first time.

Statement of WILLIAM H. SOTHAM, *of Piffard, Livingston county, New York.*

In this vicinity there is a vineyard, owned by Mr. Samuel Warner, of about $1\frac{3}{4}$ acres. His vines are planted in rows about eight feet apart. Some of them are trained to wooden trellises, others to posts and wire. He made 40 barrels of wine from the pure juice this year. This vineyard will make, including labor and sugar, full $2,000 worth of wine, at $1 50.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

The Isabella and Catawba grapes seldom ripen well in open culture in this parallel, after leaving the Hudson, before we reach the lake influence at Syracuse. The present season, however, has been an exception, being the first in eleven years that these varieties have fully ripened in perfectly open culture. In this city, on brick walls, and amidst the shelter of high close fences and yards, the Isabella ripens tolerably well in most years. Some of our varieties of Frost grapes yield a tart fruit, which is very rich when gathered late. Unfortunately, however, most of them are shy bearers when transplanted into our gardens. There are also two or three varieties with large berries, of early maturity; but one of them, a very shy bearer, makes loose clusters, from which the berries fall easily as soon as ripe. They all, moreover, have thick skins and a hard pulp. A variety as hardy, productive, and valuable for the table as the Isabella or the Catawba, and early enough to mature habitually, is a very great desideratum here. Such a grape, I have little doubt, could be produced by crossing some of the hardiest foreign sorts with the Isabella or Catawba. It could also probably be raised from their seed. The experiment should be tried on a large scale if possible.

The only valuable grapes that habitually ripen early enough in this climate are the Early Black, July, Miller's, Burgundy, Violet, and some varieties of the Sweet-water, such as the Early Malvasia and the Royal Muscadine. There are perhaps a few other foreign sorts that would mature in season. These, it will be seen, are all foreign varieties. In seasons that are steady, warm, and dry, all of these ripen well and produce largely; but in seasons that are cold and irregular, as also those which are hot and wet, foreign grapes are sure to mildew, and often fatally, though the timely use of sulphur is frequently found to save them. It is worthy of consideration, that when the grape is mildewed by hot and wet weather, the balls and the foliage of the potato are similarly affected.

The most successful mode of grape culture includes a deep, dry soil, but moderately rich, with a free exposure to air and light, involving, of course, close trimming and wide culture. It will also be found that after giving the vines earth and faithful culture, a little wholesome neglect in midsummer, by letting the grass and small weeds grow, will prove useful. The *rationale* of this is, that in this way the luxuriance of growth is prevented, and the hot sun affects the roots less. In short, it is but another mode of "mulching." I suggest these thoughts with diffidence, although they are forcibly commended to my judgment by the experience of the past summer, and also on theoretical grounds. The low training of the grape has also been found favorable to the resistance of mildew, obviously on the same principle as before—that of shielding the soil, and thus preventing the effects of sudden atmospheric changes. Notwithstanding assertions to the contrary, the Isabella and Catawba are liable to mildew in bad seasons, though less so than foreign sorts.

Increasing attention is also given here to the culture of grapes in cold and hot vineries, and with good success. The fruit sells here in the autumn at from 9 to 15 cents per pound. Packed in thin layers, between bats of cotton, layers of dry maple leaves, or fine dry and sweet hay, they may be easily kept until mid-winter.

I have practised grafting the foreign grape on our hardy native

stocks. In this way we may have the second year a considerable, and in the third year a heavy, crop of grapes. This mode most strongly recommends itself to all families possessing thrifty vines of late maturity or inferior quality. I have practised grafting as soon as the soil is open in the spring, and also after the foliage is fully expanded; that is, about the 25th of June. Both methods are about equally successful, so far as it regards the immediate growth of the scion. The early season, however, is preferable in this climate, because the late period does not admit of the maturity of the young wood in case of an early autumnal frost. I wish I were able to report the foreign grapes as secure from mildew when grafted on hardy native sorts, as had been hoped. But why should such a result have been hoped for, when natives themselves are not always exempt? I must not forget to state that the German mode of extreme thinning out of the summer growth of wood, and often of leaves, will not do in our hot summers, not even when practised on foreign sorts. It robs the fruit of its elaborating machinery, and thus hinders the growth, and deteriorates the quality of the fruit. If the foliage of the grape be but well exposed to air and light, it is a matter of indifference whether the clusters ever see the sun or not. This, I think, is obvious on philosophical grounds, as well as verified in practice.

Statement of BENJAMIN SUMMERS, *of Vermilion, Erie county, Ohio.*

There are several vineyards in this county planted mainly with the Catawba and Isabella grapes. The blossoms are not apt to be injured by the frost, though one year they were killed twice, and put out a third set, producing a good crop. Where the vines are cultivated properly, and are not allowed to bear too full, the fruit is large, plump, and luscious, worth from $1 50 to $2 per bushel for table use; the product being from 75 to 100 bushels to the acre, and will make about 300 or 400 gallons of light wine, which is worth, when new, from 50 cents to $1 per gallon. I believe the pure juice has not sufficient body to keep without the addition of sugar or spirits, or boiling it away two or three to one.

The best districts for grape culture are the islands in Lake Erie and the lake-shore farms, where the proximity to the temperate water of the lake gives them a week or two longer to ripen than the frosts allow in the interior. From a slight personal acquaintance with Cincinnati and its vineyards, as well as a somewhat critical examination by our chief wine-maker, I cannot but think this is a much better grape county than that. Mr. Longworth, in his articles on grape culture, &c., about Cincinnati, admits that, owing to mildew and frosts, the crop there is very uncertain, though sufficiently sure to be profitable.

We put out our cuttings in beds one year, and transplant to the vineyard, in rows about six or eight feet apart, the next; training them to rails set in posts. The greatest difficulty is to get a heart sufficiently hard to thin out the young fruit. Some contend that nineteen-twentieths of the clusters should be taken off. I should think that rather too much, but I must acknowledge I have never taken off enough yet. Experience alone will enable one to do it right. One comparison I could not avoid making in regard to the cost of cultivation, &c., at Cincinnati and here. There the land consists of hard, clayey hills, which have to be trenched and manured to the depth of two or three feet; at what cost I know not, but probably from $40 to $50 to the acre, in addition to its first outlay—say, from $200 to $300 per acre. Here the land needs no trenching, and but little manure; is worth only $40 or $50 per acre, and will produce two crops to their one. On the other hand, there they can command any number of cheap day-laborers when needed, which is very desirable in this business, and without which a vineyard will be very apt to suffer.

I am unable to make a statistical estimate of the cost of cultivating grapes; but from a little experience, and the information obtained from those more extensively engaged in it, I am satisfied it pays as well as any other agricultural pursuit, and perhaps better where the location is favorable. If we had as hardy and as prolific a grape as the Isabella, two or three weeks earlier in maturing, our whole county might become a wine-growing region; but with that and the Catawba only the most favorable localities can be successfully used for that purpose, both of them requiring the warm weather to be pretty well extended into October, in order fully to mature the fruit.

Statement of A. MARSHALL, *of Westchester, Chester county, Pennsylvania.*

For the last twenty years I have paid some attention to the grape culture. I commenced, as most others have done, by travelling in the beaten track of foreign cultivators. In this county, where my experiments have been made, and where I have watched with much interest the success of others, all attempts to cultivate the grape on a large scale have proved a failure.

The trials have generally been made on high ground, on hill-sides of various slopes and aspects. Imported vines from the wine countries of Europe were first tried, and soon abandoned. Native vines (Catawba and Isabella) were next tried with better success; but even the little encouragement afforded by these was soon given up. After bearing a few tolerably good crops, the vines would decline in health and die. In some locations the vines would cast their leaves in August, and the fruit, as a matter of course, could not mature. In other instances I have seen a single vine, growing against the north end or west side of a building, produce a large crop of well-ripened, delicious fruit; but even in these cases the vines were short-lived.

I am aware of the fact that in the vicinity of Cincinnati, on the Ohio river, the vine is cultivated with great success, yielding fair profits. In the neighborhood of Reading, in this State, on the Schuylkill river, the Catawba and Isabella grapes do well; also, in the neighborhood of Philadelphia, on the Delaware and the Schuylkill, the vine produces freely and ripens well. From these facts I draw this conclusion: that the grape-vine requires a moist atmosphere, and will not do well on dry hills remote from large bodies of water.

My object in this communication is not to give instructions for cultivation, but my views in relation to atmospheric influences on the vine, which may be useful in the choice of location.

Statement of H. R. Robey, *of Fredericksburg, Spotsylvania co., Va.*

The Catawba and Isabella are the only kinds of grapes grown extensively. The rot sometimes destroys a good part of the crop. Quite a number of families make wine in a small way—say from 20 to 100 gallons a year. One bushel of grapes will yield $4\frac{1}{2}$ gallons of wine. If the grapes are all very ripe, no sugar is required; but if a part are a little green, one pound of good brown sugar to the gallon is as much as I have ever used. The grapes are bruised and put into a crib and pressed, as for cider; the juice is then put into a clean cask and allowed to ferment. In about a month the wine should be drawn off and put into another cask, and stopped tight. No brandy nor any kind of liquor should be put into the wine. A deep sandy soil suits the vine best.

THE SOUTHERN SYSTEM OF VINE CULTURE AND WINE-MAKING.

BY SIDNEY WELLER, OF BRINKLEYVILLE, NORTH CAROLINA.

About twenty years since, I settled as a farmer and vine-grower at my present residence. At first, an ardent friend of temperance, I was induced to turn my attention to the vineyard business, because learning from reliable information that in Eastern countries, where this species of culture is widely disseminated, little or no drunkenness prevails; and therefore, so far as the vineyard cause is promoted in our country, the horrid vice of intemperance would decrease.

The result of my vineyard enterprise and industry therein, is about a dozen acres of flourishing vines, mostly on scaffolding, or as canopies, covering continuously with branches (and when in bearing, with leaves and fruit) overhead, from 8 to 10 feet high, and nothing is seen between these canopies and the ground but main stems of the vines, and the posts or rock pillars to support the frame-work above. My annual yield of wine has been as high as 60 barrels; besides entertaining hundreds of visiters at 25 cents each entrance, and 50 cents per gallon for select grapes gathered to carry away. My vineyard is the largest, I learn, in the South, and I am encouraged to enlarge it every year.

To show that the Scuppernong is the "grape of grapes," South, (it does not do well north of latitude $37\frac{1}{2}°$,) I may state that, at our late fair at Raleigh, I took diplomas on grapes and wines, and especially on the Scuppernong, as most highly commended by the judges. I exhibited Scuppernong grapes four inches in circumference, unparalleled in size; and no mean judges of wine, from different parts of the country, pronounced my "Scuppernong hock" the best of wine. I here digress, to state that, of half a dozen brands of the Scuppernong wine, I sell all readily, as soon as fit for market, from \$1 to \$6 per gallon.

As to cultivation, I would state that whatever diversity, in North Carolina or elsewhere, in the mode of culture of other grapes, there is only one uniform mode of success with the Scuppernong—the arbor or scaffolding method. I have heard repeated, and not unfrequently seen it inserted in books, that Scuppernong vines should never be trimmed.

This is a great mistake, for no young grape-vines need trimming more than the Scuppernong; for, if left to grow bushy, (as they always will if not trimmed,) they will not bear well, and soon will come to nothing. In the fall and summer, all the laterals of the young vines are to be removed, and one or two main stems only suffered to grow unchecked in length. But after the main stems are five or eight feet high, and branches thence spreading over the scaffolding, trimming is uncalled for. Some of the first planted of the Scuppernong part of my vineyard have not been trimmed nor manured at all for fifteen years, and every season they have produced abundantly, and grow better now than at the first of that period. Posts and scaffolding have had to be renewed and repaired occasionally.

According to my American system of vine culture, set forth years since in the old "American Farmer," I never curtail the length of a vine. Nature's process in keeping up and increasing fertility in woods and old piney fields, afforded me a most significant lesson as to sustaining the productiveness of my vineyards in the unchecked growth lengthwise. Therefore, I invariably scarify the ground underneath the canopies, before expected frosts, to cause the leaves to fall; and after they fall, to prevent their blowing away, or, by blowing off, to counteract the practical principle that the leaves and litter of any plant is the best manure, or equivalent therefor.

I plant other kinds of vines 10 feet apart each way; but the Scuppernong should never be planted, for a permanent stand in a vineyard, nearer than 20 feet each way, for the branches will eventually run 100 feet or more. Some of mine are 30 or 40 feet apart, locking and interlocking their branches on the canopies. So it may readily be conceived how one Scuppernong vine may, by right culture and management, eventually cover near a quarter of an acre of canopy, and produce five barrels of wine annually—a fact I know of in two instances.

The Scuppernong cannot be successfully cultivated by cuttings; but by grafting and layering, all desired success attends its propagation. The layers are made by burying freshly grown lateral branches in the spring and summer, with ends left out of ground; and, in the fall, the small-rooted plants are cut from the parent stock, planted in rows, and cultivated in the nursery a year or so, and they result in well-rooted plants for your own propagation, or for sale. I send hundreds yearly, mostly South, at the medium price of 25 cents each, and cuttings of all kinds at 4 cents each. I send, also, both wines and vines to Petersburg or Norfolk, Va., one place about 70, and the other about 100 miles distance, mostly by railroad—the cost of transportation from 25 to 50 cents per hundred weight. For distant places, I box casks of wine, as well as my other products, for market. And not only does boxing the casks prevent chances of abstraction, but the adulteration of the wine. In the corners of the boxes I put bottles of wine, as samples and presents. Most generally, my articles go safely thousands of miles, as first to Petersburg, thence direct to New Orleans, or by New York, and thence, say to St. Louis, or elsewhere.

Scuppernong and Muscadine grapes ripen for successive gatherings for nearly two months, and are collected for wine-making as follows: A large sheet of strong cloth, fastened to poles on two opposite sides,

is held by two persons, and a third shakes the canopy above the sheet with a forked stick. All the grapes then ripe fall and roll into the middle of the sheet. The grapes are mashed with a machine, consisting of two rollers, on a frame, placed over an open-headed hogshead, turned by handles, at opposite ends, by two persons, with a third one putting the grapes into a hopper above. After mashing, and no fermenting in the must, I press off in straw rings, as for cider; and folds of a woolen blanket put on a frame over the tub to receive the juice from the press and strain it, promotes the maturity of the wine by taking out the greater part of the extraneous matter that would have produced over-fermentation in the cask. Wine is made with spirits, only, as the safe-keeping, enriching ingredient—one-third or less added, according to the weather and state of the grapes as to dryness and maturity; and the mixture is put into a clean cask and well shaken, where it undergoes a gentle fermentation and natural clarifying, as indicated by the several quarts of lees found at the bottom of the barrel in two or three months, when the clear wine is drawn off for sale or use.

The Scuppernong champagne requires one bushel, say, of purple Scuppernong grapes, mashed with six or seven of the white or proper Scuppernong, and fermented in the must twenty-four hours or more, according to the heat of the weather. After pressing, as aforesaid, a fourth part of spirits and one pound of double-refined sugar per gallon are added, before turning or putting into the cask.

For Scuppernong hock the same process is pursued, with nothing more added than three pounds of double-refined sugar, with some additional trouble of racking, &c., to prevent the danger of acetous fermentation. Doubtless on the same principle, Mr. Longworth, of Cincinnati, distinguished for vineyard enterprise, sells his Catawba champagne so much higher than his wine, with no ingredient added. What I sell for purest Scuppernong, at $6 per gallon, is made with Scuppernong brandy, distilled from soured Scuppernong juice, and mixing a third part thereof with the juice of the same grape.

Having read of the fact, in the vineyard treatises of Hoare and others, that, through the discovery, by a French chemist, of some property in vine-leaves as in the fruit, good wine could be made of leaves only, I produced from Scuppernong leaves a wine that was pronounced by competent judges, at our late State fair, superior to foreign Port. My Scuppernong leaf, or Port wine, is made by steaming, say six bushels of leaves for a barrel, in a box made of oak plank, with a sheet-copper bottom, placed over a furnace. The juice or decoction, as the result of such steaming, is mixed with one-third spirits, and from one to two pounds of sugar per gallon. In a similar manner, as stated in the vineyard treatise of Mr. Adlum, the pioneer of the vineyard enterprise in our country, I make good wine of Scuppernong and other green grapes by adding an extra quantity of pure ingredients, as sugar and spirits.

As to the cost of making wine, I would state that on a farm of about 400 acres, and a comparatively small proportion in vineyard and nursery, and other tillage, I have, on an average, about half a dozen good hands, at the cost of about $50 per annum and their board and clothing. These hands are alternately employed on the farm ground proper, or in the nursery or vineyard, according to circumstances; but in the midst of the vintage season, for several weeks, I employ about half a dozen extra hands, at 25 cents per day, with a premium of two cents per bushel for all the grapes they gather.

The result of our joint labors, so far as ascertained, is 500 bushels of corn, 2,000 pounds of cotton, 300 bushels of sweet potatoes, some 20 stacks of hay and fodder, and about 40 barrels of wine. From all sources of income during the grape season, as that of entrance fees for pic-nics, grapes sold, &c., I calculate that the receipts are in the neighborhood of $200. I will further state, that an enterprising lady, a near neighbor, three years since, made at my presses 10 barrels of Scuppernong wine, from a small vineyard of less than half an acre, set out from my nursery about ten years previous; thus realizing, with very little labor, in a slack time for farming here, just after what is called laying by corn, at least $250 for wine. Another lady, living near me, makes two barrels of wine annually, from two Scuppernong vines which I planted about a dozen years since, directing her to train the branches to and over some oak-trees in her grounds. The vines now overspread the trees instead of scaffolding, and afford an abundance of the best of fruit for weeks, besides the two barrels of wine, worth at least $50.

From the foregoing statements it is obvious that, with materials for insuring a strong body and safe-keeping, of American origin and manufacture, as good native wines can be made as those from the East, and especially when confidence can be instilled in the minds of our countrymen that these wines contain no impure or deleterious ingredients, like those palmed off by dishonest or ignorant salesmen as genuine Madeira or European Port. Let any of our American wines be duly generous with safe-keeping and enriching ingredients, my word and experience or it, as good wine as any from the East will be the result.

THE WINE CROP OF THE WEST.

[From the Cincinnati Columbian.]

The grape culture, the grape and wine interests of our community, are fraught with very considerable importance now, and must eventually become a great and absorbing feature of the State's property. Fields of waving corn or golden-tasseled wheat are fair to the view; but picture to yourself the vast vineyards that shall anon deck the hill and dale with gorgeous and tempting, voluptuously rich, red, ripe Isabellas or Catawbas.

The third year after planting the slips, the production of wine may be commenced from the fruit. There is more expense and labor in commencing the cultivation of the vines, than is probably attendant upon the planting of the usual crops, but less afterwards. From one acre, well planted with healthy vines, probably from $600 to $1,000 worth of wine may be produced in good seasons. This wine has generally brought $1 per gallon here, but this year will probably bring $1 25.

Nothwithstanding the immense annual increase of the quantity of

wine manufactured in the West, the price continues to improve, and it must do so as the wine becomes more generally known. This year, notwithstanding the increase, the price has raised nearly 25 per cent., and the demand for wine is much greater than last year. So must this demand continue increasing. The crop this season has been very fruitful, surpassing, in fact, any former yield known in the West. The wine will be very pure, and the demand great.

In Ohio there are about 1,500 acres of land exclusively devoted to grape-growing, between 300 and 400 of which are near Cincinnati. Within twenty miles of this city, including a part of Kentucky, on the opposite side of the river, there are 1,300 acres, and double that quantity of vines. More have been planted this year than there were last. In Missouri, near Hermann, there are 500 acres; in Indiana, 200 or 300; in Illinois, about 100; and in Kentucky the same—making about 2,500 acres in all. It is estimated that Indiana, Ohio, and Kentucky will this year produce at least half a million gallons of wine. The yield on some of the vineyards will be equal to 7,000 or 8,000 gallons—allowing 2,400 vines to the acre, planted about three feet apart, in rows separated by a distance of three feet. Mr. Robert Buchanan, who is among the most successful cultivators of the vine, this year obtains about 800 gallons of wine from each acre of his vineyard, which will net him about $700 per acre. Some other vineyards will do equally well. Persons, however, are not advised to embark in grape-growing with the expectation of profit, if it shall be necessary to hire labor. The German vine-dressers muster all capable members of their family into the service—the wife often being the most efficient. In this manner they realize an adequate income.

It has been customary to give a piece of land, of say fifteen to twenty acres, with a house on it, to those Germans, on the condition that the tenant shall plant a certain quantity of grapes each year, in a proper manner, and pay the proprietor one-half the proceeds of the vineyard.

The fruit is purchased from the vineyard men for from $5 to $6 per 100 pounds, (or two bushels,) a bushel yielding from 3½ to 4 gallons of wine. It is then mashed by the manufacturers in the city and pressed. The juice is then fermented in the cellars, and the sparkling Catawba is in prime order for market at the end of fifteen or twenty months.

A few days ago we visited the wine-vaults of Mr. Longworth, and the following facts were derived: There are three vaults, one of which will turn out 50,000 bottles every year, and another 100,000 bottles yearly, of dry wine. Some portion of the cellars is occupied by immense butts, or cylindrical tanks, one of which holds 5,000 gallons, or $5,000 worth of wine if bottled. The staves are about three inches in thickness, and the heads curve inward, so as to introduce the arch, to resist the internal pressure. Other objects, quite as noticeable, are the long rows of black bottles placed in a horizontal position, and stacked up like cord-wood, in solid piles, as high as one's neck. In the cellars of the extensive native-wine establishment of Longworth & Zimmerman are twenty-four casks, holding about 2,500 gallons each, or 60,000 gallons altogether, of the vintage of 1850–51–52, and it is expected to store 25,000 gallons of this year's wine.

Mr. Longworth will this year have on hand and for sale about 200,000

bottles of sparkling Catawba; Messrs. Longworth & Zimmerman some 60,000 bottles of dry Catawba, exclusive of a quantity of wine sufficient for 190,000 bottles; Messrs. Bogen, Cornew & Son, Work, and others, from 90,000 to 100,000 bottles of Catawba.

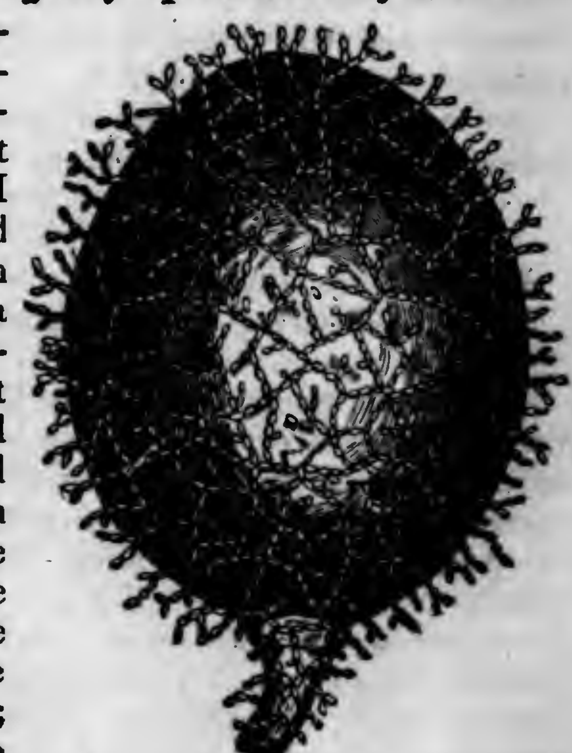
Mr. Zimmerman tendered us various samples of the present and past years' wines; and as far as our judgment in the matter stands, the purity and flavor of the vintage of 1853 will prove the finest specimen of Catawba yet bottled in the country.

THE GRAPE DISEASE IN EUROPE.

For two years past, a disease of a serious nature has attacked the grape-vine throughout Portugal, and a similar malady has also made its appearance on the vine in other parts of Europe, as well as at Madeira and Teneriffe. The following communication from Nicholas Pike, esq., United States consul at Oporto, to the State Department, will throw some light upon the subject:

United States Consulate for Portugal,
Office of Oporto, January 1, 1854.

SIR: In my last despatch I mentioned to you that a disease of a serious nature had made its appearance on the grape-vine throughout this kingdom. Since that period I have carefully examined and watched the progress of the disease. Soon after the grape begins to form, a minute parasite makes its appearance, completely covering the fruit with a close network, as indicated by the adjoining cut of a magnified grape. It increases with the growth of the fruit, until it is perceptible to the naked eye, extending to the leaves, and often covering the whole vine. In many instances, I have noticed only one cluster affected; but on close examination, with the highest power of my microscope, I have always discerned the parasite. It appears to be a flocculent fungus, unknown to me, and, I believe, new to naturalists. After the grape has arrived to its full growth, and just before it changes its color, it bursts open, showing the two pits, as denoted by the following figure, and immediately dries up.



I have seen whole vineyards in the vicinity of "San Cosme" and "Campanham," near Oporto, with the grape in this condition, having the appearance of being dried by a scorching sun. Many of the farmers in the vicinity, who made from 20 to 30 pipes of "green wine"

in former years, have not been able to produce more than five pipes the

last vintage, and then by carefully picking the fruit which had not the appearance of disease to the naked eye. I have discovered the fungus on the fairest and best fruit, which has been carefully selected by myself for examination. Wine made from grapes of this vintage, in my opinion, is not wholesome. Many cases have come under my observation of sickness to the stomach and vomiting, after eating the fruit that is diseased.

Wine merchants are afraid to mix it with other wines, and large quantities are used for "lodge" purposes, such as seasoning casks, &c.

I have lately examined cross-cuttings of different parts of the vine, and have discovered that each joint of the new wood of last year's growth is already commencing to decay; and a correspondent of the Upper Douro informs me that many of the vines have begun to decay in the wine district.

In 1852, about 80,000 pipes of wine were produced in the Upper Douro. Last year, not more than one-half the amount has been produced. Brandies and wines have advanced in price 100 per cent., and are still advancing. Merchants and holders here refuse to sell, as a total failure is looked for in the vine next year.

In my examination of various vines, such as the squash, pumpkin, cucumber, and other kinds, I have always discovered the same fungus that infests the grape. The olive-trees are also attacked with the same disease; and last year, the quantity of oil was about two-thirds the quantity usually produced.

As wine and oil are the two principal products of this country, the consequences of a failure of them will be a great calamity.

I am, sir, your obedient servant,

NICHOLAS PIKE.

Hon. Wm. L. Marcy,

Secretary of State, Washington, D. C.

Note.—At present we know little concerning the origin or production of that class of fungi known by the name of "blights;" but as far as investigation has proceeded, it is found that the minute fibre called *mycelium* corresponds with the office of plant, and the fungus the development, the spores of which contain the sporules, which are analogous to the seeds of vegetables, as regards reproduction, and which are so minute as to baffle investigation by assistance even of the most powerful magnifiers. These sporules are disseminated throughout the atmosphere, or remain inert, or in a state of inaction, until the period arrives when certain conditions of the atmosphere, soil, and other circumstances, conspire to their development. What is called "mould" comes under this denomination, and every vegetable substance is more or less subject to this *oidium*. It is to be found upon almost every substance while entering into a state of decomposition, which it greatly facilitates; and even may be seen in great perfection upon sour paste or bread, in summer, and, under different forms, upon vegetables in their growing state.

The parasitic fungus with which the vine is affected, appears first as a small blotch upon the surface of a leaf, and then spreads so rapidly, that in the space of a few days every branch and leaf is covered with minute spores, as thickly as if lime or flour had been carefully dusted over their entire surface, whilst the fruit is covered as entirely as if first moistened and then dipped into those substances. With millions as cyphers to define number, and computation to infinity for their enumeration, the human intellect is still left behind in the attempt to convey to the minds of others their number and extent. Yet each of these individual atoms is a spore, or seed-vessel, containing thousands of sporules, all endowed with vegetable vitality; each of which is capable of reproducing its species, whether taken up by the atmosphere, or returned to the soil to remain quiescent until a combination of circumstances concur to bring them into active life. Imagine a quantity of potatoes strewed indiscriminately over the space of an acre of land, and every potato throwing out a radicle, or shoot, exactly in the direction of each potato nearest to it, and those to others next in succession to them, and so on over the whole surface, until the whole intervening space is filled in with these shoots, you will then have an idea (a magnified one) of what is progressing upon every portion of the leaf of a vine infected by these destructive agents; every pore of every leaf becomes penetrated, until every portion of the vegetable sap is extracted, and the plant withers and dies by exhaustion alone.

Sulphur, applied to the vine, as well as to peach-trees, with a little attention in the early stage of its appearance, will entirely subdue the blight. The flour of sulphur may be put into a piece of muslin or "cheese-cloth," immersed in water, and well worked with the hands. The water may then be applied to the vines by means of a syringe, first striking the under side of the leaves, and afterwards the upper. A second washing will sometimes be necessary to complete the cure.

D. J. B.

THE STRAWBERRY.

When we contemplate the relations which the strawberry-plant bears to other parts of nature—to the sun which expands its blossom—to the winds which sow its seeds—to the brooks whose banks it embellishes—when we contemplate how it is preserved during a winter's cold capable of cleaving stones—how it appears verdant in the spring without any pains employed to preserve it from frost and snow—how, feeble and trailing along the ground, it should be able to migrate from the deepest valleys to Alpine heights—to traverse the globe from north to south, from mountain to mountain, forming, on its passage over prairie and plain, a thousand mingled patches of chequered work of its fair flowers and scarlet or rose-colored fruit, with the plants of every clime—how it has been able to scatter itself from the mountains of Cashmere to Archangel, from Kamtschatka to Spain—how, in a word, we find it in equal abundance on the continent of America, from the bleak fields of Tierra del Fuego to Oregon and Hudson's bay, though myriads of animals are

making incessant and universal havoc upon it, yet no gardener is necessary to sow it again—we are struck with wonder and admiration at so precious a gift.

The strawberry appears to have been disregarded by the ancients as a fruit-bearing plant. Virgil, Ovid, and Pliny, but lightly speak of it, though the latter particularly mentions the raspberry as an article of medicine, luxury, and diet. The strawberry was described by Joan. di Cuba, in his "Ortus Sanitatis," in 1485, in which its medical and other properties are treated of at length. It was also in some repute in England in the time of Tusser and Shakspeare, and is noticed in their works.

CONDENSED CORRESPONDENCE.

Statement of MICAJAH BURNETT, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

Nowhere in the world, perhaps, can the strawberry be produced in greater abundance, and in better perfection, with the same attention, than with us. The Early Scarlet, and some of the Pines, are the most prolific. Mammoth, McAvoy's Superior, and Longworth's Prolific, are good varieties.

Statement of HENRY LITTLE, *of Bangor, Penobscot county, Maine.*

Strawberries grow wild in our fields in great abundance, and are mostly used for preserves. Among the cultivated varieties are Hovey's Seedling, Early Virginia, Jenny's Seedling, and Boston Pine. The White Wood is the most common variety, as it is hardy and very productive. We have also Burr's New Pine on trial.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

Strawberries are quite commonly cultivated by private gentlemen, who make very fine displays of this fruit at our occasional city fairs. But the public supply is mostly from the fields, where they are gathered growing spontaneously. My remarks on the raspberry are even more applicable to the cultivation of the strawberry.

THE STRAWBERRY AND ITS CULTURE.

BY CHARLES A. PEABODY, OF COLUMBUS, GEORGIA.

That eminent horticulturists are liable to be mistaken in their views of culture, as well as of the origin and history of plants, as any other class of men, we have ample proof in the conflicting opinions of the nature and culture of the strawberry. Downing says: "The strawberry is the most delicious and most wholesome of all berries, and the most universally cultivated in all gardens of a northern climate." Again he says: "The strawberry properly belongs to cold climates, and though well known, is of comparatively little value in the south of Europe." With this high authority, the horticulturists of the South never dreamed of cultivating the strawberry to any extent, although the woods and fields were covered with the wild fruit. It was a knowledge of the fact that the wild strawberry grew all around me, that induced me to try strawberry culture at the South. I do not believe there is a plant in nature that so easily adapts itself to soil, situation, and climate, as the strawberry. In many of its homes, however, it produces little or no fruit, spreading itself rapidly by its runners.

Now, as there are two ways of propagating the strawberry, one by its seeds and the other by its runners, the question is, which method do we prefer? If we were going to introduce the strawberry-leaf for a tea, for which it makes a good substitute, common sense would dictate to us to cultivate for runners, and stop the fruiting, or perfecting the seed, as the fruit is nothing more than the receptacle for the seed; and if, on the other hand, we wish seeds or fruit, we must cultivate for that purpose alone, and stop the runners.

Intelligent experimental cultivators have long since discovered that plants have a specific food for their wood, leaves, and fruit. Physiologists know full well that it takes different substances to form the bones, flesh, and muscles of animals; and profiting by these hints in nature, I would feed for fruit instead of vines. Before planting out the vines, the cultivator should understand the sexual character of the plants, as upon a proper knowledge of this fact will depend his whole success in culture. That plants are staminate and pistillate, or male and female, no intelligent cultivator will now presume to deny. But in the strawberry there are three varieties—the perfect male, the perfect female, and the hermaphrodite. The perfect pistillate, or female, is the most productive of the three, when impregnated by one of the other kinds. The perfect staminate, or male, produces no fruit, making a great show of flowers, and sending out innumerable runners, which will soon take possession of the whole bed. The hermaphrodite produces fruit, but not in so great abundance as the pistillate, and answers the purpose of an impregnator equally as well as the purely staminate. These three varieties of flowers are represented by figs. 1, 2, and 3, Plate I.

Fig. 1 is from a hermaphrodite plant, which blooms and impregnates itself. The stamens marked *a*, are full of a fine pollen, or yellow powder, which falling on the end of the unopened calyx of the buds, below the flower, or around it, on the pistillate plants, is carried by an unseen agency direct to the pistil, impregnating and setting the fruit. This variety is the Early Scarlet, a continuous bloomer with my culture, and the best impregnator for the ever-bearing Hovey Seedling I have ever met.

Fig. 2 is the sterile staminate, or male plant, never producing fruit under any circumstances whatever. It will be observed the flower is larger and more showy than the others. It deceives many an inexperienced cultivator with its false promises of fruit. The flower of the

pure male may be easily known by its large anthers and stamens, as marked *a*, *b*, in Fig. 2.

Fig. 3 is the pistillate or female blossom. It will be observed that there are no stamens around the pistil, as *b*, but nearly every bud will produce a berry if impregnated by one of the staminate or hermaphrodite plants. Of this variety is the Hovey Seedling, which, as far as my experience goes, is the best strawberry ever yet cultivated North or South. This, and the Early Scarlet, as they appear in Plates II and III, are a fair sample of the fruit they produce at the South, at least six months in the year; and I see no reason why, with the same culture, they may not bear at the North four months in the year. It will be observed that these plants are in full and perfect fruit; and at the ground marked *o*, is the new germ of another fruit-stem, which will be in bloom and fruit by the time the older fruit is gone; and thus it will continue through the most of the year, if the runners are kept down, and the plants cultivated as hereafter described.

Before proceeding to the method of culture, I will give my views on the time of impregnation, being fully satisfied that the generally received opinion that the strawberry is impregnated after the petals expand, is entirely erroneous. I have long since observed that the first strawberry blossoms never produce fruit. The staminate varieties, or rather the hermaphrodite, open from two to ten blossoms, which must shed their pollen on the ends of the unopen calyx of the young buds below, or fall on the ends of the unopened pistillate buds, and immediately cause impregnation.

Fig. 5 is a sketch of a staminate variety, just as it buds and blooms, with two flowers fully expanded. The stamens and anthers are plainly perceptible, the anthers being loaded with pollen, and may have impregnated many a bud around them; but neither of these flowers can produce a berry, once having opened their petals without impregnation.

Fig. 4 is the pistillate variety, an exact copy from nature. The flower *b* will be seen fully expanded, but can never make a fruit. The unopened buds, *a*, *a*, below it, may all be made to fruit, if the pollen from the staminate flowers *c*, *c*, fig. 5, fall upon their ends before expanded.

The pollen of flowers is one of the most volatile substances in nature. That of the strawberry, viewed through a microscope, is a hairy substance, which, upon ripening, bursts and floats off on the least breath of air. The point of the unopened calyx, marked *d*, fig. 4, contains a glutinous matter, which catches and holds this hairy pollen, and the work of impregnation is done; and when the calyx opens, and the petals expand, the young strawberry may be seen perfectly formed. From this will be seen the importance of the pistillate and staminate varieties blooming together. I would always prefer the pistillate plant for a large fruit crop; for, if properly impregnated, nearly every bud will be a berry. Thousands of blossoms will be found in the beds to correspond with figures 2 and 3. Fig. 2, let it be recollected, is a staminate or male flower, and fig. 3 an impregnated pistillate or female flower, neither of which, by itself, can ever make fruit.

Having now explained the sexual character of the plant, and the time of impregnation, I will proceed to the culture. As I have before

stated, were I to cultivate for vines alone, I would stimulate the plants by the most active fertilizers; but if fruit be the object, the luxuriance of the vine must be curtailed; and that food only, known as the special food of the fruit, given. Now, as to soils. There are as many opinions as cultivators, from the fact that the strawberry adapts itself to almost any kind of soil. But the soil which I have found to suit them best, is a sandy loam. I would prefer new land for the beds, with a stream of water running through them, as water, being an indispensable requisite, should be in the vicinity.

It is now well known throughout the Southern States that for many years I have cultivated the strawberry extensively, and have had from my beds a constant succession of fruit six months in the year, and frequently have it ten. While I am now writing, (December 24,) one of my beds, of an acre, is loaded with ripe fruit, specimens of which I have sent to New Orleans, Montgomery, Savannah, Charleston, Mobile, and New York. This bed has scarcely produced a runner the past season. The causes of this will be found in my method of culture. I have said that I prefer a sandy soil and new land. My grounds are on what is called "piney wood lands," hill and valley, with never-failing streams meandering through them. I have taken the grounds bordering on the streams, ploughed them deep, and laid them off in rows, two feet apart, and planted as indicated in the annexed diagram:

*	*	*	*	*	*	*	*....Early Scarlet
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
*	*	*	*	*	*	*	*....Early Scarlet.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
+	+	+	+	+	+	+	+....Hovey's.
*	*	*	*	*	*	*	*....Early Scarlet.

I plant the pistillate for fruit, and the hermaphrodite for impregnators; and the only two which I have found to bloom and fruit together the whole season are the Hovey Seedling and large Early Scarlet. Ross Phenix, Burr's New Pine, and a seedling of my own, not yet fully tested, I have also caused to bear continuously. I plant seven rows of the pistillate, and one row of the hermaphrodite, two feet apart each way. The first season I let the runners fill the ground; in the fall, go through the grounds with hoes, thinning out to 8 or 10 inches, leaving the vines to decay just where they are cut up. I then cover the whole bed with partially decomposed leaves from the woods or swamps. The winter-rains beat down the leaves, the fruit-germ finds its way through them, and the first mild weather of spring the blossoms appear.

I have before spoken of the volatile nature of the pollen. In very dry weather the particles float off on the winds, and much is lost to the buds below; hence the importance of watering freely when in bloom. Free applications of water will set the whole bed with fruit, which will require continuous watering to swell and ripen it. A strawberry bed may be moist, the plants in fine condition, and yet one good shower will make a difference of one-third in the quantity of fruit picked the day after. Consequently, in dry seasons, artificial watering must be resorted to, and no labor will pay better.

I never use animal manure of any kind—nothing but the leaf-mould, and an occasional sprinkling of wood-ashes. The leaf-mould keeps the ground cool and moist, as well as the fruit clean, and does not stimulate the vines to runners. The potash and acids contained in it is just what the fruit wants. Should the vines be disposed to spread, keep the runners down by constant pinching off, and clear out the grass and weeds with the hoe. A few years of this culture will check their disposition to run, and encourage them to fruit. The bed once thus formed and cultivated, will, to my certain knowledge, continue productive twelve years, and, I have reason to believe, as much longer as the culture is continued. Should the vines have taken possession of the ground, in spite of the efforts to keep the runners down, we go through in the fall with the hoe, thinning out the plants to 10 or 12 inches, leaving every cut up vine to decay on the ground where it grew; we then cover with the decaying leaves. When the plants begin to bloom in the spring, a top-dressing of wood-ashes will be found beneficial. I have tried strawberry culture with the plough, which will make a greater quantity of vines, but will give only one crop of fruit. It is generally remarked that the wild strawberry is finer flavored than the cultivated; but with this treatment the latter retains all the original flavor.

It has been recommended by some cultivators to irrigate the strawberry grounds by letting water on the vines; but the strawberry cultivated after the manner described, can bear as great a drought as any other plant. It is not the vines and leaves that want the water, but the flowers and fruit; and the water must come in the form of rain, through the clouds, from an engine, or a common watering-pot.

I have noticed quite a contest going on among horticulturists as to the possibility of strawberries changing their sexual character by cultivation. Without taking part in the controversy, I must state that I would as soon think of high feed turning a cow to a bull, as to change

the pistillate character of Hovey's Seedling by any method of cultivation. I have cultivated the strawberry under every aspect; with high manuring, and without manure; in new lands, and on old lands; have had the vines stand from 12 to 18 inches high, and in meek submission to hug the ground; yet I have never found the least change in the blossom. A perfect pistillate or staminate flower, first blooming so from seed, will never bloom any other way. Cultivators are often deceived about their plants, from the fact that they frequently find varieties in the beds which they did not plant; but these spring from seed. The strawberry springs from seed with astonishing rapidity. Since my beds were started, the whole country around me is covered with strawberry-plants from the seed dropped by birds. These I find running into all varieties—pistillate, staminate, and hermaphrodite—most of them worthless, but some with good fruit.

The proper time for transplanting the strawberry at the South, is as soon in the fall as the weather is cool and moist enough. Here, this may be continued until spring. Plants are easily transported great distances in the winter. I have sent them 2,000 miles with safety. It will be observed by the diagram, that I plant the staminate every eighth row. Some cultivators mix in the rows; but I prefer to keep them separate and distinct, as they are more easily distinguished, and kept better in their places.

Now, if the cultivator would know the secret of my having strawberries six, eight, and even ten months in the year, in the hot climate of Georgia and Alabama, it is this: proper location, vegetable manures, shade to the ground, without exhaustion, and water to the bloom and fruit.

Plates II and III are exact copies of fruit as ripening in my grounds in March, April, May, June, July, and August. Later than this it falls off in size, but not in quality. Thus it will be seen that high culture makes vines, whilst my simple, plain method makes fruit. One reason why so many fail in garden culture with the strawberry is, that the beds are surrounded by trees and shrubbery, which may produce one crop of fruit in the spring, but rarely more than that, unless it should prove a very wet season. The strawberry-bed, whether in the garden or the field, should have no tree, plant, or shrub near enough to it to take the moisture from the earth. The plants require all the moisture from the atmosphere and the earth around them. Whether the strawberry was originally found in cold climates, or not, I find they readily adapt themselves to any climate, and very soon become indigenous. I doubt whether there is a State in this Union that cannot produce the strawberry months, instead of weeks in the year, with proper culture. And when we take into consideration the ease and simplicity of its culture, its continued bearing and productiveness, its exemption from all insect depredations, its delicious flavor and healthy influence upon the system, it ranks first in importance among the fruits of the earth.

THE RASPBERRY.

The common cultivated raspberry is found wild in the agricultural and sub-alpine regions, and in the woods and moist wastes of almost every part of Europe, as well as in Northern Africa, the Himalayas, and in North America, from Pennsylvania to Hudson's bay. Its properties and uses were well understood by the ancient Greeks and Romans; and it has been described by various authors down to the present time. In a state of cultivation, like most of our garden or orchard fruits, it presents several varieties, particularly in the size and complexion of the berries. The roots belong to that description which is called "trailing;" that is, the suckers extend themselves all round the central plant, so as every year to come up in a fresh soil. Hence a raspberry plantation requires to be frequently taken up and replanted—every five or six years. The raspberry, for this reason, has been considered as a good example of the doctrine of the "excretion of plants," first broached in detail by De Candolle, and subsequently elucidated by various experiments by M. Macaire.

CONDENSED CORRESPONDENCE.

Statement of Micajah Burnett, *of the United Society of Shakers, Pleasant Hill, Mercer county, Kentucky.*

The Fastolf, genuine red Antwerp, and the Franconia raspberries, are very fine, and give satisfaction, except that they are too tender to stand the winter without protection. The Monthly or ever-bearing, Red English, Spurious Antwerp, Yellow English, and Pine-apple, bear well, and are hardy enough to stand the winter. Knevel's Giant is an excellent variety, and from the short trial we have made of it, we believe it to be a hardy one.

Statement of Henry Little, *of Bangor, Penobscot county, Maine.*

Raspberries grow wild in abundance. Several tons are annually sold in this market. Fastolf, Franconia, and Knevel's Giant, are the best cultivated varieties.

Statement of Chauncey E. Goodrich, *of Utica, Oneida county, New York.*

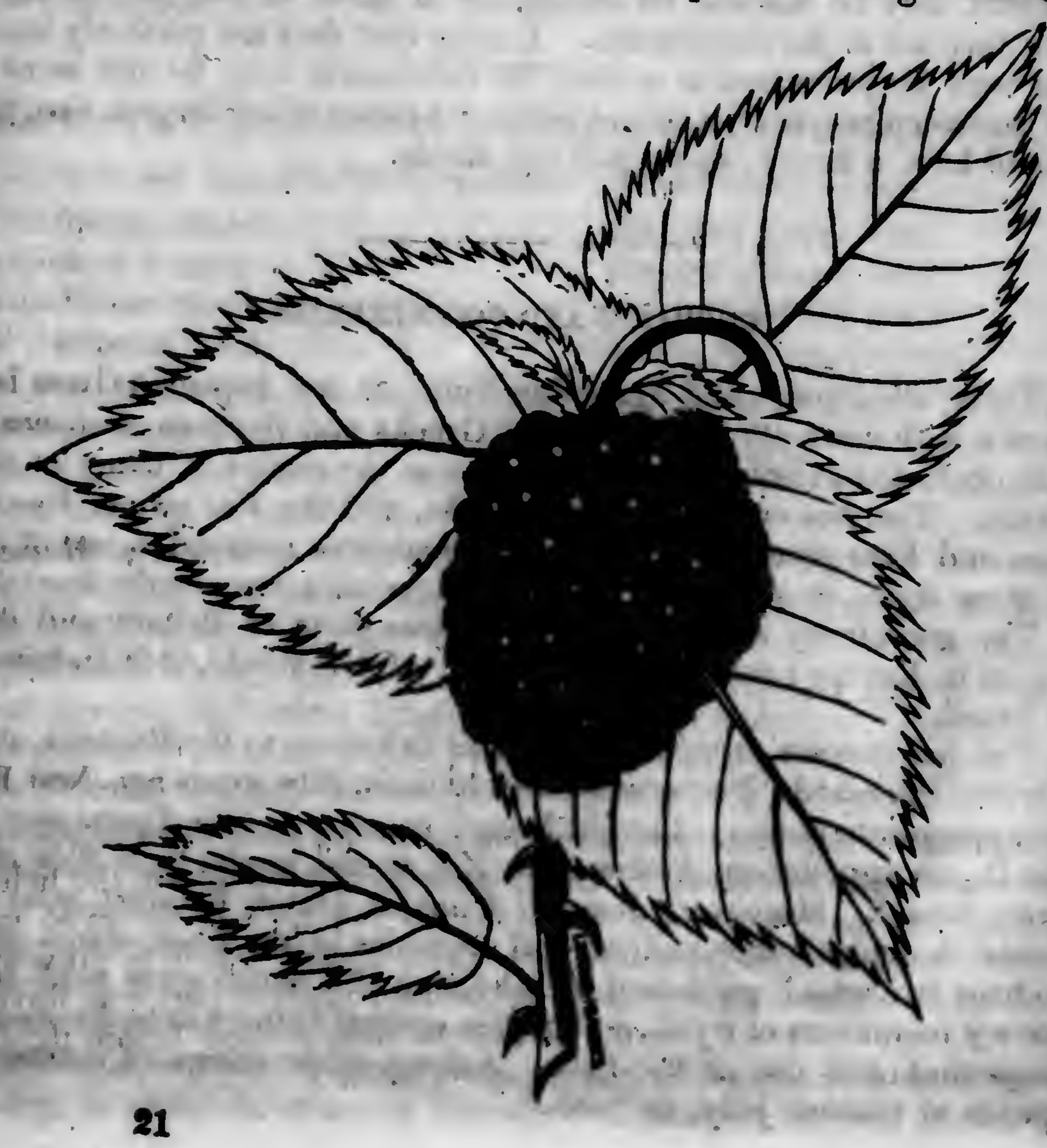
Raspberries are extensively cultivated in the gardens of private gentlemen. But while so many broad margins remain about the fields of our careless farmers, and while in rough localities about us so much waste land exists, there will be no lack of space for them to grow spontaneously. The wild fruit is considered by many superior in flavor to the cultivated. Thus situated, it will be a long time before they can be profitably cultivated by the market gardener.

BLACKBERRIES.

CONDENSED CORRESPONDENCE.

Statement of William Lawton, *of New Rochelle, Westchester county, New York.*

For several years, a new variety has been cultivated in small quantities in this town, which, for the want of a better name, I beg leave to introduce into notice as the "New Rochelle blackberry." I have not been able to ascertain who first discovered the plant, and brought it into garden culture; but am informed that it was found on the roadside, and from thence introduced into the neighboring gardens. I have examined many works with a view to ascertain if there has ever been any improvement on the well known wild varieties, but without success. The "Double-flowering," "Dwarf" or "Dewberry "American Upright," and the "White-fruited," are all that are named. The Dewberry is the first to ripen, and the best-flavored fruit. The White-fruited seems to be cultivated as a novelty, more than for the fruit. The Upright variety fruits late in the season, is of vigorous growth, and under favorable circumstances, produces large mulberry-



shaped berries; but the seeds are not thickly bedded in the pulp, and are so abundant as to impair materially the quality of the fruit.

From the many millions of plants which spring up from seeds, annually distributed in almost every diversity of climate and soil, we should constantly find new varieties; but this plant seems to adhere to its original character with singular tenacity. Improving the wild plant by careful cultivation, is one thing; to produce a new variety, is another. The fruit now before me I believe to be of the last-named character. It is not like the Dewberry, nor long and mulberry-shaped like the Upright blackberry, and the seeds are so completely imbedded in a rich pulp as hardly to be noticed. I think in shape and size it compares very well with the Hovey Seedling strawberry.

The "New Rochelle blackberry" sends up annually large and vigorous upright shoots, with lateral branches; all of which, under common cultivation, will be crowded with fine fruit, a portion of them ripening daily in moist seasons for six weeks. My plants have ripened from the 20th of July until the 15th of August. They are perfectly hardy, always thrifty and productive, and I have not found them liable to blight, or injury by insects.

It will be many years before our citizens generally will be able to procure this fine fruit, as our large hotels and saloons will contract at high prices for all that can be sent to market. But numerous private gardens may be stocked for family use in three or four years, and in their turn aid in the distribution. Except that they are perfectly hardy, and need no protection in winter, the cultivation may be the same as the Antwerp raspberry; but to produce berries of the largest size, they should have a heavy, damp soil and shade.

CURRANTS AND GOOSEBERRIES.

These wholesome and agreeable fruits do not appear to have been known with certainty to the ancient Greeks and Romans, as considerable confusion exists among the writers in the names of many of their plants. The *Isos* or *Oesos* of the Greeks, and the *Vua crispa*, *Vua marina*, and *Vitis precia* of the Romans, doubtless referred to one or both of these fruits, as several of their characteristics are clearly described.

The gooseberry is found wild in various parts of Britain and other places in Europe; and, on the authority of Dr. Royle, it is indigenous to Nepal.

The red currant, it would seem, was unknown to the Romans, as the French, Spaniards, Portuguese, and Italians, fifty years ago, had for it no appropriate name. The old French name, *groseilles d'outre mer*, and the Dutch appellation, *Beskins over Zee*, would imply that they came from abroad. Moreover, Joan. di Cuba, a Dutch botanist, who travelled through Greece and several countries in the East, states in his "Ortus Sanitatis," published in 1485, that this shrub grew wild on the snowy mountains of Syria, and quotes several authors as to the medical properties and use of the fruit. Among other things of interest he speaks of currant jelly, or "rob."

CONDENSED CORRESPONDENCE.

Statement of Chauncey E. Goodrich, *of Utica, Oneida county, New York.*

Gooseberries grow here freely. The requisites for successful culture are a deep rich soil, and extreme pruning, so as to leave the foliage open to the sun and air. Mildew is almost the only drawback to successful culture. I have found its prevention both cheap and easy. It is by thickly sifting fresh warm ashes over the foliage when the flowers first appear in the spring, and again in six or eight days. One application is often effectual, though it is safer to make two. The alkali of the ashes probably prevents the action of some minute insect, or the permeation of fungus, by the one or the other of which suppositions the mildew is to be accounted for. This alkali also becomes a needful aliment to the plant. An ordinary wire seive is the best instrument for applying the ashes. The morning, when the dew is on the bark, is the best season. Careless cultivators may lose all their pains with the gooseberry by neglecting this application at the proper time. The usual price of this fruit is from 6 to 10 cents per quart, when picked green, as it usually is.

Statement of Henry Little, *of Bangor, Penobscot county, Maine.*

Currants are found in every garden. Those mostly used are:

White Dutch,	Knight's Large Red,
Red Dutch,	Knight's Sweet Red,
White Grape,	May's Victoria, (red)
Cherry, (red)	Black Naples, (large.)

The gooseberry thrives well in this State, and is cultivated by many somewhat extensively. It has been imported in large quantities from England, and grows to a very large size. It is not so liable to mildew here as in most other sections. It seems to be designed by nature for a northern climate. I imported to this city the following varieties, which are now cultivated: Red Warrington; Crown Bob; Whitesmith; Green Walnut; Red Champagne; Yellow Champagne; Early Green Hairy; Heart of Oak; Keen's Seedling; Green Gage; White Honey; Rifleman; Bright Venus; Early Sulphur; Yellow Ball; Smiling Beauty; Green Laurel; Lord Crew; Jolly Tar; Large Early White; Sheba Queen; Wellington's Glory; and White Lion.

All the above I consider very good; but there is an American hybrid sort called "Houghton's Seedling," which I prefer to any of the imported varieties, although it has a small berry, but is an immense bearer, uniting more good qualities than any other within my knowledge. I never knew it to mildew in any location. It is very easily multiplied by layers or cuttings—more so than any other.

I have just received a letter from Joseph P. Sinclair, of Levant, near this city, in which he states as follows: "I received at your garden in

the spring of 1848, a gooseberry plant, 'Houghton's Seedling.' In the spring of 1850, I took from the standard bush 24 well-rooted layers; in 1851, 100 layers; in 1852, 300 more; and in 1853, 650 layers. I now have on hand, one year old and new layers, over 1,000 plants well-rooted. I have sold for cash, since 1851, over $50 worth, and have had a good supply of the berry annually." The "Houghton gooseberry" is a great and constant bearer, and does not mildew. The fruit of this variety, when ripe, is extra fine.

CRANBERRIES.

CONDENSED CORRESPONDENCE.

Statement of Chauncey E. Goodrich, *of Utica, Oneida county, New York.*

Cranberries have not been cultivated here with any encouraging success. In the spring of 1850, I procured plants from the south shore of Long Island, and with much difficulty raised plants from the seeds of the ordinary fruit sold in market. Plants derived from both these sources were cultivated on swamp muck, moderately drained, on swamp clay that was usually moist, and on moist sand on a springy hill-side. They grew well in all these localities, and fruited, except the clay, from which they were removed too early—that is, before the bearing season in the second year. The cost of cultivation, however, forbids its continuation on the score of economy; for so delicate is the plant, and so great the difficulty of rearing it, that the cultivator is discouraged. The assertion that the cranberry once planted in soil divested of its bushes and large herbage will take undisputed possession of the soil, is not true in my experience, although there doubtless exist lands so poor that such a result would follow.

There are at least two localities in this county where the cranberry grows spontaneously, on swamp lands, in small quantities. Much, probably, might be done to improve wet or humid situations by cutting out brush and coarse grass, and by graduating the flow of water. The latter might in many cases be accomplished by artificial sluices at the outlets of swamps. In future years, when our population shall have greatly increased, and our wild lands proportionally decreased in quantity, such modes will doubtless be resorted to. Whether search in natural localities and reproduction from seed will ever bring to light new varieties, adapted by constitution to at least a dry soil, and fitted by strong and somewhat upright herbage to cultivation with the hoe, I cannot say. Report did indeed speak of such discoveries a few years ago; but I have never seen the proof. The whole range of vegetation scarcely affords the parallel of a vegetable so humble in appearance, and producing in many natural localities, spontaneously and abundantly,

a fruit at once so worthless as a nutriment, and yet so pleasantly contributing to human comfort, as the cranberry. Its more general and cheap culture ought certainly to command the attention of shrewd men.

MELONS.

The history of the *watermelon*, so much esteemed for its sweet, delicious, and cooling juice, as well as that of the *muskmelon*, or *canteleup*, which is equally prized for its rich aromatic pulp, may be traced back to remote antiquity. The former, which is generally considered as the melon of the Jews, mentioned in various places in the Bible, is believed to have originated in Egypt or Southern India, where it has been cultivated from time immemorial. It would appear that it was unknown to the ancient Greeks and Romans, as no definite information respecting it can be gleaned from their authors. The muskmelon, which is represented to have been a native of Asia, was known to the Greek and Roman physicians, and its properties and uses described by them at length.

The kind of muskmelon most esteemed among amateurs in various parts of Europe, and described, is the "Canteleup," so called from a place about fourteen miles from Rome, the country seat of the Pope, where this fruit has long been cultivated. This variety is stated to have been brought thither from that part of Armenia which borders on Persia, where it grows in the greatest perfection and abundance. The flesh of this melon, when fully matured, is delicious, and may be eaten with safety, without injury to the dyspeptic or those of the weakest stomachs. The form of canteleups is generally roundish, with a rough, warty, or netted outer rind, or skin. The size of the plant is rather small, and the flesh for the most part of a yellowish color, though with some it is green.

CONDENSED CORRESPONDENCE.

Statement of Heman Powers, *of Lewiston, Niagara county, New York.*

For two years past, my method of cultivating melons has been, first to plant the seed on inverted sods of good thickness and size, in a hot-bed, in the month of April, and transplant them, sod and all, early in June. In this way the plants will take an early start, and are removed to the garden or field without retarding their growth by disturbing the roots.

In a similar manner, cucumbers, tomatoes, or other plants, may be accelerated in their growth several weeks.

Statement of CHAUNCEY E. GOODRICH, *of Utica, Oneida county, New York.*

The Green-fleshed variety of melon usually matures well here, if planted in hot-beds about the 15th of April, and carefully removed to the open ground the 10th of June. This is the most economical plan for the market gardener. The private gentleman, however, should make a small hot-bed for each hill, much earlier, from which the plants should never be removed. The melon may always be plucked in seventeen weeks after planting, with proper culture and the ordinary season. In a long, dry, and warm season, this edible fruit may often be finally matured here in perfectly open culture. This melon, as produced here, is said by travellers to be superior to those usually seen in the West Indies, or on the coast of South America. This is obviously due to superior culture, and not to soil and climate.

Considering that the melon may be so readily and cheaply raised in this climate, and that its best varieties are equal or superior to the peach, which cannot be produced here, it seems very desirable that it should be more generally cultivated, especially that it should supplant the old "Yellow Muskmelon." It should be generally known that surplus plants of this melon when pulled out of the hill, carelessly even, may be transplanted almost with the safety and certainty of cabbage-plants. Great care in sheltering the plant until it roots again, is of course needful. This part I have often verified. Cucumbers may be similarly transplanted; but, unlike the melon, they subsequently thrive slowly, and fruit very late. Our August market is flooded with this melon, brought from New Jersey; but it is never good, being necessarily picked prematurely, and bruised in transportation.

Our watermelons have a tender foliage, which is more readily destroyed by cold and wet weather than that of the Green-fleshed melon, which attains a large size, often exceeding 30 pounds. The best mode for open culture is to plant directly upon fresh green sward, recently inverted by the plough. I have twice raised heavy crops of late years in this way, at a very trivial expense. The culture in this case is of the simplest kind. The great discouragement with us in the culture of this melon, is the earliness and cheapness with which it is brought from the South.

CLIMATOLOGY.

U. S. PATENT OFFICE, *June* 19, 1854.

SIR: We should be glad to append to the Agricultural Report of the Patent Office, about to be published, a paper on the climatology of the United States, compared with that of Europe and other parts of the world, as far as practicable.

Such a paper is understood to be in existence; but as some of its most important materials, so far as regards American climatology, have been collected through the instrumentality of the Smithsonian Institution, they ought first to be given to the world through the reports of that Institution.

In view, however, of the great benefits that would result from an early publication of the above-mentioned paper in our report, I am induced to request of you the special favor of allowing it to be thus published, in anticipation of the appearance of those materials among the proceedings of the Smithsonian Institution.

I hope you will feel that a greater amount of benefit will thus be conferred upon the public than by delaying the publication till some subsequent period, which, I trust, will be a sufficient reason for granting this request.

Yours truly,
CHARLES MASON, *Commissioner.*

Prof. JOSEPH HENRY,
Secretary of the Smithsonian Institution,
Washington, D. C.

SMITHSONIAN INSTITUTION,
June 21, 1854.

SIR: The meteorological materials mentioned in your letter of the 19th instant were collected under the direction of the Smithsonian Institution, the board of Regents of the University of the State of New York, and the Medical Bureau of the army of the United States; and, in consideration of the claims of these parties, they ought first to be published in a general report under their sanction.

It is only in this way that due credit can be secured to all the institutions and individuals who have contributed to the collection; but, since the paper you mention has been prepared, and you propose to give it an immediate and wide circulation through the Report of the Patent Office, I do not consider myself at liberty, in behalf of the parties interested, to object to its publication.

I have the honor to remain, very respectfully, your obedient servant,
JOSEPH HENRY,
Secretary of the Smithsonian Institution.

Hon. CHARLES MASON,
Commissioner of Patents.

AGRICULTURAL CLIMATOLOGY OF THE UNITED STATES COMPARED WITH THAT OF OTHER PARTS OF THE GLOBE.

BY LORIN BLODGET.

The purpose in which this sketch of agricultural climatology was undertaken, was a doubtful or contingent one, designed to occupy such space only as should be found convenient to assign to the subject in connexion with the regular report of the agricultural department of the Patent Office. But in the preparation of the matter it was found better to take a more general view of the peculiar characteristics of American agricultural climatology as a preliminary step, and to make some general comparisons as a basis for treating any specific branch satisfactorily. A hasty general sketch and comparison of this with the Eastern continent was thus entered upon, and although now falling far short of the completeness desirable on that point, it is sufficiently complete, perhaps, for the purposes subsequently considered.

In entering upon a specific climatology, also, the basis of comparison appeared quite imperfect as found in other climatologies. The temperature measures indicated as the limits of, or as the more favorable conditions for, particular plants are frequently quite inapplicable to our own climate, and they are evidently quite vague even for Europe. Each seemed to deserve a new discussion by the aid of the light a new continent could throw on these more fixed relations; and though the labor of completing these several discussions was quite too great for the present time and place, some approach to that thorough treatment seemed necessary if an intelligible statement were made at all in this connexion. The statistics have therefore been employed in this direct association with some special single illustration, or some particular staple, and they have been made as fully illustrative of that particular point as was both possible and desirable.

In such a plan many products and many features of an agricultural climatology must remain unnoticed, unless considerable space be given the work. For the space available here, it seemed better to take the more prominent staples of cultivation, and the more prominent points in such a climatology, and treat them somewhat at length. Subsequently, opportunity may offer for extending and completing the analysis, if the present mode shall be found adapted to its purpose as far as it may go.

General character of the climate of the United States east of the Rocky Mountains, and its comparison with the climates, of the same latitudes, of the Eastern continent.

The principal conditions of climate, or those of temperature and amount of rain at least, have been very fully and accurately observed in the United States for a considerable period. For the time of its occupation, indeed, no country has been more fully observed, as all definite instrumental observation dates only from quite recent times. The mercurial thermometer was first introduced in 1720, and it was probably invented near that date, though some writers have referred to its use a few years earlier.* Some years still earlier, the spirit thermometer was employed with a rude measure of accuracy, and for some of the dates about 1720, it is difficult to say which instrument was in use. The best series of thermometrical observations in Europe begin some years later, or about 1730, and one only at the date here given, that at Berlin in 1719. In the United States, the earliest recorded observations were at Charleston in 1738, but this record embraces only brief and detached periods of a few years each. At Cambridge, the first was in 1742, and valuable summaries embrace the whole subsequent period, with detailed means for the several months and years from 1770. At Philadelphia, the earliest that remain were in 1748–49, recommencing in 1758, and but little interrupted from that time forward. At Williamsburg, Virginia, observations commence in 1776, and embrace some valuable series, though not quite continuous from that date.

Generally, every important portion of the country possesses comparable series for the last thirty years, and there are several continuous series, not named above, of more than forty years.

Our climatology in temperature may, therefore, be quite complete for the period of our occupation of the territory, and we may adapt its results more directly to our want in the various requirements of practical knowledge of climate than has ever been done in Europe. Long and wasteful processes of experimenting upon the adaptation of climate to the various requirements of civilized life, were undergone by all the nations of the Old World in the course of the changes through which they have passed in emerging from barbarism. On the contrary, we may occupy a vast continent with definite measures of every condition of its climate at hand, and with full knowledge of the climatic requirement of the cultivation or the animal life we would introduce.

Precise determinations came last in Europe, or after experiment had decided what was practicable and what was not. Here we may use the known relations of climate to cultivation and animal life, as experiment and science have both determined them there, in entering upon the occupation of new districts, and in deciding what to attempt and what to avoid. For the first century, or perhaps more, of occupation by colonies in America, the losses and disasters were immense from this want of definite knowledge of the capacities and deficiencies of climate. They have continued to some extent until the present time, but they may now wholly cease, if we will but use the materials we have at hand.

In the outline of comparative climatology here proposed, it is designed to present the more striking facts and results of this description, and to show what precise conditions of climate have been found, in our

*The mercurial thermometer was used by the Italian philosopher Renaldini, as early as 1694, who proposed the method of graduating the instrument between the freezing and boiling points of water. The mercurial thermometer was also used by Roëmer, of Dantzic, before the year 1709. D. J. B.

new and brief experience, to be definitely favorable or unfavorable to particular products. Placing the definite measures of temperature and amount of rain in connexion with known success or failure of any cultivated staple, we may apply the comparisons directly in many cases here. We may designate anomalies also, and the divergence from the results in other countries, which may be due to peculiarities of our own climate, and the result may indicate new fields for some existing cultivation perhaps, or effect the introduction of what is elsewhere impossible.

The mode of procedure in this illustration will be, first to compare the climates of the temperate latitudes of the two continents generally in regard to the conditions of temperature and amount of rain. In this connexion, the characteristic differences will be particularly compared; and in respect to these, it is unimportant whether the distinguishing characteristics of the climates of this continent are regarded as anomalies or not. We possess conditions quite anomalous in regard to Europe, but it is not determined that the climates of Europe are more truly normal than our own; that is, that they are such as more properly belong to their latitude, considering the earth as a whole. In the introduction of European cultivation, we should, of course, retain that general basis of comparison; but America has added largely of indigenous plants to the list of cultivated staples, and has also developed singularly favorable conditions for the extension of the range of natives of the Old World.

With the general comparison proposed, or following it in the order of the more considerable products, specific comparisons for several important staples of cultivation will be given, selecting those to which such comparison would add illustrations of the greatest practical value. It is not anticipated that these will be complete or prove decisive in every case, but they can scarcely fail to be illustrative, and to assist those whose direct interest is concerned in their cultivation. A precise climatology of vegetable and animal life, which would embrace everything entering largely into the uses and requirements of civilized nations, is exceedingly desirable; but our material of observation and experiment is not yet sufficiently abundant, nor is the elasticity and power of acclimation of the several plants and animals determined within a sufficiently near approximation.

The principal results anticipated in the present case, therefore, are the indications of obvious and unmistakable relations; new, because they are developed in a new and partially occupied country, and becoming obvious by the application of instrumental tests and direct comparison with known results elsewhere.

The eastern half of the territory of the United States occupies a peculiar area in respect to some of the more important conditions of climate. A distinguishing feature is the great range of temperature in the annual changes, both in the means for the several months, and in the single non-periodic extremes. This last range has also its maximum at the most important periods of the year in the growth of plants affected by such extremes, thus exaggerating the measure of effect somewhat beyond that which would be apparent in the mere statement of its measure. The curve of horary variation of temperature is less abrupt than the monthly curve; yet greater by a considerable measure than would occur in connexion with the same mean temperatures in Europe.

In comparison with Europe, we have a tropical summer and a high northern winter; and the capacity of our climate for vegetable growths, or particularly for animals, ranges through all climates, from tropical to extreme north temperate, for almost the same districts. The peculiar staples which attain the highest perfection here differ, therefore, from those of any other continenal area, and embrace in the same localities those which are elsewhere widely separated, and appear only in distinct climates.

From this general semi-tropical summer we find peculiar developments of natives and acclimated products. The characteristic class is, in every instance, of sudden growth, exuberant, prolific; developing tropical characteristics in the preponderance of saccharine nutritive elements, and great perfection of essential oils and narcotic qualities.

Indian corn, cotton, tobacco, cane, &c., which are elsewhere tropical, or are natives of tropical regions, have a large range here; and two of these, indeed, may be cultivated successfully to the fiftieth parallel of latitude, or much beyond our northern boundary. Hemp, the vine, peach, &c., are similar in their requirements, and in their unusual range in our climates. A slight attention to the general character of these characteristic growths will show our climates to be singular in their capacity. The comparisons with other districts in similar latitudes, or with similar temperatures, on the Eastern continent, must be made in view of this general character, and with careful distinctions of correspondence, or want of correspondence, in this respect, for each district.

Next to temperature, *humidity* and *distribution of rain* are controlling in their influence upon our climate, and the United States are signally distinguished from other continental areas in temperate latitudes in respect to these conditions. The amount of precipitation is very great, and greatest in summer, increasing the thermal effect much beyond that which the same air temperatures would produce in arid districts. This relation of the precipitation to the temperature in respect to seasons, holds true in the comparison of districts also; those of the highest temperature having, as a rule, the greatest amount of rain. The distribution among the months affecting annual growths and staple cultivation is, however, practically nearly equal; the greater amount in the warmest months scarcely rendering the general humidity equal to that of the cooler months affecting cultivation. With a certain limit in non-periodic extremes the mean distribution of rain presents the most extraordinarily favorable conditions for vegetable production, and almost precisely corresponds to the advantages in temperature.

Before proceeding further with the peculiar features of the climate of this portion of the continent, some tabular statements may be given, illustrating this contrast in the monthly range of temperature as compared with Europe. The comparison of mean temperatures for each of the months should be given in this tabular statement, as our common comparisons are with the temperatures for the colder months and the annual mean. It will be found that in summer much of the excess of heat in the same latitudes in Europe disappears, and that we approach much nearer to their measure of heat for that season than is usually supposed.

Temperatures of the North American continent in temperate latitudes.

Places.	Latitude	No. y'rs.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.	Spring.	Summer	Autumn	Winter.	Year.
Albion Mines, N. S.	45° 34′	10	18.8	19.4	27.1	37.3	46.5	58.3	66.1	65.6	56.3	46.5	36.0	23.7	37.6	63.3	46.3	20.6	42.9
Quebec	46 49	10	9.9	12.8	24.4	38.7	52.9	63.7	66.8	65.5	56.2	44.1	31.5	17.3	38.6	65.3	44.0	13.3	40.3
Montreal	45 31	27	15.0	17.5	29.4	43.5	58.1	68.4	73.1	70.6	60.6	46.5	33.7	19.1	43.7	70.8	46.9	17.2	44.6
Castine, Me.	44 23	40	21.4	22.5	30.4	41.4	50.3	59.4	64.8	64.7	58.4	48.4	38.0	25.6	40.7	62.0	43.3	23.2	43.4
Portsmouth, N. H.	43 04	17	25.1	25.4	33.4	42.3	52.0	61.3	66.6	65.0	56.9	49.8	38.3	27.0	42.6	64.3	49.0	25.8	45.2
Burlington, Vt.	44 27	18	20.5	20.8	30.9	42.0	54.9	64.7	69.4	68.1	59.5	47.3	35.9	23.9	42.6	67.4	47.8	21.8	44.6
Salem, Mass.	42 31	43	25.6	27.7	35.4	46.0	56.8	67.2	72.5	70.5	63.0	51.3	40.0	30.3	46.1	70.1	51.4	27.9	48.9
Boston, Mass.	42 21	26	27.8	27.9	36.2	46.4	58.5	66.2	71.6	69.4	62.2	51.5	41.0	31.1	46.3	69.1	51.6	28.9	48.9
New Bedford, Mass.	41 38	41	28.6	29.0	35.6	44.6	54.2	63.7	69.3	68.2	61.8	51.9	41.9	32.3	44.8	67.1	51.0	30.0	48.4
Providence, R. I.	41 49	21	26.5	28.8	34.8	44.8	55.5	65.3	72.7	68.6	60.7	50.3	39.1	30.1	45.0	68.9	50.9	28.5	48.1
New York, N. Y.	40 42	30	30.2	30.8	38.5	49.1	59.6	69.1	74.9	73.3	65.9	54.3	43.5	33.9	49.1	72.5	54.6	31.6	51.9
Albany, N. Y.	42 39	22	24.5	24.3	34.8	47.7	59.8	62.0	72.2	70.3	61.4	49.2	39.4	28.3	47.4	70.2	50.6	25.7	48.3
Rochester, N. Y.	43 45	18	26.1	25.8	33.0	45.8	56.9	64.5	69.7	67.8	60.1	47.7	38.2	26.8	45.0	67.3	48.7	26.9	47.0
Toronto, C. W.	43 39	13	22.9	24.3	30.8	41.4	51.8	61.1	66.3	65.6	57.3	44.9	36.3	27.0	41.7	64.3	46.2	24.7	44.2
Philadelphia, Pa.	39 57	57	30.8	29.4	38.1	51.1	62.9	71.5	75.2	72.4	65.9	53.9	42.3	31.2	50.7	73.0	54.0	30.5	52.1
Baltimore, Md.	39 17	22	33.1	34.3	42.4	53.0	63.2	71.6	76.6	74.5	67.7	55.8	45.0	37.8	52.9	74.3	56.1	34.4	54.4
Norfolk, Va.	37 02	25	40.5	41.0	47.5	56.1	65.9	74.2	78.3	77.1	71.4	61.7	51.2	43.2	56.5	76.5	61.5	41.5	59.0
Charleston, S. C.	32 42	20	50.4	51.7	58.3	65.0	72.8	78.5	81.3	80.3	76.1	67.2	59.0	51.2	65.4	80.1	67.5	51.1	66.0
Savannah, Ga.	32 05	11	52.6	54.7	60.0	68.4	74.8	79.4	81.3	80.6	76.9	67.2	58.3	52.2	67.7	80.4	67.5	53.0	67.2
Key West, Fla.	24 33	9	70.0	70.7	73.8	76.3	80.2	82.1	83.3	83.5	82.5	79.1	75.6	72.8	76.8	83.0	79.1	71.2	77.5
Mobile, Ala.	30 40	10	51.3	53.7	59.4	67.1	74.1	77.8	79.8	79.4	76.1	65.7	57.0	52.3	66.9	79.0	66.3	52.4	66.1
New Orleans, La.	30 00	18	54.8	54.5	61.5	67.6	74.0	78.6	80.4	79.6	77.1	69.1	57.5	56.2	67.7	79.5	67.9	55.2	67.6
Fort Gibson, C. N.	35 40	25	40.8	42.6	52.4	62.6	69.8	76.1	80.4	80.2	73.4	61.3	49.9	40.8	61.6	78.9	61.5	41.4	60.8
St. Louis, Mo.	38 37	16	33.2	34.9	44.3	59.0	66.3	73.8	78.4	76.3	68.1	54.9	40.1	33.8	56.5	76.2	54.4	34.0	55.6
Cincinnati, Ohio	39 06	16	33.5	34.1	43.4	54.5	63.5	71.1	76.3	73.7	65.5	53.0	42.3	33.8	53.8	73.7	53.6	33.8	53.7
Marietta, Ohio	39 25	24	32.2	34.1	42.6	53.0	61.8	69.2	72.7	70.9	63.5	51.8	42.6	34.7	52.5	70.9	52.6	33.7	52.4
Fort Gratiot, Mich.	42 55	17	25.5	25.1	33.0	44.4	53.9	63.6	69.4	67.6	60.5	47.7	38.0	27.9	43.8	66.9	48.7	26.2	46.4
Green Bay, Wis.	44 40	23	18.9	20.6	31.4	43.0	57.7	66.6	71.3	67.9	57.2	46.5	36.7	20.8	44.0	68.6	46.8	20.1	44.9
Fort Snelling, M. T.	44 58	30	15.9	18.5	30.7	46.5	59.0	68.0	73.5	69.8	58.7	46.8	31.9	17.2	45.4	70.4	40.8	16.9	44.6
Sault Ste. Marie, Mich.	46 29	21	17.4	16.7	25.7	38.5	49.5	59.5	65.1	63.9	54.0	43.7	32.8	21.3	37.9	69.6	43.5	18.5	40.9
Pembina, M. T.	49 00	1	......	......	18.9	31.0	53.7	......	74.4	69.0	......	......	21.7	5.4	31.0	......	......	......	......
Fort Kearney, M. T.	40 40	4	20.6	25.9	35.9	44.3	59.6	68.4	73.9	71.6	64.8	50.8	33.8	18.5	46.6	71.3	49.8	21.6	47.3
Fort Laramie, M. T.	42 12	3½	31.2	33.5	35.5	44.5	56.1	67.1	75.1	73.1	64.3	49.8	32.7	23.8	45.4	71.8	48.9	29.5	48.9
Brownsville, Texas	25 57	3½	59.5	66.9	69.4	74.5	78.9	80.8	83.3	84.6	80.4	73.9	66.9	60.9	74.2	82.9	73.7	62.4	73.3
San Antonio, Texas	29 25	3½	52.7	57.9	65.5	69.7	76.4	80.5	82.3	83.8	79.9	72.2	62.2	52.1	70.5	82.2	71.4	54.2	69.6
Fort Fillmore, El Paso, N. M.	32 03	1½	41.7	49.8	52.9	60.3	68.0	78.5	82.5	80.1	77.9	60.0	46.9	43.1	60.4	80.4	61.6	44.9	61.8
Santa Fé, N. M.	35 41	6	34.8	35.7	44.7	54.0	66.9	72.5	75.3	72.9	68.3	58.8	37.8	29.7	55.2	73.6	51.0	33.4	53.3
Fort Yuma, N. M.	32 43	1	54.4	53.1	62.6	72.9	......	87.7	89.5	88.7	84.6	74.0	61.8	53.9	......	88.6	73.1	53.6	72.2
San Diego, Cal.	32 41	2 2-12	52.7	54.4	55.3	59.1	61.9	66.1	70.7	74.6	73.0	65.9	57.0	51.6	58.8	70.3	65.3	52.2	61.6
San Joaquin, Cal.	37 40	1 5-12	49.3	57.4	56.6	65.5	74.9	88.5	......	82.9	78.1	67.1	56.6	49.7	65.7	86.6	67.3	52.1	67.8
San Francisco, Cal.	37 48	1 2-12	50.1	51.0	53.8	57.7	55.9	58.8	57.9	62.2	61.6	61.9	56.2	50.0	55.9	59.6	59.9	50.4	56.4
Monterey, Cal.	36 37	4	53.2	50.9	52.4	53.7	55.7	56.0	58.4	58.4	59.8	58.5	54.5	51.8	53.9	56.3	57.6	52.0	55.4
Fort Ross, Cal.	38 35	4	47.2	48.0	49.9	51.3	55.3	56.9	57.9	58.4	56.0	53.4	50.2	48.9	52.2	57.7	53.1	48.0	52.8
Salt Lake, Utah	40 46	7-12	28.3	30.5	34.3	45.4	64.7	71.2	80.5	......	......	......	......	......	48.1	......	......	......	......
Oregon City, Oregon	45 20	3	39.6	42.0	45.2	55.9	60.9	66.3	72.3	71.9	61.2	55.8	47.2	39.1	54.0	70.2	54.4	40.2	54.7
Steilacoom, Oregon	47 07	3 2-12	40.1	41.3	41.8	48.6	56.3	61.3	64.4	64.6	56.4	52.2	46.5	36.7	48.9	63.4	51.7	39.4	50.6
Sitka, Russian America	57 03	10	35.7	36.3	39.7	45.1	48.8	54.9	58.5	59.0	53.9	48.5	40.8	34.5	44.5	57.5	47.0	36.5	46.4

Temperatures of the Eastern continent in temperate latitudes.

Places.	Latitude.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Catania, Sicily	37° 30′	6	54.7	55.6	58.1	60.4	71.0	76.5	81.7	84.2	77.8	70.1	63.7	57.3	63.2	80.8	70.5	55.9	67.6
Naples, Italy	40 52	13	46.2	47.6	51.1	56.7	64.8	70.8	76.1	76.2	69.3	61.9	53.1	49.1	57.5	74.4	61.4	47.6	60.2
Rome, Italy	41 54	20	45.0	47,3	51.6	57.8	65.2	71.1	75.9	75.6	70.1	64.8	53.4	47.8	58.2	74.2	62.7	46.7	60.5
Venice, Italy	45 26	20	36.3	38.9	46.1	54.7	63.4	70.4	75.1	73.7	66.2	56.6	44.6	39.9	54.7	73.0	55.8	38.0	55.4
Milan, Italy	45 28	56	33.2	36.3	45.9	54.6	64.1	70.6	74.7	73.5	66.4	56.9	47.1	36.5	54.8	73.0	56.8	36.0	55.2
Cadiz, Spain	36 32	2	51.4	53.7	55.2	59.6	63.7	68.1	70.2	72.8	70.2	67.1	58.8	53.6	59.5	70.4	65.3	52.9	62.0
Lisbon, Portugal	38 42	5	52.5	53.6	56.3	59.0	63.6	69.4	72.1	71.2	69.4	62.6	55.4	51.4	59.6	70.9	62.5	52.5	61.4
Madrid, Spain	40 25	2	42.4	44.4	48.2	55.6	63.1	71.9	78.2	78.9	68.0	56.5	47.8	42.6	55.6	76.4	57.4	43.1	58.1
Funchal, Madeira	32 37	2	60.2	61.1	63.4	65.4	67.9	69.4	71.7	72.8	72.1	69.5	65.4	64.2	65.6	71.3	69.0	61.8	66.9
Marseilles, France	43 18	5	43.2	45.4	48.4	56.1	63.2	71.0	75.9	71.9	68.7	58.7	50.2	47.1	55.9	72.9	59.2	45.2	58.3
Bordeaux, France	44 50	10	41.0	45.0	51.3	56.1	60.8	66.9	73.1	73.2	67.1	58.1	48.4	43.2	56.1	71.1	57.9	43.1	57.0
Dijon, E. France	47 19	7	33.6	36.7	48.2	51.1	60.6	66.0	70.2	72.5	62.4	53.8	43.7	35.8	53.3	69.6	53.3	35.4	53.0
Geneva, Switzerland	46 12	30	31.0	36.2*	42.6	51.7	62.2	67.5	71.7	71.7	65.1	53.9	43.7	34.8	52.2	70.3	54.2	34.0	52.7
Strasburg, France	48 35	32	31.0	35.9	41.9	49.7	58.2	62.6	65.8	65.1	58.7	50.0	41.1	35.7	49.9	64.5	50.0	34.2	49.7
Manheim, Rhine, Germany	49 29	8	33.3	35.6	40.2	50.7	59.5	67.2	68.8	66.3	61.8	49.3	38.7	31.9	50.1	67.4	50.0	33.6	50.3
Munich, Germany	48 08	25	29.6	33.0	41.2	46.9	57.6	62.1	64.7	64.1	58.1	49.2	39.0	34.9	48.5	63.6	48.8	32.5	48.4
Vienna, Austria	48 13	60	29.3	33 5	40.8	51.8	62.1	67.5	70.7	69.9	61.9	51.2	40.3	33.0	51.6	69.4	51.1	31.9	51.0
Berlin, Prussia	52 31	24	27.7	31.6	38.1	47.4	56.5	63.3	65.8	64.4	58.4	49.9	39.3	34.9	47.4	64.5	49.2	31.4	48.1
Bremen, N. Germany	53 05	12	29.5	34.1	39.1	46.2	55.9	61.9	64.6	63.3	57.7	50.1	39.1	35.6	47.1	63.3	49.0	33.1	48.1
Amsterdam, Holland	52 23	19	33.2	36.8	40.7	48.1	55.7	62.5	65.3	65.3	60.6	51.1	41.9	36.9	48.2	64.4	51.2	35.6	49.8
Paris, N. France	48 50	39	35.4	39.5	44.0	49.7	58.1	62.7	65.6	65.3	60.1	52.2	44.1	38.5	50.6	64.5	52.2	37.6	51.3
London	51 31	65	37.2	40.1	42.5	46.9	53.5	60.5	62.4	62.1	58.1	50.7	45.0	40.4	47.6	61.7	51.3	39.2	49.7
Dublin	53 20	17	39.2	40.7	43.2	48.0	54.3	60.2	61.4	61.4	56.4	50.0	43.7	42.0	48.5	61.0	50.0	40.6	50.0
Aberdeen	57 09	8	37.8	39.0	42.8	47.5	54.3	58.5	60.4	59.6	56.7	49.9	43.2	40.1	48.2	59.5	49.9	39.0	49.2
Edinburg	55 57	17	37.3	38.2	40.5	44.1	50.3	56.0	58.7	56.8	53.4	48.8	41.4	39.7	45.0	57.1	47.9	38.4	47.1
Stockholm	59 21	50	24.3	26.6	29.6	38.7	48.2	57.0	63.4	60.8	53.6	44.2	35.3	27.1	38.2	60.4	44.4	26.0	42.3
St. Petersburg	59 56	13	14.7	18.7	25.5	37.1	48.5	59.9	63.9	61.1	51.3	41.3	30.4	22.5	37.0	61.7	41.0	18.6	39.6
Moscow, Central Russia	55 45	21	13.5	16.0	26.7	41.7	54.4	62.4	66.4	63.1	53.2	39.5	27.1	16.0	40.9	63.9	39.9	15.2	40.0
Catherinoslav, S. Russia	48 20	10	16.2	20.9	32.7	46.7	60.2	68.4	72.8	69.5	61.5	48.3	36.3	21.7	46.5	70.3	48.7	19.6	46.3
Odessa, S. Russia	46 29	9	25.6	29.7	34.2	46.4	57.6	66.2	73.1	70.7	59.6	52.4	39.4	33.3	46.1	70.0	50.5	29.5	49.0
Constantinople	41 00	4	40.5	42.5	46.5	54.2	62.7	71.6	75.6	75.6	67.7	64.4	51.9	42.5	54.5	74.3	61.3	41.8	58.0
Jerusalem	31 47	1	47.7	53·7	60.0	64.7	66.8	71.7	77.3	72.5	72.2	68.4	58.9	47.4	63.8	73.8	66.5	49.6	63.4
Teflis, Caucasus	41 41	5	31.7	37.0	45.0	54.7	63.7	68.9	75.8	75.4	66.4	57.5	44.8	38.0	54.4	73.4	56.2	35.6	54.9
Astrachan, Caspian Sea	46 21	(?) 5	12.6	20.9	35.8	52.4	69.6	73.2	76.9	77.6	68.3	50.1	38.8	23.9	52.6	75.9	52.4	19.2	50.0
Barnaoul, Central Asia	53 20	6	—5.6	4.3	9.2	33.3	50.7	61.7	67.5	60.3	47.5	35.6	13.5	0.3	31.1	63.2	31.5	—0.3	31.4
Pekin, China	40 00	3	25.9	39.8	43.1	56.2	67.3	74.6	78.8	76.9	67.8	53.9	41.9	29.4	55.6	76.8	54.5	29.4	54.1
Canton, China	23 08	10	52.5	55.0	62.5	70.0	77.0	81.0	83.0	82.0	80.0	73.3	65.2	57.1	69.8	82.0	72.8	54.2	69.9
Nangasaki, Japan	32 45	4	43.4	44.0	50.4	61.0	69.0	77.1	80.2	83.2	78.0	66.5	53.2	47.2	60.1	80.2	65.9	44.9	62.8

The two tables give the mean temperatures of all important climates in the north temperate latitudes of both continents. The stations on the Eastern continent give successive series in different longitudes or groups of comparable districts. Catania, in Sicily, is more nearly than any other an exceptional locality, and scarcely the representative of any considerable district. It gives much the highest temperatures observed in Europe. Naples and Rome are strikingly like Philadelphia and Cincinnati in their summer temperatures, and do not differ largely in latitude. Fort Madison, in Iowa, differing but about one degree of latitude from Rome, has almost precisely the same temperature for the three summer months.

Cadiz and Madrid do not exceed the summer temperatures of the same latitudes in our own interior. Marseilles is on the tropical side of the Alps, yet its contrast is only equal to three degrees of latitude.

Bordeaux, in the southern wine district of France, has its summer temperatures exceeded at Fort Snelling, in the same latitude, and at Montreal, one degree further north. Burlington, Vermont, in nearly the same latitude, has the same temperature for the three summer months. Geneva and Vienna are repeated at Montreal and Burlington, differing but one degree in one case and three degrees in the other from correspondence of latitude.

Strasburg, Paris, Berlin, and all the northern plain of Western Europe, give nearly the same measures for the three summer months, and all fall below Quebec at 47° of latitude, and Fort Union, of the Missouri, at 48°. The range of these mean temperatures for the three months falls very little below the corresponding latitudes in the St. Lawrence valley, and on the Saskatchawan, in British America.

The summer temperatures for the British Islands are all below the range for the same months in any part of the United States, except the immediate coast of the Pacific. There the means for the summer months are repeated with little change through twenty-three degrees of latitude, or from Santa Barbara, of California, to Sitka, in Russian America, 34° to 57° north. There is no portion of the continent eastward in which the winter temperature is such as to render it habitable where the summer temperature falls so low, except the remote locality of St. Johns, Newfoundland.

Stockholm and St. Petersburgh have a higher temperature than the group just mentioned, and are in three or four degrees higher latitude. They have no parallel on this continent.

In Eastern Europe and Asia the comparisons become again instructive. Constantinople is quite the parallel of Baltimore in temperature for the summer; the six warmer months giving almost precisely the same measures. The difference of latitude is but one degree and forty minutes. Odessa, at the southern border of the great grain-growing district of Southern Russia, compares very nearly with Rochester, Albany, and Boston, for each month, and for the whole year; and, for the first of the European list, reproduces the temperature curves and general climate of the eastern United States. Catherinoslav, in the centre of this grain district, north of Odessa, most resembles Montreal, northern Wisconsin, and Fort Snelling.

For the interior of Russia, at Barnaoul, and the Caspian Sea, at Astrachan, we have no parallel, though the valley of the Great Salt Lake approaches nearest the summer temperatures of Astrachan; the Asiatic interior being much colder in winter. The contrasts in elevation in these cases between the districts corresponding in latitude and temperature render comparison impossible.

On the great area of the Chinese empire, however, we have general physical conditions so far analogous to those of the United States, that such comparisons as the few observations there enable us to make should be direct and instructive.

Pekin, in 40° north latitude, differs from Philadelphia, Marietta, and other places in the same latitudes here, in its lower winter and higher summer temperatures—the annual mean being nearly the same. The adjacent deserts and the smaller annual amount of rain may cause this difference, and may render these climates an extreme beyond those of the United States in the same direction of divergence from those of Europe. Further south in China this continental character of climates seems to disappear. We have no perfect representative of the tea district. Canton itself is too nearly tropical, yet its means of temperature may show us clearly that the greater tea districts are both warmer and drier than any available portion of the eastern United States. They lie in 27° to 29° north latitude, and in or near these we have no considerable or continental areas. The immediate coasts of the Gulf of Mexico, and from Charleston southward on the Atlantic, give sufficiently high temperatures; but they are humid or sea climates for the most part, and not analogous to the inland and variously-elevated tea districts of China. Nangasaki, in Japan, and in the latitude of Charleston, has a decidedly lower temperature for the colder months, and might be compared with the United States interior in latitudes two degrees further north. If the tea-plant is successful in this portion of Japan, as it is said to be, there is a large district of the United States in which the temperature condition is sufficiently favorable. It is probable, however, that the range of extremes in temperature, and especially in humidity, which are characteristic of the United States, would affect this cultivation injuriously, if not quite prevent it. We have very few direct measures of these conditions for any part of China, and can only infer from the few data we have that the amount of precipitation and the range of extremes in humidity and temperature are much less there than here.

DIRECT COMPARISON OF EUROPE AND AMERICA.

Classifying the climates of the two lists of stations, excluding those of Asia, a small number of each may be separated as being nearly tropical. The high temperature of the winter months and the low curve of monthly differences mark these more distinctly than the absolute temperatures of the summer months. Southern Italy, including Rome, Cadiz, Lisbon, and Jerusalem, of the Eastern continent, and Savannah, Key West, Mobile, New Orleans, San Antonio and Brownsville of Texas, El Paso of New Mexico, Fort Yuma and San Joaquin of California, correspond in the tropical character of the means of temperature. The American localities give absolutely higher temperatures in this comparison, yet

the resulting character of the climate is much less permanently tropical, if it may so be termed, as extremes in any year and extreme years intrude far and fatally into these districts in American climates, cutting off the products which require a winter temperature without extremes. Annuals may therefore flourish where tropical trees and fruits fail entirely; and such, indeed, is the general character of the comparison which may be instituted between all the warmer districts of the two continents, and to the limit of abundant vegetable production northward.

Another list of climates for the Eastern continent may be given which will compare very well with the most nearly tropical of the United States in productive capacity. Venice, Milan, Marseilles, Bordeaux, and Constantinople, are of this class. They rank with the American stations first given in production of semi-tropical fruits and annuals, but in temperature they fall much behind them, and compare in this respect with Norfolk, Richmond, Memphis, Fort Gibson, and the interior of California, in the latitude of San Francisco.

For these classes, the following table, giving the differences of the several months from the mean for the year, will illustrate the semi-tropical character and excessive summer temperatures of American climates in contrast with those of Europe.

Comparison of the mean for each month and the summer with the mean for the year in semi-tropical climates.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Summer.
Catania	—13.0	—12.0	—9.5	—7.2	3.4	8.9	14.1	16.6	10.2	2.5	—4.0	—10.3	13.2
Naples	—14.0	—12.6	—9.1	—3.5	4.8	10.6	15.9	16.0	9.1	1.7	—7.1	—11.1	14.2
Rome	—15.5	—13.2	—8.9	—2.7	4.7	10.7	15.4	15.1	9.6	4.3	—7.1	—12.7	13.7
Cadiz	—10.2	—8.3	—6.8	—2.4	1.7	6.1	8.2	10.8	8.2	5.1	—3.2	—8.4	8.4
Lisbon	—8.9	—7.8	—5.1	—2.4	2.2	8.0	10.7	9.8	8.0	1.2	—6.0	—10.0	9.5
Jerusalem	—15.7	—9.7	—3.4	1.3	3.4	8.3	13.0	9.1	8.8	5.0	—4.5	—16.0	13.9
Savannah	—14.6	—12.5	—7.0	1.3	7.6	12.2	14.2	13.4	9.8	0.1	—8.9	—17.0	13.2
Key West	—7.5	—6.8	—3.7	—1.2	2.7	4.6	5.8	6.0	5.0	1.6	—1.2	—4.7	5.5
Mobile	—14.8	—12.4	—6.7	1.0	8.0	11.7	13.7	13.3	10.0	—0.4	—9.1	—13.8	13.0
New Orleans	—12.8	—12.5	—6.1	0.0	6.4	11.0	12.8	12.0	9.5	1.5	—10.1	—11.4	12.8
San Antonio	—16.9	—11.7	—4.1	0.1	6.8	10.9	12.7	14.2	10.3	2.6	—7.4	—17.5	12.6
Brownsville, Tex.	—13.8	—6.4	—3.9	1.2	5.6	7.5	10.0	11.3	7.1	0.6	—6.4	—12.4	9.6
*El Paso	—20.1	—12.0	—8.9	—1.5	6.2	16.7	20.7	18.3	16.1	—1.8	—14.9	—18.7	18.6
*Port Yuma	—17.8	—19.1	—9.6	0.7	......	15.5	17.3	16.5	12.4	1.8	—10.4	—18.3	16.4
*San Joaquin	—18.5	—10.4	—11.2	—2.3	7.1	20.7	......	15.1	10.3	—0.7	—11.2	—18.1	18.2

* In absolute temperatures these stations rank here; in the curve of monthly differences they belong to the second list, in which, also, El Paso is given.

Comparison of the mean for each month and for the summer, with the mean for the year.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Summer.
Venice	—20.1	—16.5	—9.3	—0.7	8.0	15.0	19.7	18.3	10.8	1.2	—10.8	—15.5	17.6
Milan	—22.0	—16.9	—9.3	—0.6	8.9	15.4	19.5	18.3	11.2	1.7	—8.1	—18.7	17.6
Marseilles	—15.1	—12.9	—10.0	—2.2	4.9	12.7	17.6	13.6	10.4	0.4	—8.1	—11.2	14.6
Bordeaux	—16.0	—12.0	—5.7	—0.9	3.8	9.9	16.1	16.2	10.1	1.1	—8.6	—13.8	14.1
Constantinople	—17.5	—15.5	—11.5	—3.8	4.7	13.6	17.6	17.6	9.7	6.4	—6.1	—15.5	16.3
Norfolk	—18.5	—18.0	—11.5	—2.9	6.9	15.2	19.3	18.1	12.4	2.7	—7.8	—15.8	17.5
Richmond	—19.6	—12.5	—9 7	—3.2	8.8	15.9	19.5	17.0	10.0	0.5	—9.3	—17.4	17.4
Memphis	—19.6	—14.8	—5.5	—1.8	8.1	15.0	19.1	17.8	11.7	—2.4	—7.6	—20.6	18.7
Fort Gibson	—20.0	—18.2	—8.4	1.8	9.0	15.3	19.6	19.4	12.6	0.5	—10.9	—20.0	18.1
El Paso	—20.1	—12.0	—8.9	—1.5	6.2	16.7	20.7	18.3	16.1	—1.8	—14.9	—18.7	18.6

By reference to the tables previously given, it may be seen that the absolute temperatures given for American stations exceed those for the Eastern continent, where the curve of differences is the same. This curve of differences of successive months is a better measure of the productive rank of these climates, within certain limits, than the absolute temperatures. They are therefore separated into two lists, which will be found to correspond strikingly in this measure of monthly differences. The adaptation of each to classes of products, or to any particular staple, is best shown by this comparison for all that temperature, as a single condition of climate may control.

Cadiz, Lisbon, and Key West, of the first list, and Bordeaux and Marseilles of the second, are modified considerably by the influence of the sea. The annual mean of each station in the first list is above 60°, and in the last above 55°.

In the peculiar conditions afforded by the American climate in distinction from the European, the range of distinctively American products becomes very great. Maize ranges over the whole continent, except the immediate coast of the Pacific, to the northern limit of the United States, and over most of the cultivable part of British America.

The range of the grape, in some degree or in some variety, is scarcely less. The peach, as a fruit, originally of warm climates; tobacco, as a product of similar climatic affinities; hemp, sweet potatoes, cotton, and the cane—all share in a large measure these peculiar requirements of climate, and all have, in the United States, a most extraordinary range of possible production, and a great range of highly successful cultivation. These all deserve consideration in mass in this connexion of general climate, as they all have, notwithstanding their great diversity of character, and their division among every class of vegetable adaptations to human uses, very similar requirements in climate for their growth.

They are, also, all high developments of vegetable organisms. The nutritive class, corn, cane, and the fruits are in the highest grade of nutritive development. Tobacco, and the plants producing fibre for manufacture, are the highest developments of their classes respectively, and are associated elsewhere with tropical or semi-tropical climates.

This characteristic of our production and climate, as a whole, is very

important in acclimation, and in comparison with the old continent. Our range is far greater than any other part of the world indeed, in products partially or wholly successful, as we have the semi-tropical and tropical productions of the Eastern continent mingling here with their and our extremes of adaptation to the colder latitudes. All the Cereals and grasses, and the succulent vegetables, of both slow and rapid growth, here border closely on the cane and cotton, and mingle successfully with the grape, peach, hemp, and tobacco. They do not, however, attain perfection of development unfailingly, and this is the greatest disadvantage of our climate in all respects. The conditions requisite to successful production may, for one year, be all that can be desired, and yet the oscillation of climate is so great that the next may be entirely unsuccessful.

It is most important, perhaps, to define the districts in which certain products may be fully relied upon. The possible range is extremely interesting as a scientific fact, but it should always be distinguished from the safe and reliable range on which business operations may be based. Indian corn, the grape and peach, hemp and tobacco, *may be cultivated* in most parts of the United States east of the Rocky mountains; yet the culture of every one is very much restricted, except perhaps Indian corn, in profitable and reliable production as a business. So, also, of the grasses and Cereal grains, fruit, succulent vegetables, &c.

Some further comparison of temperature and humidity of the various districts of Europe and America may be made before examining the precise localization of these staple products. For this purpose, the measures of each of these conditions of climate, in the districts of most successful cultivation of any one, should be known, and the differences of our climate from the European, under which the same success has been attained, be distinctly given, where actual introduction of any production has taken place, or where it is proposed.

Applying the test of mean temperatures for July to Europe, we find England to fall below the minimum of the requirement for the growth of Indian corn in every part. This mean ranges from 55° to 62° for the principal districts of England, Scotland, and Ireland. Chiswick Gardens, representing the most favorable locality near London, attains 63°. Generally, the best agricultural districts do not attain 60° for the mean temperature of July; and notwithstanding the uniformity of the climate, and the skill of English cultivation, no progress has been made in the acclimatization of several of the distinctively American staples and fruits.

Kaemtz limits the growth of maize in France at Rochelle, on the Atlantic coast, and at Strasburg on the Rhine, which give very nearly the precise measure of temperature for July, and are found to be the limit in America.

At Paris, a series of forty years gives 65° as the mean for July. Versailles, Arras, Dunkirk, and other stations in Northern France, give but 65° as the mean temperature for July.

In Holland the mean varies from 60° to 64°; a series of ninety-two years at Zwanenburg giving 63.5°, which is probably near the true mean for the whole low country of Holland.

In Germany, Berlin attains 65° as the mean for July and August

or a long series of years. Hamburg, Bremen, and all other stations in the north of Germany, fall below this temperature, to 63° and 62°.

In Southern Germany the deeper valleys only attain to 68° or 70° for July and August. A portion of the valley of the Rhine, at Manheim and Heidelberg, and at Geneva, with the valley of the Danube at Vienna, are the principal exceptions to the general maximum limit of 65° as the mean temperature of the warmest summer month.

In Italy, the summer temperatures rise abruptly from 72° to 78° for the months of July and August; and the latitudes of 40° to 46° there, correspond with 37° to 41° in the United States. Florence and Genoa, in latitude 44°, have a mean temperature of 77° for July—the same as that of Baltimore, in latitude 39°. Milan, in latitude 45°, corresponds with Philadelphia, latitude 40°, both having a mean for July of 74°. Catania, at the sea-level, in latitude 37° 30′, has a mean temperature for August (there apparently the warmest month) of 84°, or very nearly that of Brownsville, on the lower Rio Grande, in 26° north latitude.

These last references are less important than those for Central Europe and England, and their comparison with the United States. To the Italian and Spanish border on the south, however, the temperature measure of capacity for particular productions is extremely precise and direct, and the specific ranges and limitations will appear very strikingly in the notice of the separate staples.

COMPARATIVE DISTRIBUTION OF RAIN IN THE TEMPERATE LATITUDES OF THE TWO CONTINENTS.

Much less is known of the principal facts of amount and distribution of rain, both for Europe and the United States, than of temperature measures. Tables of mean amount, for different districts, are somewhat difficult to procure for Europe, as no recent general collection of them has been made.* The facts are indispensable for the comparisons at the basis of an agricultural climatology, however; and in the following tables, representative localities are given as fully as the facts at hand permitted, and perhaps as fully as may be required for the illustration.

The climate of the older United States is readily illustrated in this respect. We have here no contrasts of a local character, nor abrupt transitions from districts of profuse precipitation, to those with little or none. This may be said, however, of the eastern portion of the United States, or east of the Rocky mountains only; the western portion being quite decidedly local and peculiar in its amount and distribution.

In Europe the distribution is mainly local. The plain of Northern and Central Europe is, perhaps, the only portion on which a symmetrical amount and distribution exist; and the general irregularity in this respect has diverted attention from the illustration of this condition. In the table for the Eastern continent, the localities are selected as representative of considerable districts, as far as this is possible.

* Many of the series used here are from Gasparin's *Cours d'Agriculture*, in which most of Schaw's researches, embraced in his "Climate of Italy," are embodied Both these tables are very full and valuable, but the most recent of Gasparin's was published in 1844. (See vol. 2 of *Cours d'Agriculture*.)

Amount of rain in the temperate latitudes of North America, (inches and tenths, vertical depth.)

Places.	Latitude.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Gardiner, Me.	44° 10′	16	3.4	2.8	3.1	3.3	4.2	3.6	3.1	3.6	2.8	4.1	3.6	3.9	10.6	10.3	10.5	10.1	41.5
Hanover, N. H.	43 45	18	2.9	2.7	3.0	3.1	3.8	3.9	3.5	4.0	3.0	4.1	3.4	3.6	9.9	11.4	10.5	9.1	41.0
Burlington, Vt.	44 29	18	1.8	1.7	1.9	1.9	3.4	3.8	4.4	3.0	3.4	3.7	2.7	2.3	7.3	11.1	9.8	5.7	33.9
Amherst, Mass.	42 22	17	3.0	2.8	3.0	2.9	3.9	3.4	4.2	4.3	2.8	4.1	3.6	3.9	9.8	12.0	10.5	9.8	42.0
New Bedford, Mass.	41 42	40	3.2	3.3	3.6	3.5	3.7	2.7	2.7	4.1	3.3	3.5	3.9	3.7	10.8	9.6	10.7	10.3	41.3
New York (Erasmus Hall)	40 37	23	3.2	2.8	3.6	3.5	3.8	3.6	3.7	4.3	2.8	3.7	3.5	4.1	11.0	11.6	10.0	10.1	42.6
Albany, N. Y.	42 39	27	2.8	2.6	2.8	3.1	3.8	4.5	4.4	3.4	3.3	3.7	3.2	2.9	9.8	12.3	10.3	8.3	40.7
Utica, N. Y.	43 07	20	2.8	2.6	2.5	3.2	3.2	4.6	4.4	3.9	3.7	2.7	3.6	3.1	9.0	13.0	10.0	8.5	40.4
Rochester, N. Y.	42 45	20	1.9	1.5	1.8	1.9	3.2	3.3	3.0	2.6	3.0	3.3	2.8	2.2	7.0	8.9	9.1	5.6	30.6
Philadelphia, Pa.	39 57	28	3.3	2.8	3.5	3.3	3.4	3.8	4.2	4.3	3.1	3.5	3.5	3.6	10.2	12.3	10.1	9.7	42.3
Baltimore, Md.	39 17	16	2.6	3.3	3.9	3.4	3.3	2.9	3.5	4.2	2.9	2.6	3.6	3.9	10.6	10.7	9.0	9.8	40.1
Norfolk, Va.	37 02	16	3.3	2.9	3.5	2.9	3.9	4.1	5.2	6.1	4.7	3.0	3.2	4.4	10.3	15.4	11.0	10.6	47.3
Savannah, Ga.	32 05	14	2.6	2.6	4.2	1.9	5.7	4.7	9.4	9.3	4.9	3.1	1.7	3.2	11.9	23.4	9.7	8.4	53.4
Key West, Fla.	24 33	14	2.0	1.2	2.3	1.1	3.1	3.5	2.4	3.3	4.8	5.1	1.6	1.3	6.5	9.2	11.5	4.5	31.8
Mobile, Ala.	30 42	10	5.7	5.4	3.9	4.4	4.3	6.2	6.3	6.8	2.8	3.1	6.3	5.8	12.6	19.3	12.1	16.9	61.0
Huntsville, Ala.	34 45	12	5.8	4.7	5.9	5.0	4.0	5.1	4.6	4.9	3.5	2.8	2.7	4.9	14.9	14.6	10.0	14.4	53.9
New Orleans, La.	30 00	13	6.5	4.4	2.7	4.1	3.5	5.4	6.5	5.5	4.0	2.6	3.5	4.6	10.3	17.4	10.1	15.6	53.4
Matamoras, Mexico	25 57	3	1.9	1.9	1.0	0.6	2.4	2.7	1.8	1.9	4.8	4.9	2.5	4.1	4.0	6.4	12.3	7.8	30.5
Fort Gibson, Ind. Ter.	35 40	16	2.0	2.3	2.3	4.3	4.3	4.4	3.3	2.8	2.2	4.2	3.3	2.2	11.0	10.5	9.7	6.5	37.6
Louisville, Ky.	38 00	11	3.4	4.1	4.3	3.5	4.3	5.9	5.0	4.0	2.5	3.1	3.4	4.7	12.1	14.8	9.0	12.2	48.1
Cincinnati, Ohio	39 06	13	1.1	5.7	4.1	3.8	3.4	3.7	2.6	3.4	2.3	2.8	3.4	6.6	11.3	9.8	8.5	13.4	48.6
Marietta, Ohio	39 25	25	2.9	2.9	3.0	3.0	3.9	4.9	4.5	3.8	3.1	3.1	3.0	3.4	9.9	13.3	9.2	9.2	41.6
Detroit, Mich.	42 19	9	2.0	1.6	2.9	2.8	2.3	3.1	3.1	2.1	3.2	1.5	2.0	1.8	8.0	8.4	6.7	5.4	28.4
St. Louis, Mo.	38 37	16	1.9	2.2	3.5	4.0	4.6	5.6	3.8	4.0	2.4	3.0	2.8	2.7	12.1	13.3	8.3	6.8	41.1
Athens, Ill.	39 55	10	2.3	1.9	2.9	4.9	4.4	6.9	3.2	3.1	3.8	2.5	2.9	2.8	12.2	13.3	9.2	7.1	41.8
Muscatine, Iowa	41 28	8	2.1	2.1	3.4	3.7	5.2	5.7	3.8	7.8	4.5	3.4	3.8	3.2	12.3	17.4	11.7	7.3	48.8
Milwaukie, Wis.	43 03	7	1.3	0.8	1.6	2.4	2.5	4.0	3.0	2.8	3.2	1.4	2.1	2.0	6.6	9.7	6.8	4.2	27.2
Mackinac, Mich.	45 51	8	1.2	0.6	1.4	1.2	2.1	1.4	2.9	2.1	3.0	2.1	2.3	1.2	4.7	6.4	7.4	3.0	21.5
Fort Snelling, Min.	44 58	15	0.8	0.6	1.4	2.3	3.2	3.4	3.9	2.9	3.1	1.2	1.4	0.6	6.8	10.2	5.7	2.0	24.8
Fort Leavenworth, Mo.	39 25	16	0.8	1.4	2.3	3.6	4.0	6.3	3.6	3.2	3.0	2.4	1.7	1.0	9.9	13.1	7.1	3.3	33.4
West of the Rocky Mountains.																			
Albuquerque, N. M.	35 13	3	0.1	0.6	0.3	0.3	0.1	2.8	0.5	2.3	0.3	0.3	0.6	0.3	0.6	5.6	1.3	0.9	8.4
San Diego, Cal.	32 41	2½	0.3	1.7	1.1	0.9	0.5	0.0	0.0	0.2	0.0	0.1	1.5	3.4	2.5	0.1	1.6	5.4	9.6
San Francisco, Cal.	37 48	3 1-12	1.7	0.5	4.4	2.1	0.4	0.0	0.0	0.0	0.4	0.6	3.0	5.5	7.0	0.0	4.0	7.8	18.8
Cantonment Far West, Cal.	39 02	3	3.3	0.6	6.4	2.2	0.9	0.0	0.0	0.0	0.3	0.1	3.5	4.6	9.5	0.0	3.9	8.6	21.9
Astoria, Oregon	46 11	1 1-12	27.0	10.9	6.1	4.4	5.9	2.6	0.0	2.3	1.9	6.7	13.2	6.2	16.4	4.8	21.8	44.1	87.2
Puget's Sound, Oregon	47 07	3 1-6	11.8	3.9	4.7	4.1	0.8	0.6	0.5	1.3	1.6	3.6	5.9	6.1	9.5	2.4	11.1	21.7	44.8
Sitka, Russian America	57 03	2	2.5	9.6	3.5	3.3	1.9	5.9	3.7	10.1	14.8	12.7	7.4	4.2	8.7	19.7	34.8	16.4	79.5

Amount of rain in the temperate latitudes of the Eastern Continent, (inches and hundredths of mean vertical depth.)

Places.	Latitude.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Aberdeen, Scotland	57° 09′	4	2.63	2.15	2.24	1.00	2.19	2.33	2.36	2.41	3.26	3.00	2.69	2.61	5.43	7.10	8.95	7.39	28.87
Hereford, Central England	52 00	24	2.27	2.35	1.81	2.30	2.07	2.38	2.79	2.38	2.88	3.18	3.41	2.85	6.18	7.53	9.47	7.47	30.66
Gosport, S. England	50 50	26	2.58	2.21	2.03	2.24	1.92	1.75	2.57	2.34	3.21	3.25	3.73	3.22	6.19	6.66	10.19	8.01	31.05
London, E. England	51 30	9	1.81	1.74	1.50	1.44	1.98	1.60	2.22	2.62	2.32	3.46	2.71	1.45	4.92	6.44	8.49	5.00	24.87
Armagh, N. Ireland	54 20	12	3.75	2.88	2.42	2.22	2.23	2.86	3.19	2.82	2.58	3.48	3.35	2.97	6.87	8.87	9.41	10.97	36.12
Brussels, Belgium	50 50	6	2.82	2.11	2.19	1.26	2.26	2.75	3.44	2.63	2.46	2.96	2.79	2.27	5.71	8.82	8.22	7.20	29.96
Paris, France	48 50	30	1.62	1.41	1.65	1.60	1.66	1.28	2.14	1.92	1.86	2.42	1.85	2.24	4.91	5.34	6.13	5.27	22.66
Bordeaux, France	44 50	6	3.51	3.65	2.57	2.88	1.79	2.49	1.35	3.55	2.69	4.24	3.44	1.81	7.25	7.39	10.34	8.96	33.96
Alais, S. France, (near Marseilles)	44 12	35	3.42	2.42	2.41	3.32	3.55	1.79	2.05	1.73	5.21	5.53	4.39	3.19	9.28	5.58	15.13	9.03	39.02
Marseilles, S. France	43 18	20	1.45	2.01	1.10	1.75	1.82	0.74	0.40	1.03	2.03	3.35	2.71	1.77	4.67	2.17	8.09	5.23	20.16
Dijon, E. France	47 20	20	2.39	2.02	1.92	2.52	2.63	2.76	2.05	2.69	2.61	3.32	3.34	2.89	7.07	7.49	9.27	7.31	31.15
Geneva, Switzerland	46 12	5	2.00	1.00	1.42	3.94	2.58	3.89	2.85	4.01	3.74	4.83	2.53	0.97	7.95	10.76	11.11	3.95	33.77
St. Bernard, Alps, 7,670 feet above the sea	45 50	12	9.12	6.99	5.45	6.29	5.27	3.94	2.92	2.69	5.66	7.81	7.09	5.56	17.02	9.56	20.57	21.56	68.81
Lausanne, Switzerland	46 30	8	2.00	2.82	2.57	1.78	3.07	4.61	3.72	5.06	2.84	5.13	2.88	2.01	7.42	13.39	10.85	6.83	38.49
Milan, Italy	45 28	68	2.84	2.06	2.25	3.07	3.73	3.17	2.94	3.07	3.27	4.33	4.13	3.13	9.05	9.18	11.73	8.05	38.01
Rome, Italy	41 54	40	3.41	2.20	2.63	2.29	2.35	1.67	0.72	1.00	2.13	4.66	4.10	3.70	7.27	3.39	10.89	9.31	30.86
Naples, Italy	40 52	14	3.15	2.79	3.12	2.38	1.74	1.48	0.57	0.88	2.43	4.24	3.85	3.01	7.24	2.93	10.[illegible]2	8.95	29.64
Catania, Sicily	37 30	8	3.66	2.26	4.12	2.27	0.90	0.33	0.13	0.17	2.01	5.12	3.33	3.83	7.29	0.63	10.46	9.75	28.13
Venice, E. Italy	45 26	7	2.13	1.83	1.43	3.03	4.41	2.95	2.89	2.64	3.44	2.20	3.78	2.15	8.87	8.48	9.42	6.11	32.88
Udine, N. E. Italy	46 03	16	4.56	3.25	4.53	5.65	4.58	7.28	8.68	5.02	6.05	7.50	6.10	5.61	14.76	18.98	19.74	13.42	66.90
Manheim, Rhine	49 29	12	1.63	1.14	1.44	1.95	2.04	2.69	2.45	2.15	2.17	1.98	1.50	1.33	5.43	7.29	5.65	4.10	22.47
Berlin, Germany	52 30	?	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	20.57
Prague, Germany	......	4	0.50	1.26	0.71	0.83	2.26	0.48	1.39	3.76	1.46	1.54	1.85	0.36	3.80	5.63	4.85	2.12	16.40
Vienna, Germany	48 13	?	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	19.55
Copenhagen	55 30	17	0.95	0.99	0.72	0.93	1.19	1.72	2.32	2.82	1.87	1.57	1.69	1.58	2.81	6.86	5.13	3.52	18.35
Stockholm	59 21	8	0.93	0.39	0.35	0.40	1.42	1.54	2.29	3.96	3.07	1.99	1.88	1.43	2.17	7.81	6.94	2.75	19.67
St. Petersburg	59 56	4	1.40	0.92	1.31	0.45	1.44	2.03	1.79	1.87	1.25	1.97	1.48	1.57	3.20	5.70	4.71	3.89	17.51
Bergen, Norway	60 00	10	7.76	7.35	7.26	4.54	3.96	4.94	5.23	8.43	10.93	8.25	10.57	8.39	15.76	18.60	29.75	23.50	87.61
Simferopol, Crimea	44 57	5	0.67	0.46	1.01	0.73	1.47	2.66	2.77	0.58	1.52	0.87	1.01	1.07	3.22	6.01	3.40	2.20	14.83
Orel, E. Russia, in Europe	52 58	4	2.17	1.28	2.74	1.40	2.23	2.34	3.01	3.15	0.79	1.94	1.89	1.70	6.37	8.50	4.62	5.15	24.64
Barnaoul, Russia in Asia	53 20	4	0.49	0.30	0.22	0.26	0.87	1.10	1.34	2.54	0.79	0.48	0.81	0.33	1.35	4.98	2.08	1.13	9.54
Pekin, China	40 00	4	0.03	0.24	0.16	1.24	1.95	4.39	8.72	5.69	2.05	0.75	0.20	0.27	3.35	18.80	2.99	0.54	25.66

The general comparison of the two continents shows that we have here *much more rain* both for the same latitudes and the same temperatures. The distribution of this amount is also remarkably equal through the various months for both continents for all but the warmest districts, and in these the maximum is in summer.

For the northern portions of both continents, or for those having the least mean annual fall, the distribution is still further equalized by embracing a much larger number of days, on which some precipitation occurs, in any month, as a rule, than in the districts giving a larger amount. This is the principal fact of importance which is not apparent from a mere inspection of the tables.

The distribution of rain on this continent for the months of summer is singularly favorable. In districts where the winter amounts fall off to an inconsiderable quantity, as at Fort Snelling, and in the western and northern interior generally, the summer precipitation is ample, and well distributed. It is not, as in Europe, the per-centage merely that remains large, but the absolute quantity; as 13 inches at Fort Leavenworth and 10 at Fort Snelling for the three summer months, are quantities fully equal to those of any part of the continent eastward in the same latitudes. This summer distribution so far in the interior of the continent, on the ample scale corresponding to its fervid heats, is without any parallel elsewhere, and it renders the vast valley tributary to the Mississippi and St. Lawrence the most favored of climates for abundant vegetable production.

References to the more precise distribution of rain beyond this are generally necessary in considering the range of particular productions, and need not be further referred to here.

The statistics of rain at European stations are extremely meagre, it should be said, however, and the limited number of full records of rain measurement hitherto published renders it difficult to represent even the well-observed climates. The proportion of rain for the separate seasons as compared with the year, has often been given instead of definite amounts, and no general collection of these records appears ever to have been made, as has been so amply done in records of temperature.*

GENERAL CHARACTER OF THE INTERIOR AND PACIFIC CLIMATES.

Many features of the whole mass of the continent west of the great plains, or of the eastern limit of the Rocky mountains, may be designated as common to all its cultivable districts, except, perhaps, a narrow belt of the immediate coast north of the 42d parallel of latitude. These chief features are its aridity, both in the per-centage of humidity of the air generally, and in the absolute amount of rain and snow; its great extremes of temperature in the season affecting vegetable growths; its unusual or abnormal winds at all seasons, and its peculiarly local

* By referring to the Philosophical Transactions of the Royal Society of England, it will be seen that a very complete series of observations on the fall of rain and snow, with other phenomena, were made towards the close of the seventeenth century, and subsequently, in Great Britain, as well as on the Continent, full accounts of which are therein published.
D. J. B.

distribution of all these conditions and extremes. There are striking proofs of the truth of these positions in almost every district, and some points of their general relation to agricultural prosperity can be easily indicated.

These principal conditions control acclimatization or adaptation of staples, and so decisively as to separate the two portions of the continent. As a whole, the characteristic American staples which distinguish the United States east of the plains as the most productive area of any continent, cease to flourish on the Pacific side. Corn, cane, cotton, tobacco, hemp, &c., which in the Central and Eastern States flourish abundantly, though elsewhere tropical or semi-tropical, are so far limited and irregular as to preclude their successful production as great staples on the Pacific coast.

Small grains, however, find many extremely favorable districts, and, as a whole, are highly successful. Next are the grasses, roots, and annuals adapted to arenaceous soils, and to the alternations of wet and dry seasons; and at last, locally, a greatly variable and peculiar range from tropical to north temperate productions in some single localities and peculiar exposures.

The general guides to productive capacity, which may be so readily followed on the eastern half of the continent, fail on the western half. The distribution of temperature and fall of rain and snow are unmistakable in the first case, and may be relied on as decisive of great capacities of production. In the last case, the distribution of temperature generally, or for the mean of months or seasons, is very favorable for the interior, considering its elevation above the sea; yet it has not, as exhibited in the isothermal lines, the same significance in productive capacity, or in absolute thermal condition, as on the eastern half of the continent. For this there are two reasons: one in the range of single and monthly extremes of temperature, and the other in the general aridity of this class of climates; the last of which reduces the thermal effect below its absolute measure by the thermometer. Thus a mean temperature of 80° for a summer month, with a very low per-centage of humidity and without rains, would probably, though the precise measure of relations is not known, be little above the mean temperature of 70° in the humid atmosphere of the Ohio valley or on the Atlantic slope of the Alleghanies. In confirmation of this view of the measure of difference due to aridity, the known, or so far as known, productive capacity of the valley of the Great Salt Lake, Utah, is scarcely greater in any thermal measure than that of the States of Michigan and Wisconsin, the south shore of Lake Erie, and other districts in the line of the July isothermal of 70°. Careful observations by Captain Stansbury give a mean temperature of 80° for the same month at Great Salt Lake city. In the more precise measures of summer thermal effect, as shown in the growth of vegetation requiring high temperature and of a semi-tropical range, the Salt Lake valley only equals the eastern districts referred to for two or three months, for which the mean temperature is several degrees higher, and it falls below them for productions requiring a greater number of months to mature.

These general distinctions embrace the extreme south of California, and much of Mexico also. They are conspicuous in the valley of the

Rio Grande, and do not change until the district of summer rains is reached in Mexico southward. With tropical summer temperatures in districts of Southern California and New Mexico, therefore, we have but semi-tropical fruits and staples, except in a few localities of peculiar position in Southern California. As a most distinctive mark of difference, the production of Indian corn may be cited. This passes but little beyond the 35th parallel of latitude for this western mass of the continent, and it has as great a measure of success to near the 44th parallel for the Eastern and Central States.

The reverse range of wheat and the associated Cereals is equally striking as a mark of distinction between these classes of climates. At the east the heat and humidity are too great for those in the Mississippi valley south of 38° north latitude, and for all districts south of 35°. For the western climates they reach the 30th parallel without regard to elevation, and continue on the arid table-lands of Mexico indefinitely southward. For the degree of fertility characterizing their soils, all the Pacific and interior climates have the highest capacity for these grains; and so far as climate may influence them, they are wholly exempt from the risks incurred in the Eastern States.

The climates of the interior and Pacific present new conditions and new adaptations in reference to a class of vegetable growths of the greatest importance after grains, and after the few more important single staples. In grasses, it is certain that those previously known as cultivated cannot be produced there to any considerable extent; but the peculiarities of condition in this respect are met in the natural growths most abundantly, and these native grasses may perhaps be adapted to all the requirements of cultivation and occupation as fully as they are to the requirements of the present uncultivated state of the country. On this point there is much to be learned of the cultivation and adaptation of the grasses characteristic of arid plains generally, and of the capacity of our native grasses in this respect. We can only say now that the English cultivated grasses have but a small place in those climates, and that the natural grasses present remarkable adaptation and value. Of their power of transition to the cultivated state, little is yet known.

The peculiarly local character of these western climates, as a class, is a most important general feature. Abrupt contrasts of elevation and exposure, and consequently of humidity, winds, temperature, and fall of water, are not the sole causes of this distinction, since conditions extraneous to these irregularities of mass and surface exist which modify the characteristics as a whole. The refrigeration of the western coast in summer is due to other causes than the interior aridity and rarefaction, the greatest of which is the presence of an extraordinarily cold mass of the North Pacific waters off the coast. Summer and winter are therefore both modified, and approach very nearly in temperature, and this peculiarity of sea influence, in connexion with the great elevation of the interior mass, exaggerates the local contrasts which would otherwise be found on its irregular surface.

VALLEY OF THE SALT LAKE, UTAH.

The climate of this valley is anomalous in many respects. It is a great interior depression, yet near enough to the Pacific to feel the general amelioration of Pacific climates, and locally isolated so much as to give a variability and range very much like that of the eastern part of the United States in the same latitude. Its elevation above the sea of four thousand feet, and the proximity to mountains on every side, render it liable to single extremes of temperature more prejudicial to many staples than in the Atlantic States. Indian corn does not succeed in consequence of early and late frosts, and the chills brought suddenly upon the valleys by local storms. Tobacco, the vine, and other equally delicate fruits and plants, would also fail here, though the mean temperature of June, July, and August is nearly that of Philadelphia. The winter months are but little colder than those of the same latitude at the East, thus giving the elevation of four thousand feet, and its measure of decrease of temperature as the measure of greater heat on this western mass of the continent when compared with the eastern portion. The rule of decreasing temperature in abrupt elevations would not probably obtain for this great interior mass. Four or five hundred feet for each degree would more correctly represent this decrease than any less number, and ten degrees on the mean of a month constitute the full measure of diminished temperature in the Salt Lake valley as compared with the coast of the Pacific at the level of the sea. This is also very nearly the measure of contrast between the opposite coasts of the continent for the winter months.

With a monthly curve and an absolute mean of monthly temperatures, therefore, very nearly the same that the same latitude on the Atlantic coast gives, the peculiar position of the Salt Lake valley gives it single extremes and anomalies which render the production of the more delicate staples and fruits of the whole of the continent east of the Rocky mountains—and which extend here almost to the extreme northern limit of the United States—quite impossible. The hardy Cereals and hardy growths of every sort are, however, unusually successful, and the cultivable portion of the country richly productive to this extent.

The upper and interior valleys of Oregon are, so far as known, very similar to this interior basin in thermal distribution, and quite the same in their cultivable capacity. In a few instances only, and probably in no decided degree, is the growth of Indian corn successful.* Further north the valleys and plains are lower than at the Salt Lake, and also nearer the Pacific, and more directly influenced by its climate. Their temperature conditions are not less favorable than at Salt Lake, therefore, and quite near the Pacific the winter is far more favorable.

Precipitation in rain and snow is extremely irregular in Salt Lake valley, and quite inconsiderable in amount for the summer. Irrigation is indispensable to cultivation; though the facility with which this may be effected, removes much of the actual difficulty presented by this feature of the climate. A uniform and considerable humidity of the atmosphere is probably necessary to many plants, though we are yet unable to say what plants would fail to be perfectly produced in an arid atmosphere and by irrigation alone. The difference of temperature which would be the equivalent of this aridity, in its influence on

* This assertion does not seem to accord with the statement of Mr. Macy, on page 119 of this Report, nor with the census returns of 1850. D. J. B.

vegetable and animal life, cannot be precisely stated. It must be some four or five degrees on the mean of each summer month, however, and may be much more. Thus the mean at the Salt Lake, of 71° for June and 80° for July, should probably be reduced five to eight degrees for each, to compare with the Atlantic and Central States; and the range of single extremes is so great, that the temperatures of 65° for June and 72° for July somewhat overmeasure the capacity for delicate growths, requiring several months to attain perfection.

Capacity of the American climate for the staples now cultivated.

MAIZE, OR INDIAN CORN.

In a specific examination of the range of each of the important staples now cultivated in the United States, Indian corn has the first rank, as a native of the American climate itself, and still its most important single product. Its wide and wonderful range is due, in part, to a peculiar elasticity of the plant, different from that controlling in adaptation in almost every other, and which permits its compression within a very brief period of growth. It seems to be restricted to but one condition, rigidly, which is the temperature of the period in which it ripens; and this is less than that required for every other plant, for the growth of which the same temperature is necessary.

The three summer months are the extent of this requirement in time;* and the thermal distribution on this continent is such, that every portion of it, almost to the limit of cultivation at the north, gives the necessary summer heat. The most important exception is a narrow line of the Pacific coast, and to this there is a general addition of some of the more considerably elevated localities in mountainous portions. Even in the valley of the Red river of the North, at the 51st parallel of latitude, a small variety may be successfully grown; and in the St. Lawrence valley the same cultivation may be carried to the 47th parallel.

Its profitable cultivation as a staple, and in competition with the best products of the several districts, is more important to practical interests, however. Its limit, in this respect, is very precisely defined on the north by a mean temperature of 68° for July. Southward there is no limit, as the plant is thoroughly tropical.

In this general view it occupies all except the more elevated or mountainous portions of Maine, New Hampshire, Vermont, Canada West, Wisconsin, and Minnesota. Northern New York, in addition to this list, completes the districts in which the elevation seriously interferes with its most successful cultivation; and the remaining portions of the continent east of the Rocky mountains form an unbroken area

* For the extreme northern limit of this growth, the time is so much less as to deserve special mention. From the statements of Schoolcraft and others, it there "ripens early in August," and does not begin its growth till near the middle of June. Less than two and a half months, therefore, suffice to perfect this grain there.

in which, so far as climate is concerned, corn ranks first in its capacity for production of nutritive matter in some form.

The maximum capacity of this singular production is also much nearer its northern than its southern limit, and is, indeed, in the States where extremes of temperature may cut off or seriously injure it at times. Wisconsin, Northern Illinois, Michigan, Central New York, and the southern part of New England, produce, under favorable conditions, an amount of value from the growth of this plant which largely exceeds any other possible product of vegetable life. Six or seven times the average amount of the grain it yields in Florida, and in other countries of which it seems a native, may be grown at this northern limit; and the proportion of nutritive matter of the stem and leaves of the plant is in nearly the same excess.* This is, perhaps, the most important point in which an investigation of its climatic range may aid our older States; and it shows that, with the increase of value in Southern lands and the introduction of staples which find their full value in the market, and which cannot have a similar or great range, the cultivation of corn must be transferred northward. The whole country south of 33° north latitude, and as far west as Central Texas, can produce more value in its own peculiar staples under proper acclimatization and with proper cultivation. The cane is more decidedly than anything else the natural successor of Indian corn in semi-tropical districts. Its analogies of growth and development of saccharine matter are nearly the same, and with the greater heat and humidity of some portions of the United States the product of grain appears to fall off, and corn loses its extraordinary power of expansion and excessive production. It is highly probable that the introduction of the best possible staples in our warmer districts will furnish advantageous substitutes for maize, and transfer its cultivation to the more productive districts further north. With this transfer northward of the line of 33° of latitude, which seems the border of the more particularly warm and humid regions, there will yet remain a larger area devoted to maize as its chief staple than that appropriated to any other single product whatever.

There is, however, greater practical importance in the examination of the western half of the continent in respect to its adaptation to this staple. Many parts of the interior and western coasts are little known, and singular anomalies certainly exist in many places. At the westward of the Mississippi, and to latitude 44° north, the highly favorable character of the immediate valley of that river is continued without interruption so far as climatic adaptation is concerned, and this, notwithstanding a constant increase of elevation westward, ultimately amounting to near five thousand feet above the sea at the eastern base of the Rocky mountains. The whole plain preserves the same high

* The writer here appears to be laboring under an error, as it is clearly stated, on pages 240 and 241 of the present Report, that the amount of tobacco raised per acre in the valley of the Connecticut, in several instances, last year, exceeded $300, which is more than three times the value that could have been produced in corn. Again, it will be seen, on page 94, that Dr. Weller, of North Carolina, actually made, last year, 73¾ bushels of corn to the acre, and would have far exceeded this amount had not his crop been injured by wet and drought. Furthermore, the planters in the West Indies often obtain 20 or 30 bushels of corn to the acre without manure, and two crops in a year, if necessary, from the same land. D. J. B.

summer temperatures, although on its northern border the summer is somewhat shorter, its measure of heat is at least equal for the time, and its adaptation to this crop quite similar, so far as known, to that of the country east of the Mississippi.

The same liability to frosts and to injurious extremes of temperature which exists east of the Mississippi seems also continued over these great interior plains, though with a decreasing range towards the western border. The singular anomaly is found also of higher temperatures on the western than on the eastern border, and this, too, notwithstanding the greatly increased elevation. The most injurious range of extreme temperatures is east of the central portions of the plains, and at 45° to 47° of latitude these become nearly decisive against the growth of Indian corn.

Similar temperature extremes sometimes strike across the high plains of Wisconsin, Illinois, and Indiana; but the injury is remarkable rather than considerable, and it does not practically interfere with cultivation.

It is more remarkable that at the western border of the plains, as at Fort Laramie, at 4,500 feet elevation, the spring and autumn should be as mild and equable as at the Mississippi river in the same latitudes; and more favorable than at Forts Kearney and Leavenworth, on the eastern side of the plain, and much lower and much further south.

Over the whole of this great interior that is not abruptly mountainous, the adaptation of climate to the growth of this staple continues highly favorable, notwithstanding its great elevation. The difference of three degrees of latitude and of nearly four thousand feet elevation between the stations just contrasted effects no material change in this adaptation.

At the mountains, however, and beyond them, important contrasts occur. In the plateau next the Rocky mountains, or first in the class of considerable plains after passing these mountains from the east, the general temperature is very high in summer for the latitude and elevation. The mean temperatures here show a fair adaptation to the growth of Indian corn. Eastern Oregon and the valley of the Great Salt Lake, with the upper valleys of the Grand and Green rivers, and of the Rio Grande, are all within the temperature limits found to be perfectly congenial to this growth in the Eastern United States. We find the result, however, much influenced, and for many districts entirely controlled, by local causes, or by the general cause of great elevation and proximity of mountains, giving local and irregular changes of temperature. Generally, also, the daily range of temperature is very great; and when absolute frosts do not occur, the great daily changes of temperature affect this cultivation injuriously.

Such are obviously the characteristics of all the districts just mentioned, though only a small portion of the Rio Grande valley is included in this description, and of the Grand and Green rivers (Colorado of California) only the portions north of 38° of latitude. Reference to the temperature tables will show that the summer means for these districts are sufficiently high, and the peculiarity which influences the condition can only be exhibited in a table of monthly extremes, in connexion with one giving the measure of the daily changes, or the curve in successive hours, as far as this may have been observed.

Lowest temperatures observed in 1851*—monthly.*

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Pacific climates.												
San Diego (1850)	34	40	39	45	50	56	58	62	51	50	37	30
San Luis Rey	40	36	39	...	...	...	...	...	...	...	...	...
Monterey	...	...	...	...	...	...	46	50	53	48	44	40
Benicia	33	32	38	43	50	52	51	53	51	52	41	37
San Francisco	30	33	34	42	45	49	47	50	50	47	40	35
Astoria	28	31	32	42	46	50	54	54	48	...	...	...
First interior valleys.												
Puget's Sound	24	24	26	31	40	46	46	46	40	39	29	22
Columbia Barracks	19	19	27	...	...	...	...	...	...	...	...	22
Cantonment Far West	29	26	33	36	37	45	53	52	49	44	32	20
Fort Miller	...	...	...	...	...	...	...	61	56	46	37	32
Camp Yuma	30	19	32	48	...	...	...	...	...	...	...	...
Interior.												
El Paso, Fort Fillmore	22	26	32	52	60	68	70	72	52	32	14	18
Socorro	10	12	...	32	42	...	62	60	...	30	5	11
Doña Ana	...	...	...	...	43	52	66	65	...	...	...	...
Albuquerque	8	7	12	23	35	43	57	...	...	...	...	...
Cebolletta	9	2	20	27	43	53	62	60	54	45	30	34
Santa Fé	5	−2	...	20	34	39	50	45	41	...	15	15
Las Vegas	−7	−14	14	30	34	47	50	...	...	...	...	...
Great Salt Lake (1850)	9	10	7	26	39	40	59	62	...	...	...	...
Fort Laramie	−5	...	15	15	30	42	53	56	47	20	14	−14
Fort Kearney	−3	2	...	24	28	48	54	46	33	16	10	−7

Lowest temperatures observed in 1852*—monthly.*

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Pacific climates.												
San Diego	38	40	36	40	44	58	60	62	49	45	38	34
Monterey	36	42	36	38	46	47	52	...	...	...	...	...
Benicia	34	39	39	...	40	53	54	55	50	48	36	32
San Francisco (1853)	41	42	41	46	47	49	50	51	50	49	44	40
Port Orford	...	...	...	...	...	46	46	48	40	41	38	30
First interior valleys.												
Puget's Sound	25	29	19	26	38	41	49	45	38	35	28	0
Columbia Barracks	22	29	21	31	39	47	...	...	...	38	30	5
Fort Reading	...	...	...	36	...	54	...	56	39	35	31	28
Fort Miller	32	36	29	38	41	68	...	55	50	41	34	28
Rancho del Chino	35	39	36	45	44	56	56	58	...	...	...	...
Interior.												
Fort Fillmore	14	21	15	26	41	55	54	56	56	30	21	15
Fort Webster	...	20	18	28	26	50	50	44	46	26	16	12
Valverde	4	18	24	26	35	45	55	60	41	32	18	14
Santa Fé	...	...	...	...	...	...	...	...	34	27	14	10
Fort Laramie	−13	−4	−2	14	34	47	55	53	28	21	5	−11
Fort Kearney	−28	−10	0	13	22	44	55	54	27	20	10	−19
Fort Leavenworth	−14	9	16	27	38	44	58	58	39	22	16	1
Fort Ripley	−36	−14	−16	2	28	34	38	36	27	20	−8	−36

Lowest temperatures observed in 1853*—monthly.*

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Pacific climates.												
San Francisco	41	42	41	46	47	49	50	51	50	49	44	40
Benicia	34	36	34	42	46	52	50	50	52	49	44	32
Port Orford	32	23	30	40	42	...	...	...	...	...	...	...
Partially interior.												
Fort Yuma	37	36	40	52	52	61	76	76	69	50	45	36
Fort Vancouver (Col. Bar.)	25	19	21	33	40	47	50	43	42	28	31	26
Puget's Sound	25	20	22	34	35	47	44	43	38	29	27	23
Dalles	19	10	22	33	36	43	46	47	46	25	22	26
Interior.												
Santa Fé	15	7	16	29	37	40	54	53	46	22	25	7
Fort Defiance	7	6	11	22	20	35	52	46	35	17	13	6
Fort Union	10	2	6	27	32	39	44	46	37	14	18	11
Fort Massachusetts	−6	−8	8	19	17	30	39	39	26	...	...	...
Fort Laramie	11	−4	9	32	33	49	50	55	36	20	22	13
Fort Kearney	−5	−8	−1	29	30	53	50	37	36	12	9	−16
Fort Leavenworth	−1	−3	12	33	38	56	58	49	44	22	22	8
Fort Ripley	−22	−35	−16	18	29	33	43	42	32	4	0	−21

Minimum temperatures in California, arranged for successive years, at the same station.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Fort Yuma.												
1851	30	19	32	48	......	......	......	......	......	......	......	......
1853	37	36	40	52	52	61	76	76	69	50	45	38
San Diego.												
1850	34	40	39	45	50	56	58	62	51	50	37	29
1851	32	34	34	......	......	......	......	......	......	......	37	38
1852	38	40	36	40	44	58	60	62	49	45	38	34
San Luis Rey.												
1851	40	36	39	......	......	......	......	......	......	......	......	......
Rancho del Chino.												
1851	......	......	......	......	......	......	55	58	51	47	36	36
1852	35	39	36	45	44	56	56	58	......	......	......	......
Monterey.												
1850	......	......	......	......	......	......	46	......	......	......	......	......
1851	......	......	......	......	......	......	46	50	53	48	44	40
1852	36	42	36	38	46	47	52	......	......	......	......	......
San Francisco.												
1850	......	......	......	......	......	......	......	......	......	......	......	28
1851	30	33	34	42	45	49	47	50	50	47	41	35
1852	35	......	......	......	......	......	......	......	......	......	......	......
1853	41	42	41	46	47	49	50	51	50	49	44	40
Sonoma.												
1851	31	32	32	28	......	......	......	......	......	......	......	......
Benicia.												
1851	33	32	38	43	50	52	51	53	51	52	41	37
1852	34	39	39	......	40	53	54	55	50	48	36	32
1853	34	36	34	42	46	52	50	50	52	49	44	32
Fort Miller.												
1851	......	......	......	......	......	......	......	61	56	46	37	32
1852	32	36	29	38	41	68	......	55	50	41	34	28
Cantonment Far West.												
1851	29	26	33	38	37	45	53	52	49	44	32	30
Fort Reading.												
1852	......	......	......	36	......	54	53	56	39	35	31	28

*Extreme low temperatures on the interior plains.**

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Pembina, Red river Valley.												
1852	—36	—39	......	—3	......	50	54	54	......	......	......	......
1853	......	......	......	20	......	......	......	......	......	......	......	......
Fort Gaines, (Ripley.)												
1850	—26	—28	—20	2	24	35	46	42	22	18	9	—26
1852	—36	—14	—16	2	28	34	38	36	27	20	—8	—36
1853	—22	—35	—16	18	29	33	43	42	32	4	0	—21
1854	—50	—26	—4	—7	......	......	......	......	......	......	......	......
Fort Leavenworth.												
1850	......	—11	9	28	32	55	60	53	49	27	18	—3
1851	1	3	22	25	31	48	59	61	43	25	18	—6
1852	—14	9	16	27	38	44	58	58	39	32	16	1
1853	—1	—3	12	33	38	56	58	49	44	22	22	8
1854	—8	6	19	15	......	......	......	......	......	......	......	......
Fort Kearney.												
1850	—2	—7	9	21	26	49	54	47	40	14	6	—12
1851	—3	2	......	24	28	48	54	46	33	15.5	10	—7
1852	—28	—10	0	13	32	44	55	54	27	20	10	—19
1853	—5	—8	—1	29	30	53	50	37	36	12	9	—16
1854	......	2	16	......	......	......	......	......	......	......	......	......
Fort Laramie.												
1851	—5	......	15	15	30	42	53	56	47	20	14	—14
1852	—13	—4	—2	14	34	47	55	53	28	21	5	—11
1853	11	—4	9	32	33	49	59	55	36	20	22	13
1854	—21	8	21	......	......	......	......	......	......	......	......	......
Cantonment Loring, (Fort Hall.)												
1850	—6	—8	—28	26	......	......	......	......	......	......	......	......
Great Salt Lake City—Capt. Stansbury.												
1850	9	10	7	26	39	40	59	62	......	......	......	......

At the coast of the Pacific we find a peculiar summer climate. The absolute mean temperatures fall very low for the summer months along the whole coast from San Diego to Puget's Sound. In this whole range no month attains a mean temperature of 65°, or the lowest permitting the growth of Indian corn. From the sea to the coast range of mountains the temperature is less than 60° for the mean of July; and where this coast range is low, the interior participates considerably in this low temperature as far as the principal mountain ranges. The Sacramento and San Joaquin valleys are, indeed, nearly all that have a sufficiently high and equable summer temperature, or one great enough to render the curve of daily change unimportant as an obstacle.

The high curve of heat for the day, so necessary to the perfect development of this vegetable, is that which is wanting on this coast. The night and morning are warmer than in many Eastern States where the warm mid-day perfects it fully, yet they avail nothing for its growth; it produces neither saccharine matter nor grain without this high mid-day heat, and with it seems to be less important that the temperature of the night is quite low, both comparatively and absolutely. There is no

* This mark — before a number indicates the degrees below zero of Fahrenheit.

plant in our cultivation less elastic, in this respect, and it is quite impossible to carry it where the midday and midsummer heats are not comparatively great. The measure of the curve of daily change of temperature for the districts of its most successful growth, and for those on our own continent, in which its success is doubtful, would much assist these comparisons.

There remain but the mountainous districts of Southern California and New Mexico for which to indicate the climatic adaptation of this staple. In these districts the local characteristics largely predominate, and control almost every condition of climate. The only one properly designated as general, and as applicable to the whole region, is that of aridity, or a very low per-centage of atmospheric humidity; and this condition is least important to the growth of Indian corn. So far as experiment in all climates has shown, it appears wholly unimportant to this plant whether the air contains very little or a very large per-centage of humidity; the most diverse districts in this respect appear equally suited to it.

Wherever the temperature is sufficient, and either rains or irrigation supply water to the soil, this product is quite successful. Between the Sierra Nevada and the eastern border of the Llano Estacado, of Texas, the table-lands, valleys, and low plains, are, as a rule, destitute of rain. Cultivation is possible, therefore, only where irrigation is possible; and this great area from the thirty-eighth parallel of latitude southward affords cultivation only in the valleys capable of irrigation, and on the mountain-sides which arrest the rains. In repect to rains and humidity, the entire basin of the Great Salt Lake is similarly situated, though its lower temperature brought it within the list of climates in which extremes of temperature become injurious to this particular staple.

Some portions of the most elevated plains at the sources of the Colorado of California, the Del Norte and Arkansas rivers, are perhaps quite too cold for this growth, though the extent of this country known to be adapted to grasses and small grains, and yet known to be unfit for maize and its associates, is not great. It is also difficult to define the limits and divisions here. On the whole, the range of this singular staple is wonderful, and the thermal condition of the summer of this continent, on which it is based, is without analogy on the Eastern continent. So large an addition to the nutritive growths of one continent in contrast to the same latitudes and general temperatures of another, must give a great advantage in capacity for dense population. Of its relation to other cultivated plauts and grains in the yield of nutritive matter, it is only necessary to say that its variable character and power of almost unlimited development promise great results from future attainments in the science of cultivation. No other grain product may be so accumulated and almost heaped upon the land by increased skill in mere cultivation.

GEOGRAPHICAL RANGE OF THE GROWTH OF INDIAN CORN ON THIS CONTINENT IN DIFFERENT LONGITUDES.

An expressive mode of representing the range of this staple is by the reference to extreme points on the several meridians of longitude

from the Atlantic coast westward; and though we have no abrupt limits at the south other than those of the continent itself, or none in climate at least, we shall find the measures of distance on these lines of longitude of some service.

The Bay of Fundy and the valleys of New Brunswick bring this cultivation up to the 46th parallel at from 64° to 67° of west longitude. In the highlands of Maine it falls off to less than 45°, and in New Hampshire to 44°; but then rises abruptly to 47½° at St. Ann's, near Quebec, at 72° west longitude. The mountainous parts of New York and some parts of Canada West, between the Ottawa river and Lake Huron, permit no cultivation of this sort; but the river valleys and better portion of the country have some adaptation to it to the 46th degree of latitude, as far west as Lake Huron, at 82° west longitude.

The influence of the lakes and the elevation reduce the summer temperature so much at this point as to throw the limiting line southward to 45° of latitude, and this line continues west almost to the Mississippi. Passing this elevated district, and approaching the warmer summer of the plains, it goes abruptly north to 50° of latitude, at Lake Winnipeg, 97° west longitude. This is probably its highest point; and, measured on this meridian, we have 23° of latitude in the United States, and the whole amount of 35° for the North American continent, as the range of a single cultivated staple, and everywhere on this line it is at least equal to any other in value.

Westward of this line, the range becomes so irregular and exceptional between the extreme points, that the comparisons have not the same value. Localities of the upper Missouri permit some amount of cultivation to the base of the Rocky mountains, and to 47½° of latitude. On the west of these mountains, it reappears in the same latitude; and in the lower valleys of the north fork of the Columbia it goes to Fort Colville, near 49° of latitude. This is another extreme point of range; and though much the larger portion of this great elevated interior mass southward to New Mexico admits but a partial and imperfect cultivation, the climatic range is interesting at least. At 120° of longitude its range ceases for all latitudes on this continent; but between 97° and 120° the whole continent is embraced south of the points just named, and, with the exceptions mentioned, as belonging to all the Rocky mountain plateau north of New Mexico.

A brief reference to the European range will show the measure of contrast between the two continents in this respect. Africa is so entirely tropical as to have little place for Indian corn, though it is cultivated to some extent near the Mediterranean. In Europe, Spain, a small part of the south of France, Italy, the valleys of Austria and Hungary, and of Turkey, with the islands of the Mediterranean, comprise its range. In almost all these districts it is also quite subordinate to other staples, though imperfect cultivation may be one reason of this inferiority. Over the more densely populated and valuable portions of Europe it scarcely grows at all, and the little grown in France north of the mountains, and in Germany, Austria, and Russia, scarcely gives it any importance. Its climatological limit is so near here, that the more equable temperature conditions avail less in its extension than with the vine. The single element of greater heat for one month of

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the summer is wanting; and so precise and imperative is the requirement in this respect, that no skill seems likely to acclimatise Indian corn in the more important European countries just named, and in the British islands.

Limiting districts in the cultivation of Indian corn in the North American climate northward.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Albion Mines	18.8	19.4	27.1	37.3	48.5	58.3	66.1	65.6	56.3	46.5	36.0	23.7	37.6	63.3	46.3	20.6	42.0
Frederickton	17.0	24.0	33.0	40.0	(?)37.0	48.5	65.5	69.7	61.5	47.5	31.0	13.5	36.7	41.2	46.7	18.2	40.7
Houlton	14.7	16.5	36.0	39.6	50.4	60.2	65.1	64.5	52.0	40.6	29.1	15.8	38.6	63.3	40.6	15.7	39.6
Quebec	9.9	12.8	24 4	38.7	52.9	63.7	66.8	65.5	56.3	44.1	31.5	17.3	38.6	65.3	44.0	13.3	40.3
Fort Coulonge	11.6	15.7	28.7	40.6	54.4	65.4	69.4	66.5	56.3	45.0	31.3	17.0	41.2	67.1	44.2	14.7	41.8
Malone	22.3	23.2	32.7	46.6	53.4	62.1	66.7	66.2	57 3	46.5	35.4	25.8	44.2	65.0	46.4	23.8	44.8
Fort Mackinaw	19.6	17.5	25.8	36.8	47.0	56.9	64.8	64.0	55.5	44.0	33.9	22.3	36.5	61.9	44.5	19.8	40.7
Fort Brady	17.4	16.7	25.7	38.5	49.5	59.5	65.1	63.3	53.9	43.7	32.8	21.3	37.9	62.6	43.5	18.5	40.6
Temiscaming	9.2	18.4	24.4	39.0	49.4	62.7	67.3	65.6	53.4	40.8	26.0	17.7	37.6	65.2	40.1	15.0	38.6
Penetanguishine	21.4	19.7	29.4	36.1	52.0	65.2	70.4	68.5	53.2	45.8	36.7	24.0	39.2	68.0	45.2	21.7	43.5
Fort Wilkins	23.6	22.0	28.9	38.8	52.8	56.8	64.7	65.1	56.8	44.0	30.9	20.7	40.2	62.2	43.9	22.1	42.1
Sandy Lake	13.8	18.2	29.7	38.3	50.1	61.2	67.6	65.5	58.3	43.4	22.8	9.9	39.4	64.8	41.5	14.0	39.9
Fort Ripley	8.6	13.7	25.8	36.2	49.7	61.9	66.9	64.8	57.1	43.1	30.7	6.6	37.2	64.5	43.6	9.7	38.8
Fort Garry	—12.5	....	....	....	....	....	69.0	....	....	....	....	....	....	....	....	....	....
Fort Union, Mo.	21.3	17.5	32.5	49.9	49.8	66.0	73.6	70.7	58 4	....	....	....	44.1	70.1	....	....	....
Fort Union, N. M.	31.8	35.0	42.2	50.9	57.3	59.5	66.2	63.9	56.8	47.5	35.5	33.4	50.1	63.2	46.6	33.4	48.3
Lapwai	31.8	38.5	42.7	52.8	57.5	68.9	70.1	72.0	64.0	48.1	41.5	40.4	51.0	70.3	51.2	36.9	52.4
Fort Colville*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Fort Vancouver	41.6	41.3	42.4	53.4	61.5	67.4	68.5	67.2	61.6	54.3	44.4	35.7	52.4	67.7	53.4	39.9	53.4

* This is an important limiting station, which would have temperatures very nearly like Lapwai and Fort Vancouver.

POSITION OF THE LOCALITIES AND AUTHORITIES OF THE OBSERVATIONS EMBODIED IN THE SEVERAL TABLES RELATING TO THE LIMITS OF MAIZE CULTIVATION.

In the list of stations on its northern limit in the table of mean temperatures, the following are the positions and sources of observation:

Albion Mines, Nova Scotia, latitude 45° 30′—10 years' observations by Henry Poole, esq.

Frederickton, New Brunswick, latitude 46°—a series from Dovè.

Houlton, Maine, latitude 46°, (Hancock Barracks)—17 years' observations at the military post.

Quebec, latitude 46° 48′—Rev. Dr. Sparks, 10 years, through J. H. H. Latour, esq., Montreal.

Fort Coulonge, Ottawa river, Canada, latitude 45° 50′—Siveright, 8 years' observations by J. H. H. Latour, esq.

Malone, Franklin county, New York, latitude 44° 50′—academy observations, 10 years.

Fort Mackinaw, Michigan, latitude 45° 50′—military post observations, 17 years.

Fort Brady, Lake Superior, latitude 46° 30′—21 years' observations at military post.

Temiscaming, Upper Ottawa river, Canada, latitude 47° 19′—2 years' observations by Siveright, from Richardson.

Penetanguishine, Georgian bay, C. W., latitude 44° 48′—1 year's observation by Todd.

Fort Wilkins, south shore of Lake Superior, latitude 46°—2 years' observations at military post.

Sandy Lake, Minnesota, latitude 46° 45′ (on Mississippi river, near head of Lake Superior)—2 years' observations by Rev. Mr. Holt.

Fort Ripley, Minnesota, latitude 46° 10′—2½ years' observations at military post.

Fort Garry, Lake Winnipeg, British America, latitude 50° 19′—2 months' observations by Moody, from Richardson.

Fort Union, on the Missouri, latitude 48°—observations by Prince Maximilian, in 1832-33.

Fort Union, New Mexico, latitude 35° 57′ (near Santa Fé)—observations at military post 1½ years.

Lapwai, Kooskooskia river, Oregon, latitude 46° 27′—2 years' observations at Mission by Rev. Mr. Spalding, from Wilkes.

Fort Colville, Washington Territory, latitude 48° 30′, on Clarke's fork of the Columbia—no observations.

Fort Vancouver, Columbia river, Oregon, latitude 45° 40′—2 years' observations at military post.

The list of extreme temperatures for the plains of the interior, embraces the following:

Pembina, valley of Red river of the North—observations by Charles Cavileer.

Fort Gaines, (Ripley,) of the upper Mississippi, military post.

Fort Leavenworth, on the Missouri river, Nebraska Territory.

Fort Kearney, Platte river, Nebraska.

Fort Laramie, upper Platte river, Nebraska, near Rocky mountains.

Cantonment Loring, (Fort Hall,) Lewis's fork of the Columbia, Oregon route.

Valley of Great Salt Lake, Utah—Captain Stansbury's observations.

The stations of the Pacific and other western climates are irregularly grouped. From the Pacific coast they have the following order:

San Diego, southernmost point of California, on the Pacific.

Fort Yuma, junction of Gila and Colorado rivers, of California, near the head of the Gulf of California.

San Luis Rey, on the Pacific, a little north of San Diego.

Rancho del Chino, near San Luis Rey, a short distance in the interior

Monterey, on the Pacific, south of San Francisco, and at the most exposed point to the sea influence.

Benicia, north of San Francisco a few miles, and somewhat protected from sea influence.

Fort Miller, valley of the San Joaquin river, southeastward from San Francisco.

Cantonment Far West, Sacramento valley, north of San Francisco.

Fort Reading, near the head of the Sacramento valley, California.

Port Orford, mouth of Shasta river, Southern Oregon.

Astoria, mouth of the Columbia, Oregon.

Steilacoom, or Puget's sound, southern point of Puget's sound, Washington Territory.

Columbia Barracks, or Fort Vancouver, north bank of Columbia river, Oregon, near Oregon city.

Dalles of the Columbia, near the passage of the Cascade mountains, by the Columbia on the east.

Oregon city, near the mouth of the Willamette river, Oregon.

NEW MEXICO.

El Paso, or Fort Fillmore, the first fort near the boundary, a few miles north of the town of El Paso.

Fort Webster, near Copper Mines of New Mexico, on the Rio Mimbres, west of Fort Fillmore.

Fort Conrad, Valverde, valley of Rio Grande, at 34° north latitude. Socorro is very near, and represents the same climate.

Albuquerque, on the Rio Grande, New Mexico, latitude 35° 13′.

Cebolletta, a short distance northwest of Albuquerque.

Santa Fé, New Mexico, latitude 35° 40′, 7,000 feet above sea.

Las Vegas, New Mexico, one degree of longitude eastward of Santa Fé, at 6,500 feet elevation.

CLIMATIC RANGE OF THE SUGAR-CANE.

The cane is more nearly associated with Indian corn in the general character of its climatic requirement than any other staple. It differs in this respect only in degree—each condition, or the principal condition of temperature, at least, being required in similar, but greater, tropical excess for the period of its growth. The cane is, indeed, wholly tropical for every other climate than that of the United States. In the southern part of the United States t c great heats of summer give this plant a range it attains in no other country of the same mean annual temperature; and it is limited only by the limit of its safe endurance of the winter. So far as the root-cane may remain uninjured by the frosts of winter, it may be cultivated successfully, as the aqueous precipitation and humidity are quite ample for all parts of the older States south of 34° north latitude, and east of the high plain and the deserts of Texas.

The area now occupied by the cane is quite limited—the lower parishes of Louisiana, a portion of Florida, in the latitude of Tallahassee, to Cedar Keys, and the Atlantic coast of Georgia, comprising its present extent. It is, however, a much larger interest than might be inferred from its limited range, in consequence of the immense capital required to conduct such estates successfully; and the possibility of its extension and enlargement becomes an important point of public interest for many reasons.

In examining this point, some comparison of the temperatures observed in the present cane districts with those in adjacent districts, and the comparison, also, of amount of rain in the same manner, will assist in the determination.

The analogies of the plant itself are also important. Its structure and saccharine development in the stem are strikingly paralleled in the stem of corn, and the conditions found to bring the last to the highest development may reasonably be supposed to be equally true of the cane. The short hot summer of the Middle States, and even of New York, loads the stem of the corn-plant with saccharine matter, and it is not unreasonable to anticipate similar results from limiting the period of growth in the case of the cane. Such has been the case, indeed, so far as the attempt has been made to extend the sugar culture in the United States; and though no precedent in cane culture can be cited, as no tropical climate elsewhere merges in this manner into temperate latitudes, the success of this extension in our climate cannot be doubted.

The table of temperatures observed in the present cane districts, and to the limit of its probable extension, will show how far mean temperatures for the several months justify such anticipations. With a summer heat high enough, the abrupt curvatures at the extremes of the season of growth are not injurious, if their limit still saves the life of the cane for the winter. Without knowledge of the point at which this is limited absolutely, it may probably be safely stated as nothing less than the freezing of the earth so much as to destroy the root of the cane. Frosts not affecting the earth so much that slight protection may not guard the cane-root from injury, cannot be destructive to this cultivation, if it follow the law of acclimatization of similar plants, as Indian corn, since this is ripened more promptly, and placed beyond injury by the approach of great changes in the autumn temperatures. As the heats of the summer close, the cane should be perfected in the same manner, and experiments upon this adaptation have, so far, been highly successful in the United States.*

In reference to the actual periods of growth for the cane in different climates, we have unfortunately but few facts. Such as have been noted are indications that, as the temperatures are lower, the period is increased, though no full comparison seems yet to have been made. Boussingault gives some notices of South American climates, as that at Venezuela, where the mean temperature of the year is 82°, the cane ripens in eleven months; where the annual mean is 76°, twelve months are required; where 74°, fourteen months; and where 67°, sixteen months. The notices are from Codazzi's Geography of Venezuela.

But of these climates it may be said that the lowest temperatures are in rainy districts, in which the annual curve during the months is very slight. These differences are scarcely such as to give ripening temperatures in any part of the year, and the cases prove rather the continuance of vegetation over those periods undisturbed, than any periodicity in the growth of cane due to a low mean annual temperature.

As far as examination has yet gone, we find no periodicity in the growth of any class of plants, and especially in those of semi-tropical origin, which may be discussed by the aid of mean annual temperatures alone. All depend upon the summer curve of differences among the months; and, as a rule, these periods are short or long, as this curve is high or low.

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*See an able article in De Bow's Review for March, 1853, and other articles there referred to.

The following tables are appropriately next in the discussion of this range of the sugar cane. They embrace results for a period sufficiently extensive at each locality to give them the most decisive value for whatever they may in this way express. It was thought better, also, to include some portion of the cotton-growing districts, and to make the tables serve for the examination of both staples.

Mean results in temperature and aqueous precipitation are the most important, and these usually give the boundaries of even annual cultivation more precisely than other forms of statistics, though in the United States the exceptions and limitations fall within the limits mean temperatures indicate. The limit of entirely successful cultivation is often a very different thing from this possible range, however, and it may fall far short of the other. The possible range of single extremes is here very great, and the cane, though least liable, perhaps, to this description of injury, does not wholly escape. Cotton is largely affected by such changes, and it has a wide margin of but partially assured success, which will be noticed more particularly in speaking of cotton alone.

The tables are deduced from observations representing very nearly the true mean temperature, as derivable from observations for each hour of the twenty-four. The hours observed in most cases represent this mean very nearly, and when this is not the case the principal corrections have been applied.

The amount of water falling, in rain and snow, is given in inches and tenths of vertical depth for an entire month, and for the mean of months and years.

Mean temperatures of the cane and cotton districts of the United States, with some foreign tropical comparisons.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Key West	70.0	70.7	73.8	76.3	80.2	82.1	82.3	83.5	82.5	79.1	75.6	72.8	76.7	83.0	79.1	71.2	77.5
Cedar Keys	53.9	52.7	67.3	68.7	75.8	78.6	80.5	80.7	78.7	73.1	64.4	59.8	70.6	80.0	72.1	57.8	70.1
St. Augustine	55.9	58.7	62.4	68.0	71.8	78.2	80.0	80.1	78.1	70.9	63.9	56.0	67.4	79.4	71.0	56.8	68.7
Savannah	52.6	54.7	60.0	68.4	74.8	79.4	81.3	80.5	76.9	67.2	58.3	52.2	67.7	80.4	67.5	53.0	67.2
Mobile	56.4	57.4	65.6	70.0	76.3	82.2	82.4	82.7	78.9	70.0	61.5	55.5	70.7	82.4	70.1	56.4	69.9
Pensacola	56.2	57.8	64.5	68.6	76.5	80.7	84.9	83.6	78.9	71.0	61.3	57.8	69.9	83.0	70.4	57.3	70.1
New Orleans	54.8	54.4	61.5	67.6	74.0	78.6	80.4	79.6	77.1	69.1	87.5	56.2	67.7	79.5	67.9	55.2	67.5
Galveston	48.1	58.0	63.5	70.0	78.7	80.7	83.0	83.3	78.3	73.1	60.2	55.6	71.0	82.5	70.2	53.8	69.4
Brownsville	59.5	66.9	69.4	74.5	78.9	80.8	83.3	84.6	80.4	73.9	66.9	60.8	74.3	82.9	73.7	62.4	73.3
San Antonio	52.7	57.8	65.5	69.7	76.4	80.5	82.3	83.6	79.9	72.2	62.2	52.1	70.5	82.2	71.4	54.2	69.6
Fort Jesup	50.5	52.3	59.3	67.4	73.7	80.3	82.3	81.3	76.1	66.2	56.7	50.3	66.8	81.3	66.3	51.0	66.4
Natchez	51.2	52.9	60.5	70.2	74.5	80.8	82.2	80.9	76.9	65.9	57.1	50.2	68.5	81.3	66.6	51.4	66.9
Fort Washita	44.7	47.9	52.9	63.5	70 7	76.5	81.3	81.0	75.1	63.2	51.6	42.8	62.4	79.6	63.3	45.1	62.6
Vicksburg	47.8	52.7	63 3	63.7	73.0	77.7	78.7	78.7	74.1	65.4	74.5	50.4	66.7	78.4	64.7	50.3	65.0
Memphis	41.7	45.9	55.3	59.0	68.9	75.8	79.9	78.5	72.5	58.4	53.3	40.2	61.1	78.1	61.4	42.6	60.8
Erie	45.4	51.4	58.9	62.9	73.9	78.2	80.5	80.5	75.3	64.8	53.2	47.2	65.2	79.7	64.4	51.3	65.2
Perry	39.8	55.1	63.2	62.9	74.1	78.2	82.3	78.8	74.8	67.6	53.3	50.9	66.7	79.8	65.3	48.6	65.1
St. John's, Berkeley	49.1	53.6	57.5	62.4	70.2	74.8	78.8	77.9	73.1	64.1	55.2	52.1	63.4	77.2	64.1	51.6	64.0
Tropical districts.																	
Havana	70.0	71.9	75.7	79.0	82.5	83.1	83.3	83.8	82.0	79.5	75.5	71.7	79.1	83.4	79.0	71.2	78.2
Kingston	75.7	76.0	76.0	78.1	80.2	80.6	81.6	81.0	80.7	79.8	78.7	76.4	78.1	81.1	79.7	76.1	78.7
Barbadoes	78.0	78.0	79.1	78.2	79.6	78.1	79.9	78.5	82.1	82 2	81.8	79.3	79.2	78.5	82.1	78.5	79.5
Madeira	60.2	61.1	63.4	65.4	67.9	69.4	71.7	72.8	72.1	69 5	65.4	64.2	65.6	71.3	69.0	65.8	67.9
Catania	49.3	54.3	56.0	61.0	71.6	78.9	86.5	88.2	78.6	69.9	59.7	54.9	52.8	62.8	84.6	69.4	67.5
Alexandria	57.3	57.8	62.1	66.9	70.2	76.2	78.5	80.3	78.1	74.8	68.4	60.4	66.4	78.3	73.8	58.5	69.3
Calcutta	69.4	74.9	82.3	87.1	87.2	85.1	84.2	83.6	84.0	82.0	75.7	69.2	85.5	84.3	80.6	70.9	80.8

TEMPERATURE STATIONS.

Key West, Florida, nine years' observations by W. A. Whitehead, esq.

Cedar Keys, Florida, three years' observations by Judge A. Steele.

St. Augustine, Florida, twelve years' observations at Fort Marion by the assistant surgeon of the post.

Savannah, Georgia, eleven years' observations by Dr. John F. Posey.

Mobile, Alabama, three years' observations by Dr. North.

Pensacola, Florida, four years' observations by J. Pearson, master of navy yard.

New Orleans, eighteen years' observations by Dr. E. H. Barton.

Galveston, Texas, one and a half year's observations at coast survey tidal station.

Brownsville, Texas, three years' observations at Fort Brown, by assistant surgeon of post.

San Antonio, Texas, three and a half years' observations at military post.

Fort Jesup, Louisiana, twenty-three years' observations at military post.

Natchez, Mississippi, seven years' observations by Dr. Tooley.

Fort Washita, Indian Territory, ten years' observations at military post.

Vicksburg, Mississippi, four years' observations by E. Leland Hatch, esq.

Memphis, Tennessee, three years' observations at navy yard.

Erie, Alabama, three years' observations by Drs. Jennings and Osborne.

Perry, Georgia, two years' observations by Dr. George F. Cooper.

St. John's, Berkeley district, South Carolina, nine years' observations by H. W. Ravenel, esq., secretary of Black Oak Agricultural Society.

TROPICAL DISTRICTS.

Havana, Cuba, three years' observations from Spanish West Indies, by Robredo.

Kingston, Jamaica, five years' observations by Lindsay.

Barbadoes, West Indies, one year's observations by R. Young, from Dové.

Catania, Sicily, three years' observations from Dové.

Madeira, (Funchal,) two years' observations, Mason's Treatise on the Climatology of Madeira.

Alexandria, Egypt, three years' observations by H. Thurburn, Journal Royal Geological Society.

Calcutta, India, ten years' observations from Dové.

Mean monthly and annual fall of rain in the sugar and cotton districts of the United States, (inches and tenths vertical depth.)

Places.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Savannah	14	2.6	2.6	4.2	1.9	5.7	4.7	9.4	9.3	4.9	3.1	1.7	3.2	11.8	23.5	9.7	8.4	53.4
St. Augustine	3	2.1	1.6	2.8	1.1	2.5	3.0	3.6	5.7	2.5	3.0	0.5	2.1	6.4	12.3	6.0	5.8	30.5
Cedar Keys	2½	2.6	1.3	2.7	1.2	1.1	5.8	10.6	5.5	11.7	3.6	2.9	2.4	5.0	21.9	18.9	6.3	51.4
Fort Brooke	13	1.8	2.8	3.5	1.7	3.2	6.7	11.2	10.4	7.2	2.5	2.0	2.3	8.4	28.4	11.7	6.9	55.5
Mobile	10	5.7	5.4	3.9	4.4	4.3	6.2	6.3	6.8	2.8	3.1	6.2	5.8	12.6	19.4	12.2	16.9	61.0
New Orleans	13	6.5	4.4	2.7	4.1	3.4	5.4	6.5	5.5	4.0	2.6	3.5	4.7	10.2	17.4	10.1	15.6	53.4
Fort Brown	3	1.9	1.9	1.0	0.6	2.4	2.7	1.8	1.9	4.8	4.9	2.5	4.1	4.0	6.4	12.2	7.9	30.5
San Antonio	3	0.8	4.6	2.9	2.8	3.2	6.3	2.6	0.5	1.9	1.8	2.3	2.9	8.9	9.4	6.0	8.3	32.7
Fort Croghan	3½	1.3	4.0	5.3	4.4	2.8	3.5	2.8	1.3	2.2	2.1	3.9	3.1	12.5	7.7	8.2	8.4	36.7
Fort Towson	14	3.4	3.1	4.4	5.6	5.5	6.2	5.4	4.0	3.2	4.6	4.6	2.8	15.5	15.6	12.4	9.3	53.0
Fort Jesup	9	4.4	2.7	4.6	4.7	3.8	4.6	3.8	2.8	2.9	5.1	3.1	4.1	13.1	11.1	11.1	11.2	46.5
Natchez	8	6.3	4.3	4.7	4.6	5.5	4.9	5.4	3.3	5.2	3.6	4.5	5.8	14.8	13.6	13.3	16.4	58.2
Jackson	3½	5.5	6.1	2.4	5.3	3.2	4.6	6.2	3.4	0.9	2.4	6.2	6.8	10.9	14.2	9.5	18.4	53.0
Vicksburg	3	9.9	4.2	3.9	3.1	3.0	3.7	2.2	4.8	3.8	3.5	3.9	2.2	10.0	9.5	11.2	16.3	48.4
Memphis	3	3.3	6.6	4.2	3.4	3.4	3.1	1.8	2.9	1.5	2.9	3.5	5.1	11.0	7.8	7.9	15.0	41.8
Monroeville	4	3.6	7.7	4.8	6.5	7.9	5.2	7.7	8.6	1.5	1.6	5.6	4.9	19.2	21.4	8.7	16.2	65.6
Perry	2½	1.4	2.9	2.5	3.5	4.3	3.3	5.1	8.2	1.3	1.5	9.9	3.5	10.3	16.5	12.0	7.8	46.7
Charleston	10	2.3	2.9	4.5	1.8	4.3	4.3	6.4	7.3	5.7	2.5	1.5	3.1	10.6	18.0	9.7	7.6	45.9

The degree of humidity and amount of rain may be supposed to be important and perhaps controlling conditions of climate affecting this cultivation. How far they are so, has been but slightly examined by the aid of precise statistics. Though usually flourishing in districts of great humidity, and of a large amount of rain, there is much reason to suppose that those conditions are quite unimportant in their climatic relations merely, and that the high fertility usually attendant upon such climates, or resulting from them in the accumulation of vegetable matter and alluvial soils, is the only thing necessary to the growth of cane. The distinction may be unimportant in the range of the cane in our climates, as, for all districts of the necessary fertility, the aqueous precipitation, at least, is quite large. The narrower range of fertile tracts in the southern interior and Pacific climates would scarcely permit its cultivation, whatever adaptation of climate might be found.

In this reference to the fall of rain and snow, and humidity, cotton is more directly affected than the cane, and the results of observations to the extent of the cotton region, and including that of the cane, are given in a table in connexion with the examination of the range of cotton cultivation.

That humidity, as a condition apart from aqueous precipitation, is not injurious to the cane in tropical climates, or with tropical temperatures in any climate, is quite apparent from what is well known of its most successful districts. The *tierras calientes* of Mexico, with their saturated atmosphere and profuse rains, for one part of the year, seem equally suited to its growth there, and in the dry season alternating in the same district; and equally with the constantly dry districts of the Eastern continent, where it is cultivated. At some periods of the summer, though variably in various years, the local humidity of Southern Louisiana becomes excessive; yet it is not noted as injurious, except in such excessive rains as mechanically break and injure the growths.

It may be reasonably inferred that no portion of the Southern States in which cane is now grown would be influenced by other conditions than temperature as merely climatic. Fertility, or specific character of soil, as alluvial, or largely abounding in vegetable matter, is doubtless indispensable.

The present limits of actual cultivation of the cane in Georgia reach to 32½° of latitude. The lower portion of the State, to this line, yields a greater or less product of ripened cane, and the chief obstacle to its cultivation, as a staple for export, appears to be the limited area of lands of the proper fertility. But a small share of the lands below 32½° will bear high cultivation in this State, and the actual cultivation of this staple there attained is only of local importance, except as showing the conditions of climate to be no obstacle.

In Florida, the same remark holds of almost the entire State. Some portions between Cedar Keys and St. John's river, and upon the rivers in that portion of the State, have a higher fertility, and may be made to produce abundantly when estates are generally opened. The climate here rapidly approaches the tropical character, and ceases south of the latitude of Cedar Keys to possess the distinguishing features of the principal portion of the cane district in the United States generally.

In Western Florida, the limit of the present cultivation of cane falls lower than in Georgia, and only portions of the counties bordering the Gulf are considered favorable to it. It may still be doubted whether this limit is one of climate only, and whether, with a favorable soil, both Western Florida and Alabama might not attain to latitude 32½° in an entirely successful introduction of this cultivation.

In Mississippi, little staple cultivation of the cane exists. The south-eastern counties have thin soils, and the greater area of the State east of the immediate vicinity of the Mississippi seems little adapted in soil to the cane. The western part of the State, however, carries the cultivation further north than in any State eastward; and the extreme limit of Holly Springs, near the 35th parallel, has produced successful growths of ripened cane.*

Louisiana is adapted to cane in every part, so far as climate is concerned. The south and centre are pre-eminently favored in soil; yet the excessive rains and the violence of storms occurring before the temperature has fully ripened the cane, in some measure balance the disadvantages of climate, which diminish the product in the colder parts of the State.

In Texas, the northern limit falls off even on the eastern border, and quite rapidly in going westward, in consequence of the general effect of the plains in producing great extremes of temperature. The northers and sudden changes diminish the thermal effect at the lower levels, and on the elevated plains they are still more severe. A line nearly diagonal to the parallels of latitude and longitude from the eastern boundary at 32½°, to San Antonio and Eagle Pass of the Rio Grande, would very nearly limit the country capable of producing the cane. For some portion of this district the extreme temperatures would render the risks

* Article on "Extension of Sugar Region," in De Bow's Review for March, 1853.

too great for reliance as a staple; but for most of it the question of success would depend upon soil and circumstances other than climate.

By the annexed tables of extremes of temperature in this region, it will be seen that San Antonio, in latitude 29° 20′, has as great a range and as severe extremes as Vicksburg, in latitude 32° 25′. The cause of this great difference is evidently in the great arid plains and mountains of Northwestern Texas, and their proximity to the heated and humid basin of the Gulf. The most extreme alternations of temperature and humidity occur in consequence of this relative position, which, at the occurrence of storms, calls unusual forces in operation from these extreme contrasts.

Minimum temperatures at stations in Texas.

Years and stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Fort Brown.												
1850	38	38	42	52	56	70	73	75	71	54	46	22
1851	36	42	42	54	64	72	72	73	62	52	31	28
1852	22	44	45	45	68	67	73	74	64	50	46	43
Ringgold Barracks.												
1850	40	32	35	58	54	69	76	74	68	42	42	18
1851	26	44	37	58	59	73	75	73	69	52	28	27
Fort McIntosh.												
1850	36	30	34	42	48	67	74	74	62	42	38	17
1851	29	37	33	54	56	70	72	70	62	47	23	23
1852	19	40	36	47	68	62	70	72	57	43	30	34
Fort Duncan.												
1850	37	29.5	35	38	43	66	70	67	61	43	34.5	12
1851	27	30	24	58	63	76	77	77	74	61	32	20
San Antonio.												
1850	36	25	35	49	50	70	73	71	65	50	39	18
1851	27	32	29	50	50	70	70	72	64	53	30	30
Fort Croghan.												
1850	28	15	28	32	40	50	62	67	60	41	30	9
1851	23	25	25	44	48	66	72	72	50	46	28	18
1852	8	30	34	40	56	60	69	68	51	40	32	24
Fort Gates.												
1850	34	20	29	37	40	55	61	62	54	30	26	4
1851	19	20	14	47	46	71	74	72	54	42	22	15
1852	8	......	......	......	......	......	......	......	......	......	......	......
Fort Martin Scott.												
1850	28	21	27	36	42	58	64	64	56	38	26	10
1851	22	25	19	48	54	63	66	72	47	40	23	22
1852	7	32	31	38	......	......	......	......	......	......	......	......
Fort Lincoln.												
1850	40	30	30	40	45	60	67	65	58	......	......	......
1851	......	......	......	......	......	......	71	70	50	44	24	28
1852	12	36	35	42	63	68	74	......	......	......	......	......
Camp Arbuckle.												
1851	11	19	21	32	......	......	61	56	38	34	24	7

Generally the range of the cane in the United States is large, and quite sufficient for any national requirement of this description of products. It is not proposed to consider this extension of its growth in any other view than that of climatic adaptation. As an economical inquiry, the character of soil and modes of cultivation enter largely, and these may continue to modify actual results much in the same measure they have hitherto been modified. Enough appears in the present line of inquiry, however, to encourage vigorous efforts to introduce the sugar culture into all the districts here enumerated. The probabilities are largely in favor of success; and when it is remembered that its acclimatization in semi-tropical districts has only been attempted in this case, and has so far been fully successful, it is certainly worth further effort to continue its extension.

COTTON IN THE CLIMATE OF THE UNITED STATES.

The list of plants originally or elsewhere tropical, and which become thoroughly acclimatised as staples in the United States, embraces several of great value. Cotton ranks first for its actual range, and for the district it occupies; and perhaps first for the country, as a whole. Some species of this genus of plants is found in every tropical climate either as native or introduced, and some instances of the cultivation of the annual plant in temperate latitudes elsewhere occur; but it nowhere else attains the financial and industrial importance it has in the United States. Passing its native limits altogether, and in a climate which at the outset would have been thought quite uncongenial, it rises to the highest rank as an agricultural staple, and develops the most extraordinary adaptation to our peculiar climate.

The cotton and cane regions in the United States are nearly identical as far as the cane goes, though there is a partial exception where we come nearest to tropical features in excessive summer rains and greater humidity, which will be noticed in connexion with the statistics of rains apparently best adapted to cotton. In temperature conditions the two staples agree very well, and in fact they range through the higher temperatures without any known limit in that direction in both cases. No summer seems too warm for either, apart from any connexion with humidity.

Defining our own cotton districts particularly, we find the mean summer temperature sufficient over a very large district, and that the characteristics of our climate in respect to frosts and single extremes of temperature must be taken as the principal guide. The summer months continue at a mean temperature quite well adapted to this growth as far northward as the lower portion of the Ohio river, in the 39th parallel of latitude, and nearly as far north on the Atlantic coast. The 36th parallel is, however, the limit of staple cultivation, and from this to the 35th only the more favorable aspects and districts are safe against extremes of cold.

In Northern Georgia and Alabama a small mountainous district prevents the cultivation of cotton, and nearly half of Tennessee, with a smaller share of North Carolina, is unfavorable for the same reason. Arkansas has some exceptions in the mountainous districts of the north-

western part of the State, and the most decided elevations in Central and Western Texas restrict it in that direction. For all the enclosed district the climate is singularly favorable to the staple cultivation of the annual cotton plant, and the practical questions are only those of special adaptation to the soil of different localities.

The whole of this great district is not, of course, at present occupied by this crop as far as it might advantageously be, under all the conditions which control the result. In many counties of Alabama, Georgia, and Texas particularly, the extension of its cultivation would furnish a better quality of the fibre, and thus equal in value the produce of warmer and richer lands from the increased price the better quality would bear. Such is the apparent influence of climate solely, and the shorter season has no other effect than to limit the period of growth in slight degree, with a diminished amount and an improved quality of the fibre. So far as the cultivation has recently been extended in new and more northern localities of the States of the Gulf and south Atlantic coast, this has been a uniform result.

In the States of the Mississippi valley, or those adjacent to the river, rather, the limit of this crop is considerably extended. The whole of Western Tennessee and Eastern Arkansas may produce cotton successfully as a staple, and instances of successful growth have occurred above the 39th parallel of latitude, in the river valleys of Missouri.

A summer mean temperature of 77°, and a mean for the year of 60°, appear, from the best comparisons of American records of temperature with actual cultivation, to be the lowest temperatures in which it may be entirely successful here. There appear to be no districts too warm, as said before, though in portions of the southwest of Texas the summer mean rises to 85°. With these definitions in mean temperature, there are important limitations in respect to extremes. The summer must be exempt from frost from the middle of April to the middle of October, and the great range of temperature occurring at these extreme months in many parts of the United States, especially in the interior, and in all districts not partaking of sea influences, restricts this cultivation much within the limits permitted by mean temperatures. It might be carried into the valleys of the Ohio and of the Mississippi, above the mouth of the Ohio, but for the spring and autumn extremes.

Amount of rain and the degree of humidity become important in the cultivation of cotton. Unlike the cane and corn, it cannot endure the excessive rains and the saturated atmosphere of a tropical rainy season; and wherever these conditions occur in the period of full growth, and during the processes of maturing, they greatly injure it. In Southern Louisiana, extreme seasons may induce quite decisively tropical features of the summer climate, and the possible injury in these cases enters largely into the estimate of the general risks attending the crop.

We are not sufficiently familiar with the requirement and range of the various species of this genus, to say that the result in case of the annual plant we cultivate is or is not singular, or whether any other species would permit of field culture, and yet be more hardy in this respect. Of the results in this case, however, we may not be in doubt, and may rely upon the fact that the annual field cotton has become, if it were not always and originally such, an extra-tropical plant, which

attains its highest perfection in a temperate climate of high summer temperatures. It certainly does not bear introduction into climates where alternate wet and dry seasons occur, and most parts of India present, for this reason, insuperable obstacles to the introduction of the American annual plant. The tree-cotton, or the woody and purely tropical plant, appears to have greater power of endurance of these humid extremes; but it does not seem to possess the same facile adaptation to the extensive cultivation required in field treatment and the management of estates, and it can never compete with the first in the markets of the world in cheap production.

The climate of a very large portion of the United States, embracing all south of the 35th parallel in the Atlantic States, of the 37th in those bordering the Mississippi, and to a line drawn from Central Arkansas diagonally through Texas to the Rio Grande, is singularly well adapted to the most extensive field cultivation of this indispensable staple. There is no area of similar extent which combines all the requisite conditions of climate; and the magnitude of the interests depending, and to depend for an indefinite period upon it, should induce great care that this cultivation is not permitted to exhaust its capacities in any manner. Those of climate are constant, and cannot, so far as we are enabled to compare climates of either hemisphere, be reproduced, and may not be found repeated.

The special comparisons of temperature which illustrate this position may be found in the table given in connexion with the sugar-cane, and in the tropical selections from climates of the Eastern continent. The summer temperatures are all equal to those of tropical districts, and are, probably, so far, of less importance than the amount of rain. To compare in this respect, we have but to refer to the amount given for localities in the cotton region of the United States, and to the known rule of distribution in tropical countries generally. In these the rainy season is almost always in summer; and where this season attains its maximum of humidity, as in the *tierras calientes* of Mexico, the annual plant is not cultivated. In northern Mexico, where the elevation is such as to render the rainy season little more than the actual summer rains of the United States, a growth of cotton exists similar to ours, though the area permitting this is extremely limited.

The table connected with the climatic range of the sugar-cane exhibits some of the more striking contrasts in distribution of rain affecting this staple.

The positions briefly indicated in the foregoing remarks may be further illustrated by a sketch of the varied range of the several species of cotton at different periods, and from the earlier dates of its cultivation. It is difficult to do more than give a general sketch, however, as the precise facts are not easily attained. Its relations to climatology are all we can determine, or would undertake here, and something may, perhaps, be done in this direction.

Some degree of cultivation and use of cotton has existed from time immemorial; yet the general character of this use in the arts was much more peculiarly local than that of any other material for fabrics or any other class of manufactures. It entered very little, if at all, into commerce; and there are scarcely any historical evidences of commercial use of cotton

until the activity of England began to gather raw material for fabrics of every sort in the seventeenth century. Some local or limited commerce in raw cotton undoubtedly existed, for some centuries previous, between small States in the south of Europe and Asia; but it had no general importance.* Fabrics, generally, of silk and wool, and the raw material for these, were the subject of extensive commerce many centuries earlier; and the point to which some attention seems to be deserved is, that with all this activity in the commerce of fabrics and raw material, scarcely anything was done in cotton until a more favorable climate permitted the great expansion which has taken place in this production in the United States.

Under the stimulus of the new demand arising in English manufactures, there seems also to have been no increase of production in the original cotton-growing regions. The best tables of the amount produced at different dates, whether entering directly into commerce or reported as the entire amount produced, give decreasing rather than increasing amounts for all these older countries. The restriction cannot, therefore, have been in the inactivity of commerce nor of manufactures, and it is very clear that it should be referred to those of cultivation merely—to the inadequate climate and soil for the production of raw cotton beyond the local demand.

That this limitation was mainly in climate, is still more evident by reference to the particular districts. In India, the localities of its greatest success are so purely tropical as to be adapted to the perennial species almost exclusively. The specific characters are but imperfectly determined, but it appears that the herbaceous species of temperate climates are nearly identical in these characters with the woody or tree cottons of India, and are, probably, offshoots of these perennial originals. This point is unimportant in the present case; but the reverse change, if change has taken place from the Indian species at all, of introducing herbaceous and annual varieties into India from the United States or other countries, is one of the greatest questions connected with cotton cultivation in its present immense expansion. The transitions from our climate to that of Lower India are so abrupt, that the herbaceous forms can scarcely be retained; and when the limits of this more purely tropical region are passed, the mountainous character of that continent soon shuts off the cultivation altogether. The upland districts of India, in which the plant will retain its herbaceous character, are too limited to supply any important measure of the demand now created in the commerce of the world.

Of Persia, Egypt, and Italy, the same remark may be made. Mexico has also but a limited area adapted to field culture of herbaceous cotton; and though all these districts may produce it for local supply, they are in no condition to furnish those surplus amounts of the raw material so imperatively necessary in the commercial States. With the demand rapidly and constantly extended as it has been for the last half century, the capacity of these older districts of its cultivation would have exhibited some expansion if such had been possible; but we note a steady, and sometimes large, decrease in the produce of Mexico, Africa generally, and all parts of Asia, except India, for the last three-fourths of a century.

The capacities of India have been more fully tried than any part of the United States, within this period, in persistent and well directed efforts to extend this cultivation. The wants of the English government, and the interests of their rule in India, have pressed them to make every exertion in aid of existing cultivation, and in the initiation of new modes. It has been attempted to make the American adaptation available there, and the well-established success of certain species of the plant, and certain modes of cultivation here, have been, as far as could be done, transplanted together to India, in the hope of attaining similar success there. But the American adaptation was itself a spontaneous result, rather than a conflict with climatological difficulties, and it appears wholly impossible to transplant its peculiar success. For the most of India the biennial or perennial species are best adapted, and its tropical climate either destroys the produce of the annual plant or changes it to the perennial form. Most of the American plants fail there to produce good cotton at all, and the recent faithful and expensive efforts to introduce it, point only to this result, and must be regarded as failures.

Whether the species peculiar or well adapted to tropical climates may be modified so far as to compete with the cotton of temperate latitudes, remains undetermined, except as the present want of any such success and adaptation may have determined it. There is no positive evidence that the purely tropical cotton may ever supply the want of civilized nations; nor does the Old World appear to offer fields for the cultivation of any species in any considerable degree of expansion beyond their present amount, and that which they have produced for an indefinite period.

From this comparison of the more general results, there are stronger motives suggested for such an analysis of our peculiar adaptation as shall show what the best results are that may be reached here. Very little effort at extension has been made here in fact, and the great advantages we clearly possess may be improved, perhaps, in a large measure. As said before, also, the climatic advantage is a positive and permanent one, and cannot, at any time, fail to the limit we have proved it.

The importance of the peculiar climatology of the cotton-plant as grown in America deserves some extension of the statistical matter given in connexion with the remarks upon the growth of the cane. There are also some misapprehensions, it would appear, respecting the atmospheric humidity of the cotton districts of the seacoast, and the real causes of the excellence of the Sea Island cotton. This is attributed, in some instances, to the greater humidity of this sea climate, and to measures of this humidity which certainly prove destuctive in other localities. There is not, in reality, so large a share of relative humidity, nor so great a positive amount of moisture contained in the air, on the immediate coast and islands of the Southern Atlantic States, as is often found in the interior, and as quite uniformly prevails at New Orleans in the summer months. The distribution of the amount

*In addition to what is said on pages 178 and 179 of this report relative to the early history of cotton, it may be stated that it extensively entered into the trade of China about the middle of the seventeenth century, and its manufacture had long before been regarded of great importance throughout Egypt and Syria, and most other countries of the East. D. J. B.

is more equal at all times on the coast, however, and the atmosphere is neither so dry nor so highly saturated as in the interior. The consequence of this equable distribution is found in the fine staple of the cotton there grown, and it is believed to be a difference belonging exclusively to climatology, which separates this variety from those cultivated in the interior.

The coasts of India are also the best localities for the produce of a good cotton staple; and wherever the coast position is such as to give a low amount of aqueous precipitation, comparatively, and an equable distribution of atmospheric humidity, these results may be expected. But coast climates of little higher temperature may differ widely in this respect, as in the eastern coast of Mexico, and of most parts of South America. These are excessively humid, and their extreme atmospheric saturation quite precludes the cultivation of these varieties of cotton, or of any, indeed, except the coarser perennial species.

To complete the illustration of these points somewhat more fully than the tables given in connexion with the cultivation of the cane will permit, a few stations are here added giving particular contrasts, and representing extreme American districts. In the first of these the Sea Island district has a very good representation in the observations of R. T. Gibson, esq., at Whitemarsh island, Georgia. The contrast of this station even with Savannah, in temperature and amount of rain, is very striking, and still more decisive with Cedar Keys and New Orleans.

Mean annual amount of rain for the months and the year, (in inches and hundredths.)

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
White-marsh island, Ga., (4½ years)	2.34	1.73	3.31	1.96	4.68	3.56	4.73	5.14	4.86	1.55	2.32	2.85	9.95	13.42	8.74	6.91	39.03
Savannah, Ga., (14 years)	3.19	2.28	3.84	2.75	5.04	4.07	7.25	7.76	4.94	1.55	2.37	5.12	11.63	19.08	8.86	10.60	50.17
Cedar Keys, (2 years)	2.56	1.34	2.65	1.19	1.08	5.79	10.56	5.52	11.75	3.64	2.85	2.44	4.92	21.88	18.94	6.34	51.38
N. Orleans, (13 years)	6.49	4.42	2.73	4.13	3.45	5.40	6.54	5.46	3.95	2.60	3.54	4.65	10.31	17.40	10.10	15.66	53.37
Vera Cruz	5.10	0.00	0.00	0.50	31.40	21.20	59.70	35.90	38.90	8.00	4.50	0.40	31.90	116.80	51.46	5.50	*164.88

* The sums for each month at Vera Cruz are for one year only, (1830;) the mean for the year is for nine years.—*Mayer's History of Mexico.*

These observations are by R. T. Gibson, esq., at Whitemarsh island; Dr. John F. Posey, at Savannah; Judge A. Steele, at Cedar Keys, Florida; and Dr. E. H. Barton, at New Orleans; by each reported in manuscript to the Smithsonian Institution.

The first quantities are clearly less than those at Savannah at all seasons, and the comparison of this island, which is but a short distance from Savannah, and not far from the main coast, shows the Sea Island climate to have a much less excessive amount of rain, and consequently a much less atmospheric saturation, especially in summer. Its temperatures are also lower.

Mean temperatures of specially important districts in the cultivation of cotton.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Whitemarsh island, Ga.	48.3	53.1	58.5	63.1	71.9	76.3	79.1	79.1	73.9	66.0	56.7	52.1	64.5	78.2	65.5	51.9	64.8
Savannah	52.6	54.7	[illegible]	66.4	74.8	79.4	81.3	80.6	76.2	67.2	56.3	[illegible]	67.7	80.4	67.5	53.[illegible]	67.2
Cedar Keys	53.9	59.7	67.3	68.7	75.8	78.6	80.5	80.7	78.7	73.1	64.4	59.8	70.6	80.0	72.1	57.5	70.1
Havana	65.3	70.0	72.0	75.4	79.7	82.7	83.2	83.0	80.6	78.4	72.6	70.0	75.7	84.2	77.2	[illegible]	76.4
New Orleans	54.9	54.4	61.5	67.6	74.0	78.[illegible]	[illegible]	79.6	77.1	[illegible]	57.5	56.2	67.7	79.5	67.2	55.[illegible]	[illegible]
San Antonio	52.7	57.8	65.5	69.7	76.4	[illegible]	[illegible]	79.9	72.2	[illegible]	[illegible]	[illegible]	70.5	[illegible]	71.4	54.[illegible]	[illegible]
Fort Smith	41.6	44.8	50.9	63.[illegible]	69.1	75.7	79.6	78.1	72.1	60.3	49.7	40.0	60.8	77.6	60.7	42.1	60.2
Jefferson Barracks	33.6	35.9	46.5	58.1	67.1	74.4	78.2	76.7	68.4	56.9	45.6	35.5	56.9	76.4	56.7	34.6	56.2
Lebanon	33.7	36.5	47.3	53.9	66.4	73.2	76.4	74.1	66.0	57.6	46.9	36.2	55.9	74.6	57.3	[illegible]	55.9
Huntsville	48.9	48.6	51.3	61.3	67.9	74.2	76.4	76.3	70.1	60.5	49.7	41.8	60.0	75.6	59.8	42.1	59.7
Knoxville	39.5	42.5	52.4	60.4	64.7	[illegible]	79.1	69.9	66.0	59.6	44.1	44.5	55.8	72.5	56.4	[illegible]	[illegible]
Chapel Hill	42.0	44.0	51.2	59.5	67.2	74.6	77.7	75.4	69.7	59.2	51.6	42.5	59.3	75.9	60.2	42.9	59.6
Fort Monroe	40.5	40.9	47.5	56.1	65.9	74.1	78.3	77.1	71.4	61.7	51.2	43.2	56.5	76.5	61.4	41.5	59.0
Camden	44.7	40.9	55.6	60.6	71.0	76.2	79.7	77.8	73.2	62.2	52.3	47.7	62.4	77.9	62.6	47.[illegible]	[illegible]

The first part of this list represents the warmest cotton climates of the United States. The best single station, Whitemarsh island, Georgia, (near the mouth of Savannah river,) which is a representative of the Sea-Island climates, is seen to be much cooler than Savannah, or any other in this part of the list. Humidity enters largely into the account also, and by reference to the amount of rain at the four stations of Savannah, Cedar Keys, Havana, and New Orleans, it is shown that they are so much more humid as to render the temperature measures too low for just comparison with other localities. San Antonio is drier, and its temperatures better compare with the second list.

In the second part of the list, limiting stations on the north are given. Jefferson Barracks, Missouri; Lebanon and Knoxville, Tennessee; and Chapel Hill, North Carolina, with Fort Monroe, at the mouth of the Chesapeake, Virginia, are all beyond the present actual field cultivation, and each is probably too cold for complete success. Fort Smith, Arkansas; Huntsville, Alabama; and Camden, South Carolina, represent the best northern cotton districts near the limit of its extension.

Lowest observed temperatures in the cane and cotton districts of the United States for each month.

Years and stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
New Orleans.												
1849									64	52	46	33
1850	30	31	38	50	55	56	75	74	60	46	45	30
1851	32	35	38	50	55	60	73	71	55	40	35	33
1852	16	30	30	47	62	65	72	71	64	52	41	37
1853	28	36	43	50	60	70	72	72	60	46	45	30
Austin, Texas.												
1851				40	50	64	68	60	54	47	30	17
1852	13	30	32	40	61	58	71	67	58	42	32	21
1853	24	29	35	46	59	70	68	72	50	30	30	37
Natchez.												
1849					50	66	71	70	61	45	40	36
1850	22	27	30	40	46	56	66	60	50	35	24	16
1851	30	30	29	46	50	66						

Lowest observed temperatures in the cane and cotton districts—Continued.

Years and stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Jackson, Miss.												
1849	...	...	...	...	...	60	66	71	52	34	33	18
1850	28	20	30	30	47	53	66	72	56	29	23	17
1851	32	29	32	42	42	...	62	65	41	32	28	20
1852	11	32	31	37	62	57	61	62	52	43	27	30
1853	23	26	34	...	...	...	...	...	...	...	...	...
Cedar Keys, Fla.												
1851	...	...	...	...	62	68	76	72	53	51	44	31
1852	22	44	47	54	63	67	73	71	69	61	45	43
1853	37	37	50	54	67	73	77	76	67	52	52	30
Whitemarsh island, Ga.												
1849	...	...	...	...	46	66	64	71	58	46	37	36
1850	31	25	39	44	54	58	71	70	59	37	33	28
1851	23	27	34	45	53	60	70	65	42	38	29	18
1852	10	28	31	44	51	61	72	66	60	40	33	31
1853	26	30	34	50	60	67	74	72	59	40	40	29

Lowest temperatures at stations near the limit of the cotton region.

Years and stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Chapel Hill, N. C.												
1849	...	...	...	...	47	58	55	60	51	35	32	20
1850	18	12	27	30	47	55	65	62	51	32	24	18
1851	6	11	30	36	40	54	65	56	46	33	28	10
1852	1	23	27	34	41	51	66	59	51	40	29	29
1853	16	26	15	37	48	60	62	57	43	32	26	19
St. John's, Berkeley, S. C.												
1846	...	...	29	40	55	58	62	71	58	40	22	24
1847	15	27	28	37	43	64	64	68	53	44	20	21
1848	24	25	27	39	47	58	70	66	51	42	25	33
1849	17	21	37	27	47	63	61	69	53	42	23	31
1850	26	24	31	34	39	53	69	69	53	37	29	28
1851	14	10	20	36	37	52	63	61	43	31	20	10
1852	7	18	26	32	40	52	68	62	58	45	25	26
1853	18	21	25	33	38	57	63	58	49	30	24	34
Erie, Ala.												
1849	...	...	...	39	60	68	69	74	61	47	37	19
1850	27	17	30	40	46	61	72	73	65	33	24	21
1851	21	27	26	43	45	63	60	68	42	30	27	10
1852	2	28	26	42	57	58	69	64	56	48	29	28
Huntsville, Ala.												
1831	18	13	20	32	42	56	60	56	30	33	24	0
1832	—9	14	13	44	50	53	58	57	50	39	28	24
1833	16	23	11	36	55	56	50	57	52	42	24	27
1834	11	29	27	38	45	58	62	61	48	29	24	24
1835	22	—4	12	37	46	54	51	54	43	33	19	22
1836	—9	—7	21	34	50	58	58	58	46	29	14	0
1837	13	17	27	31	40	50	60	54	46	35	24	22
1838	18	8	31	33	41	50	64	63	40	29	20	—7
1839	22	16	13	37	42	52	60	62	43	42	13	17
Lebanon, Tenn.												
1851	6	12	13	33	33	58	57	62	35	19	19	9
1852	—7	21	15	32	39	47	60	57	46	33	16	20
1853	17	10.7	23	40	49	64	71	50	46	31	27	17
Memphis.												
1849	...	...	...	...	...	...	...	68	46	40	36	...
1850	30	16	30	40	44	52	61	64	50	30	28	20
1851	17	24	...	36	38	58	58	65	40	29	24	10
1852	—8	28	25	37	45	50	61	59	50	40	...	...
1853	20	22	30	43	49	72	68	60	50	36	34	26
San Antonio, Texas.												
1850	37	29	36	38	42	66	70	67	61	42	34	12
1851	27	30	24	58	63	76	77	77	74	61	38	30

NOTES OF THE HISTORY AND CULTIVATION OF COTTON ON THE EASTERN CONTINENT.

The following quotations from Schouw's Climatology may be inserted here, though they are not concurred in entirely by other authorities on historical points:

"Herodotus, who lived in the fifth century before Christ, reports that the Indians had a plant which bore, instead of fruit, a wool like that of sheep, but finer and better, of which they made clothes; and Arrian narrates that the Indians made their clothes of a kind of white flax which grew on trees. Other nations do not seem to have cultivated the plant at that time, or even to have used cotton; at all events, only exceptionally, as a rare and expensive stuff. Thus it is assumed that the precious material called *byssus*, spoken of among the Jews, was cotton. The growth of cotton and its use seem to have become diffused shortly after the birth of Christ. Strabo, in the first century of our era, speaks of cotton being cultivated and manufactured in Susiana, on the Persian Gulf; and Pliny mentions that the plant was cultivated not only in India, but in Upper Egypt, and says that the Egyptian priests used the material there grown for clothing. In all probability the Arabs brought the cultivation of cotton into Europe. In the time of Mahomet, the use of cotton was general among them, and the first country of Europe in which mention is made of the cotton-plant as an object of cultivation is Spain. An Arabian author mentions it as generally grown in the last-named country. Cotton culture did not come until later into Sicily, the South of Italy, and Greece; but cotton goods were brought from India, by Constantinople, to Europe, in the middle ages.

"Although this trade in cotton goods from India to Europe, partly by way of Constantinople and partly by way of Egypt, existed at a very early period, still the use of cotton stuffs was very limited throughout the middle ages, and in fact for long after.

"The most northern cultivation of cotton in Italy is near Naples, 41° north latitude, and particularly about Castleamare. Further south, it is found in Calabria and Sicily. When the trade of the Continent was closed under Napoleon, the Italian cotton culture was more considerable than at present. In Spain, cotton is cultivated on the south coast and on the east coast of Valencia, to 40° and 41° of latitude. It is even found on the plateaux. The cotton culture of Greece and the Greek islands is considerable, and it reaches to Constantinople, or about the same latitudes as in Western Europe. It occurs exceptionally in the Crimea, at 45°; but only on the south side of the high mountains, which afford shelter and cause a locally warm climate. The Asiatic coasts of the Mediterranean, Asia Minor, Syria, as also the Asiatic islands, produce cotton. In Egypt, especially of late years, Mahomet Ali has made great attempts to extend the cultivation of cotton, and it is grown all along the North African coast. Although Asia is colder than Europe in the same latitudes, the cultivation of cotton extends as far towards the north there as elsewhere, as it is met with in China and Bokhara, up to 40° and 41° north latitude—probably on account of the comparatively dry and warm summer; and in China and Japan it reaches the same limits."

CULTIVATION OF THE VINE IN THE UNITED STATES.

The determination of the capacity of our climate for this cultivation is more difficult than for the chief agricultural staples, as it is in every respect more difficult in its requirements. The temperature is not a precise guide, neither in the form of means for the proper periods, nor of extremes in the same manner, though there are limits of a general character on both points, and a wide range of doubtful ground must then be passed over to reach both lines of absolute limit. The climate of the United States, generally, has a great excess of humidity as compared with the vine-growing districts of Europe; and this is exhibited in a much greater amount of rain for the year, and in periods of greater saturation of the surface atmosphere. Our atmosphere is often supposed to be drier, and, as a mean, may perhaps be so, as it is certainly at times very much more dry and elastic. But these periods alternate with others of excessive saturation, and of such extreme character in this respect, and such considerable duration, that they influence delicate growths and fruits, as the European grape particularly, in a very unfavorable manner. It is evidently due more to this condition than to any other circumstance that our measures of temperature fail to be as decisive and intelligible as they are in Europe in respect to this cultivation.

In Europe, also, cultivation has attained to the extreme limits of climatic capacity; and the uniformity of all the conditions is such that it may be defined there with great precision, and by very narrow differences of temperature. Thus the sheltered valleys of Northern France and of the Rhine are extremely successful as wine districts, while the greater portion of the interior both of France and Germany, stretching southward over five degrees of latitude from the vineyards of Nassau and the Maine, fails in climate. These interior portions rise gradually as plateaux, and are both too cold and too variable for wine districts, though the measure of absolute difference in temperature is very narrow.

On the whole, the conditions and districts for Europe are capable of very precise determination, and may be used as rigid definitions if we are able to find districts here where they are reproduced. But in their application to our climate we find the amount of rain and the atmospheric humidity first to vary greatly, and in such a manner as to quite unsettle the precision of temperature measurements. Our extremes of temperature are also greater, and may, of themselves, deserve to be especially characterized in districts, first, of greater or less liability to extremes, injuring summer growth; and next, of liability to absolutely destructive extremes, destroying the whole plant.

Generally, we may compare mean temperatures with advantage as climatic guides on the larger scale, and as indicative of the range of native species from which we may develop some varieties with characteristics suited to our general climate. Subsequently, the humidity and distribution of rain may show what the probable differences of climate are in this respect, and what may be reasonably anticipated of comparison and experiment upon the whole subject of this cultivation.

European cultivation has undoubtedly done all for the extension of the vine culture that may be done. It passes the natural limit there by this excess of care; but it is only necessary here to consider the safe and recognised range of general cultivation. Kaemtz assigns latitude 47° 30′ on the Atlantic coast of France, latitude 49° in the interior, and 50° 20′ at Coblentz, on the Rhine, for the east. "In Germany it does not pass 51°, to which line it is sensibly parallel in Eastern Europe." These are extreme limits, and the true wine districts fall considerably lower, and probably should be designated as not above the 46th parallel on the Atlantic coast, 47° 30′ in the interior, and irregularly in the valley of the Rhine, somewhat beyond the 49th. Bordeaux, Dijon, and Manheim would represent these climates very correctly for France; and in Germany the elevations are such that beyond the Rhine they scarcely reappear north of the valley of the Danube and the climate of Vienna. By reference to the table of temperatures for Europe, it will be seen that the mean temperature of these localities is from 68° to 70° for the mean of the three months of summer, and for the warmest month 69° to 73°. In Central France, the elevations increase from Paris southward so considerably that the department of Aveyron, latitude 44°, and 2,066 feet above the sea, is, on the whole, less favorable to this culture than Paris itself.* No considerable district in this central portion of France affords a decisively favorable climate for the vine, and the successful localities are wholly in the valleys of the larger rivers.

The mean annual temperature is not a precise guide in this respect, as may readily be seen by comparing European mean temperatures for the year with those of America. Nantucket, Newport, New Haven,

* *M. Blondeau*, of Rodez, Aveyron, South France, in an instructive note in the *Annuaire Meteorologique de France* for 1850, has the following remarks:

"The determination of the conditions of climate in which the culture of the vine is possible, is of practical as well as theoretical interest. Knowing that any particular locality has long been devoted to this culture, we are able, as has been determined by MM. Arago and Furster, to fix, with a satisfactory approximation, the mean temperature of this locality; and, consequently, to know if the climate has undergone any change in successive periods. We can, again, by studying with care the circumstances prejudicial to the development of the vine, avoid the fruitless attempts which often cause the ruin of agriculturists who undertake this culture where it is impossible, industrially speaking. We believe, then, that with this double knowledge, it is possible to ascertain what are the causes which prevent this culture, and to fix the limits of successful prosecution of it with precision.

"The department of Aveyron offers very favorable conditions for the study of these questions, as it is situated at the extreme limits of this cultivation. In the environs of Rodez, but a single plantation of vines appears; and, again, fortunately for the solution of this question, it is very rare that the fruits produced attain to sufficient maturity to make good wine. So this unproductive culture has been completely abandoned, and this single vineyard remains as a definite mark of the limit beyond which vineyards may not go.

"By observation, continued during five years, we have been enabled to fix the mean temperature of Rodez at 50°.5, which differs little from that of Paris—the latter being comprised between 51° and 51°.4. The slight difference of some tenths of degrees between the temperature of these two places does not give the solution of the failure of the grape to ripen in the principal localities of Aveyron, whilst it ripens very well at localities elsewhere having a much lower mean annual temperature. Thus. on the Rhine, the vine ripens with a mean annual temperature of 48°.2 to 49°.1; and even at Berlin, with a temperature of 47°.3, a wine of good quality is produced. It is necessary, therefore, to seek the cause of this failure at Rodez in other causes than mean temperature.

"They will be found, it is believed, in the exposure to west and northwest winds, which re

and New York, on the Atlantic coast, and Monterey and San Francisco on the Pacific, are equal in mean annual temperature to Paris; yet the mutual relations of these localities in this respect are widely different. M. Blondeau, in the subjoined note, has fully shown that the mean annual temperature is not a guide for the great central plateau of France; and that many features of the single condition of temperature enter into this consideration, even where the remaining conditions of climate, or of humidity particularly, remain uniform.

Boussingault gives a table of temperatures actually found to be favorable and unfavorable in a well-established vineyard on the northern border of this cultivation in Germany. The three months of summer alone are not decisive, as may be seen by this table, and in the note of Blondeau; and it is clear that the whole period of growth, with the mean for each of the three summer months, must enter into the consideration.

duce the temperature in spring a degree below the mean temperature of that season at Paris. The following table of results of several years' observations exhibits this fact:

Mean temperatures of spring.

	Paris.	Rodez.
1846	59°	57°.2
1847	55°.7	54°.7
1848	59°.4	56°.5

"The winds referred to, blowing violently at the time when the blossoms of the vine appear, destroy these tender growths with cold or actual frosts. The varieties of the vine cultivated here cannot withstand these conditions as hardier plants may, or varieties of later appearance in spring, and of a thicker-skinned fruit, ripening slowly.

"The vines cultivated in sheltered localities produce a small black fruit, with a thick skin, and with very small seeds. These vines blossom late, appearing near the middle of June, and the fruit is not gathered until the middle of October. The amount of heat required to ripen these grapes, which produce wine of an inferior quality only, is greater than that which is necessary for the best varieties.

"The mean temperature of summer in Aveyron is, in truth, even greater than that of Paris, as is shown by comparison of different exposures—that to the north giving equal means from observations for several years, and that to the south exhibiting much higher temperatures from the greater number of clear days, as compared with Northern France. The results of observations are—

Summer.

	Paris.	Rodez.
1846	69°	61°.9
1848	63°.8	63°.8

TEMPERATURES FAVORABLE TO THE VINE.

Comparison of different years at the vineyard of Schmalzberg, Lampertslock, Flanders.—(Boussingault Rur. Econ., p. 255.)

	Mean temperature of whole time of growth.	Mean temperature of the summer.	Gallons of wine per acre.	Per-centage of alcohol.
1833	58°.4	63°.1	311	5.0
1834	63°.1	68°.5	413	11.2
1835	60°.4	67°	625	8.1
1836	60°.4	71°	544	7.1
1837	59°.3	66°	184	7.7

In 1833 and 1837 the wine was scarcely drinkable. In 1834 and 1835, unusually good.

In the sharper curve of monthly differences which characterizes the climate of the United States in contrast with Europe, it becomes still more necessary to compare the temperatures of each of the months which may influence the growth of the vine. Extreme months and single non-periodic extremes of temperature are quite as important here as on the elevated plateaux of France and Germany; and with

"And as the grape requires four months, or one hundred and twenty days, to come to maturity, the result is that it receives an amount of heat much greater than that required to ripen this fruit at Paris.

"From the 15th of June to October 15, the mean temperature of Rodez being 16° centigrade, we have, for the sum of temperatures for one hundred and twenty days, 1,920° (c); and solar heat for fifty clear days, at 18° (c), and seventy cloudy days, at 2°.5 (c), a sum of 1,085° (c); the entire sum being 3,005° (c.)

"From this we prove that the grape at Rodez demands, for its perfect growth, a much greater quantity of heat than is necessary for the varieties cultivated at Paris, which only demand 2,676° of heat, and a stronger grape than that at Berlin, which only requires 2,337° (c.)

"We have based our calculations on the mean temperature of Rodez; and while we have observed that in this locality the cultivation of the vine has been almost entirely abandoned, taking refuge in a sheltered valley some leagues from Rodez, in which they cultivate the vines mentioned to a great extent, the village of Marcillac is the centre of this culture; and this locality, in a low valley sheltered on every side by mountains, has a mean temperature of 55°.4. This is nearly the same as that of Bordeaux; and the quality of the wine produced there is much like that at Suresnes. If we then hold to the mean temperature as a guide, we will regard the locality of Marcillac as very favorable to the vine, whilst it is really the limit of its successful cultivation; proving, again, that when the vine is not effectually sheltered against the cold winds of spring, the hardy varieties alone may be cultivated, and those which produce less saccharine matter and more acid, furnishing a sharp wine with little alcohol. Some attempts have lately been made to acclimate at Marcillac the varieties grown at Bourgogne, and some species from strong stocks. We would not make haste to form opinions from these trials, but we fear much that the vines cultivated successfully on the lower plains will not bear the cold winds which prevail in spring throughout the whole central plateau of France.

"The purpose of this note has been to show that the mean annual temperature of a locality is not sufficient to determine whether the vine culture will be entirely successful, and that it is necessary to inquire whether other circumstances do not interpose insuperable difficulties. The vine is only cultivated in a very limited portion of the central plateau of France, and we must attribute this fact not so much to the mean temperatures for the year, as to the cold winds, which lower the temperature at critical seasons, and render the cultivation of early kinds impossible, even in sheltered positions."

[The reference in this note to the "*amount of heat*" required to mature the grape in the two cases is scarcely in keeping with its otherwise just views, and may be passed over as wholly unimportant. It could not, however, be readily severed from its connexion in the note.]

mean temperatures for the summer, or for the entire period of growth, fully equal to the European requirement, we may still find these extremes to have an injurious effect, and possibly to be fatal to the cultivation.

Winter temperatures are important also in some districts here, and the annual mean which would indicate that open cultivation, or that without winter protection, would be quite safe, proves not to be reliable in this respect. Such is the case on the open plains and prairies of the Western States from 38° of latitude northward, as has been observed by Dr. Ryhiner, of Highland, Illinois, in a careful examination of the question of introducing the European grape. The mean annual temperature observed by him for a period of twelve years is 55°, and the mean for the summer 76°.5. These equal the most successful vine climates of France and Italy. Dr. Ryhiner says of his experiments: "The mean temperatures show our spring, summer, and autumn to be very nearly as warm as Bordeaux, while our mean winter temperature is as low as that of Frankfort-on-the-Maine, and lower than that of the valley of the Rhine, as far as the grape is cultivated. This would show sufficiently that the European grape could not be cultivated with advantage, and actual experience proves it. Of a large number of vines from the Rhine and other sections of Germany and of France, planted here four or five years ago, not one survives; they generally perished during winter, the plants being frost-killed several inches into the ground."

The mean winter temperature at this locality is 33°.4, or somewhat above that indicated by Humboldt as the limit of the vine, and it is undoubtedly owing to the greater severity of non-periodic extremes that the complete destruction of the European grape is due.

Comparing the mean annual summer and autumn temperatures at this locality, with those given in Humboldt's table, we find the following results:

	Latitude.	Spring.	Summer.	Autumn.	Winter.	Year.	Yrs. observed.
Highland	38° 40′	55°.7	76°.5	55°.5	33°.4	55°.3	12
Bordeaux	44 50	56°.0	71°.0	58°.0	43°.0	57°.0	10
Manheim	49 29	50°.8	67°.1	49°.5	34°.6	50°.6	12
Berlin	52 31	46°.6	63°.6	47°.5	31°.0	47°.5	23
Cherbourg	49 39	50°.8	61°.7	54°.3	41°.5	52°.1	3
Cincinnati	39 06	53°.8	73°.7	53°.6	33°.8	53°.7	18

This table embraces one known successful and one known unsuccessful district in the United States; and of the European list Bordeaux and Manheim are successful, Berlin partially so, and Cherbourg wholly unproductive. These comparisons are given here to show that temperature conditions alone may not be taken as decisive, especially for the United States. For the year, 49° is given by Humboldt as the minimum requirement of the grape; yet we find its cultivation impossible at localities having an annual mean of 55°, and successful cultivation in others having but 47° and 48° in the United States. The western shores and islands of Lake Erie, in 41½° of latitude, are scarcely

inferior to Cincinnati in capacity for grape culture, and the mean annual temperature is 48°; at Oberlin, Ohio, 48°.3. For temperature conditions only, we have, therefore, no regular guide in our climates, and we require closer analyses of mean results, and more careful attention to the measure of non-periodic extremes, than is necessary in considering the same range in Europe.

As a rule, the culture of the European varieties most valued is very much restricted in the United States, and our variable thermal conditions and variable humidity are injurious for most if not all districts east of the Rocky mountains. We have more directly to consider whether any grape yielding the amount of saccharine matter necessary for the manufacture of wine, or for the perfection of the fruit itself, may be produced, and what the peculiarities of climate are which modify the European types. Our requirement is for a more hardy plant in its capacity to endure temperature extremes, and the still greater extremes of humidity.

Very little consideration is given to the amount of rain or degree of humidity in the examination of this subject in Europe, and this inattention to it arises mainly from the fact that this condition is generally so favorable, and so rarely injurious as a special extreme. Districts of like temperature here receive nearly twice the amount of rain falling there; and though our rains are of less duration, and occur on a less number of days of the summer, particularly the degree of saturation at these periods is much greater, and the amount of water falling is proportioned to this excess. The delicate structure of the European grape always suffers injury from this excess of humidity, and the extremes of temperature add another considerable measure of risk—together sufficient quite to discourage attempts to acclimatize here the favorite vines of France and Germany growing on the northern border of the wine districts of Europe.

These humid conditions and extremes are also non-periodic in all respects, and the most difficult of all elements of climate to measure in such manner as to assign to them precise values, and to permit comparisons of a general sort. It cannot be said that certain periods are characterized by these extremes as an invariable rule, but rather that they are liable to them, and that they may occur at any time. The warmer districts in which the vine may be cultivated are liable in a greater degree than other portions; the amount of water falling in the summer months being the best measure of this liability and of its possible effects. There is less precision on this point in direct measures of humidity in monthly means, for the reason that these periods alternate with those which have the most extreme opposite character—several changes perhaps occurring in the same month.

In the following table a selection of stations is given which represent the known wine districts both of Europe and the United States, with the mean temperatures of the seasons and year, the mean amount of summer rains, and some partial results of mean humidity deduced from the observation of the temperature of evaporation as indicated by the wet-bulb thermometer.

Humboldt refers to the excellence of the grapes grown at Astrachan, and pronounces them equal to the best of Italy. It would be interest-

ing to compare the varieties grown there with those of Western Europe; and as the temperature range at Astrachan is even more extreme than in any part of the United States, varieties found to succeed there might be transplanted here, or be made the model of some part of American cultivation.

Climate of the vine-growing districts of the United States.

Places.	Latitude	Elevation.	Temperature.					Amount of rain—inches.				
			Spring.	Summer.	Autumn.	Winter.	Year.	Spring.	Summer.	Autumn.	Winter.	Year.
Baltimore, Md........	39° 17′	193 ft.	52.3	74.3	55.6	34.3	54.1	11.5	13.7	10.2	9.0	44.4
Scuppernong, N. C....	35 50	30	58.6	74.7	60.0	43.3	59.1	*10.3	15.4	10.9	10.6	47.3
Chapel Hill, N. C.....	35 54	570	59.3	75.9	60.2	42.9	59.1	......	......	......	......	......
Camden, S. C.........	34 15	250	62.4	77.9	62.6	47.4	62.6	13.6	20.8	9.8	10.1	54.4
Sparta, Ga...........	33 17	550	63.9	79.2	68.2	46.5	63.2	11.1	10.5	14.6	15.5	51.7
Huntsville, Ala.......	34 45	600 (?)	59.9	75.6	59.8	42.1	59.7	14.9	14.6	10.0	14.4	53.9
San Antonio, Texas..	29 25	600	70.5	82.2	71.4	54.2	69.6	8.9	9.4	6.0	8.5	32.8
Nashville, Tenn......	39 09	533	59.4	77.5	58.2	39.2	58.6	14.1	14.0	12.3	12.4	52.8
Cincinnati, Ohio......	39 06	550	54.3	73.0	55.0	32.9	53.8	11.9	14.2	10.0	11.3	47.5
Cleveland, Ohio......	41 42	625	46.4	67.0	51.4	30.8	48.9	6.5	8.7	7.7	9.4	32.3
Oberlin, Ohio.........	41 23	799	45.6	69.3	49.6	28.6	48.3	9.3	11.4	10.0	5.2	35.9
Ann Arbor, Mich.....	42 10	750	45.5	66.3	48.4	25.3	46.4	7.3	11.2	7.0	3.1	28.6
Battle Creek, Mich...	42 20	800	44.4	70.2	49.9	26.8	47.8	7.5	11.2	7.1	6.8	32.7
New Harmony, Ind...	38 11	400 (?)	58.7	76.9	54.9	37.6	57.0	10.5	12.8	7.2	12.3	42.8
Highland, Ill.........	38 40	600 (?)	56.9	77.9	56.8	34.1	56.4	†12.2	13.3	9.2	7.1	41.7
St. Louis, Mo........	38 37	450	56.9	76.2	54.4	33.9	55.5	12.7	14.0	8.7	7.0	42.5
Fort Madison, Iowa ..	40 38	600 (?)	50.5	73.2	53.1	26.3	50.8	15.3	15.9	14.5	4.7	50.5
Fort Arbuckle.........	35 15	1,790	61.3	78.1	61.1	41.8	60.6	7.1	10.0	10.4	7.9	35.5
Albuquerque, N. M...	35 13	4,576	52.4	73.1	55.5	34.4	53.8	0.6	5.6	1.2	1.0	8.4
El Paso, N. M., (Fort Fillmore)...........	32 03	3,940	60.4	80.4	61.6	44.9	61.8	0.6	6.6	4.9	0.3	12.4
Rancho del Chino, Cal.	34 00	500 (?)	60.8	72.6	64.9	54.8	63.3	2.5	0.1	1.6	5.5	9.7

NOTES.

Baltimore, Dr. Edmondson, 8 years' observations.

*Scuppernong, Rev. J. A. Shepherd, 2 years' temperature. Rain at Fort Monroe, near Norfolk, Virginia, and for 16 years. This locality would represent the district in which Scuppernong is situated quite correctly.

Chapel Hill, Professor Phillips, 8 years. No observations of amount of rain have been made in this vicinity.

Camden, Thornton Carpenter, esq., 4 years.

Sparta, Dr. Pendleton, 2 years—1852-53

Huntsville, Rev. Dr. Allan, 12 years—1831 to 1842.

San Antonio, assistant surgeon military post, 3 years—1850 to 1852.

Nashville, Professor Hamilton, 7 years—1840 to 1845, and 1850.

Cincinnati, Professor Ray, 16 years.

Cleveland, Hon. E. Wade, 1½ year.

Oberlin, Professor Fairchild, 3 years.

Ann Arbor, "L. S. H.," 3 years.

Battle Creek, Dr. Campbell, 3½ years.

New Harmony, Dr. Troost, 2 years—1826 to 1828.

†Highland, Dr. Rybiner, 12 years' temperature observations. The amount of rain is from the record of Mr. Hall at Athens, Illinois, about 60 miles north of this locality, but in the same general surface and exposure.

St. Louis, Dr. Engelman, 16 years.

Fort Madison, D. McCready, 4 years.

Fort Arbuckle, on the Canadian river, 2 years' military observations, 1851-52. From this point to New Mexico wild vines are very abundant.

Albuquerque, surgeon military post, 3 years—1850 to 1852.

Fort Fillmore, near El Paso, surgeon military post, 1 year—1852.

Rancho del Chino, California, (the southern valleys of California, near Los Angelos, and in a superior vine district,) one and a half year's observations at the military post. The rain is given from measurements at San Diego, a lower position, on the coast. The summer rain is more abundant in this very superior vine district, which embraces the spurs and terminus of the coast range of mountains in the counties of Los Angelos and Santa Barbara of California. By the State census of 1852, Los Angelos county is reported as having 350,000 grape vines, and as producing 57,355 gallons of wine. Santa Barbara, Santa Clara, and Solano counties, have a large produce also.

Climate of the principal European vine districts.

Places.	Latitude	Elevation.	Temperature.					Amount of rain—inches.				
			Spring.	Summer.	Autumn.	Winter.	Year.	Spring.	Summer.	Autumn.	Winter.	Year.
Lisbon, Portugal......	38° 42′	Sea level.	59.6	70.9	62.5	52.5	61.4	......	......	......	......	......
Funchal, Madeira.....	32 37	1,200	65.6	71.3	69.0	61.9	66.9	......	......	......	......	......
Turin, Piedmont......	45 11	857	53.7	71.5	53.8	33.5	53.1	8.2	9.0	11.5	7.8	36.5
Vienne, Lyons, valley of Rhone...........	45 32	300 (?)	56.2	71.8	54.6	38.7	55.3	10.2	9.5	10.4	4.3	34.4
Bordeaux, W. France.	44 50	Sea level.	56.1	71.1	57.9	43.1	57.0	7.3	7.4	10.3	9.0	34.0
St. Michael's, Azores..	37 50	Sea level.	60.6	72.5	65.2	57.3	63.9	6.6	3.6	9.5	11.7	31.4
Vevay, Switzerland....	46 28	1,250	50.5	65.7	51.0	35.9	50.8	7.9	10.8	11.1	3.9	33.8
Manheim, Rhine......	49 29	258	50.1	67.4	49.9	33.6	50.3	6.3	8.0	7.4	5.3	27.0
Dijon, E. France......	47 19	700	53.3	69.6	53.3	35.4	52.9	7.1	7.5	9.3	7.3	31.2
Chalons, N. E. France.	48 57	492	51.0	66.8	53.8	37.1	52.2	5.4	6.2	6.1	5.6	23.3
Bucharest, valley of Danube	44 27	(?)	44.1	65.3	50.1	27.8	46.8	......	......	......	......	......
Astrachan, Casp'n sea.	46 21	Sea level.	52.6	75.9	52.4	19.2	50.0	......	......	......	......	......

NOTES.

Lisbon.—The temperatures represent the vine-growing districts of Portugal and Spain very nearly, though the summer temperatures are lower at Lisbon. No observations of amount of rain are accessible for any of these districts. The summer is, however, known to be dry.

Turin.—Temperature observations for many years. Distribution of rain from Schouw's table for the "Transpadane Belt" of the climate of Italy. The elevated districts of Northern Italy, yet lower than the Alpine, are very well represented by the table.

Vienna.—The amount of rain is the mean fall in the basin of the Rhone for five years through the period of vegetation, April to September; for the remainder of the year the quantities are for 1848 only. This is a favorite wine district.

Bordeaux.—Number of years of observation unknown.

St. Michael's.—Ten years' observations, by T. Hunt. Brit. Assoc. Reps.

Funchal, Madeira.—The vine district is at an elevation of 1,200 to 1,500 feet, and its temperatures less than than those here given. The amount of rain is quite similar to that at the Azores.

Vevay.—The amount of rain is given as measured at Geneva, which is unfavorable to the vine. Vevay, for which no observations of this sort exist, is only known to have less in summer.

Manheim.—Annual mean of rain for Strasburg, and the divisions among the seasons according to Kaemtz's table for the east of France.

Dijon.—Twenty years' observations.

Chalons.—Somewhat more elevated and exposed than the favorite vine districts of the Marne, for no precise locality of which are there any reliable series.

Bucharest.—Two years' observations from Dové.

Astrachan.—A series from Dové, without date.

The most conspicuous feature of this comparison is the excess of temperature and amount of rain for the summer in America, as compared with Europe. Both these measures are here so far in excess, compared with districts in which a similar extent of vine culture exists in Europe, that the parallel seems to fail of significance or of application in this connexion. We are, in truth, thrown upon a new trial, and upon the development of new or native varieties which will bear the peculiarities of climate, in regard to which we differ from Europe too widely to transfer their most successful varieties.

In the districts where the temperature and amount of rain are less excessive in summer, the opposite extremes of winter and spring temperatures are quite certain to become injurious. A district bordering the southern and western portions of Lake Erie is more favorable in this respect than any other on the Atlantic side of the Rocky mountains; and it will ultimately prove capable of a very liberal extension of vine culture. None of the stations given in the table represent it precisely, though Oberlin, Ohio, and Ann Arbor, Michigan, differ only in being somewhat more exposed and extreme in temperature at the colder seasons. The amount of humidity is much lower here in summer than elsewhere; and it corresponds more nearly than any other

district with the vine-growing districts of the Rhine both in temperature and amount of rain.

The southern portions of the Alleghany mountains, bordering the South Atlantic States and those of the Gulf, possess general characteristics greatly favorable. They have less humidity than the plains below them, reversing the European law of humidity and aqueous precipitation in this respect; and their exposures southward and sheltered valleys must favor this cultivation to a very great degree.

The present wine districts of Cincinnati, and other localities on the Ohio, and those on the Missouri, at Herman, are very successful in every point except the liability to injury from excess of humidity and of rains. The general climate will always present difficulties in this respect which the utmost care in cultivation and choice of position can only modify in slight degree.

In the lower portion of the valley of the Rio Grande, in New Mexico, the nearest approach to equable temperatures and the requisite low humidity is attained. In the vicinity of El Paso, vineyards are numerous and successful; the rarified atmosphere and slight precipitation of rain being more signally favorable than in any portion of the continent eastward. The cultivable districts in this latitude towards the Pacific must present many localities of proper adaptation in their peculiar conditions, though the extent of these is not great. The southern valleys of California, sufficiently distant from the seacoast and from the loftier sierras, would be unusually favorable.

Upon this point recent information from the southern portion of California is particularly favorable, and the probable results here indicated appear to be fully sustained. As these features of climate, which are known to be so decisive of the measure of success there, attain singular completeness, as it may be said—that is, the measure of humidity and of temperature becoming of the most perfect mutual proportion—the result is the most extraordinary perfection of vegetable development. This is true of other products—of wheat and the Cereals generally, of some varieties of roots, of particular species of trees, and of the vine and fruits; this in distinct localities, however, as if a variable division of the climate had been so arranged as to present conditions in the highest degree favorable to each product in turn.

The precise range of different varieties of the grape, whether native or European, does not enter into the present purpose; and the consideration of this point, which is properly with actual cultivators and experimenters, should so remain. The distinctions of this sort are in a more precise climatology than may be attained in this general comparison; and there are considerations not capable of being embraced in any climatology. We may indicate the range of the more delicate native varieties now cultivated, however, and also the range of the rude native or wild varieties, which pass through almost every peculiarity and shade of excellence as fruits.

In this last view, the range of wild varieties, of a certain class, is very great on this continent. Nearly the entire area of the United States in which Indian corn may be grown, produces, spontaneously, vigorous native species of the grape; and though the edible and valuable varieties are far south in this wild condition, there must be some

significance in this extreme range of the ruder varieties. It is believed that this limit is the possible limit of this cultivation under the high preparation and great care which are given this culture in Europe, and which may be given it here—that is to say, the more perfect fruits, when thoroughly acclimatized or developed from the wild varieties, may be extended, by skilful cultivation, over the whole area in which the native vine of any sort may be spontaneously produced.

To attain this extension in this country, as before remarked, we must develop especial features of adaptation to our peculiar climate. The production of seedlings, and the thorough discussion of the special requirements, is proceeding rapidly, and may safely be left to the culturists themselves. We have now two varieties, the Isabella and Catawba, which, if not both native, suit our peculiar climate admirably, and may be grown over a very large area where the European grape wholly fails. Central New York, Ohio, some parts of Michigan, Indiana, parts of Illinois and Iowa, &c., are successful districts with one or both these varieties, with slight protection. In the Ohio valley and Missouri, and in some parts of Western Ohio, near the extremity of Lake Erie, they fully succeed without protection, and are liable only to the injury resulting from humidity, rains, and other causes than temperature. The temperature limits of these districts can be stated only negatively, as not below 70° for the warmest summer month, nor below 30° for the coldest month of winter. Districts of 70° and more for July, may have too low a winter temperature, and such is the case in most of Michigan, the northern parts of Indiana, Illinois, and Iowa.

For the greater portion of the United States it may readily be seen that the climate will not permit the transfer of European varieties of the vine, and that though the conditions are generally favorable to growths requiring semi-tropical temperatures, they are rudely so, and we have extremes both of temperature and of humidity often injurious to delicate fruits. Varieties may be developed by cultivation which will possess adaptation to these rude characteristics of climate, however, and which will give larger production with an equal though peculiar quality.

Lowest temperatures observed at Hillsborough, Ohio—Latitude 39° 15'.—Rev. J. McD. Matthews.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1836	—14	—11	—8	22	35	50	52	54	34	24	10	—1
1837	4	—3	15	23	32	44	56	44	36	22	22	2
1838	4	—22	6	24	30	46	52	54	34	26	9	—5
1839	6	6	—10	28	30	46	51	48	30	28	2	2
1840	—2	4	16	24	36	44	50	54	......	......	15	4
1841	—8	1	13	28	34	52	55	52	20	26	20	10
1842	9	—4	23	30	36	42	52	46	40	28	2	1
1843	4	—5	—1	24	40	40	56	56	42	22	21	12
1844	—1	10	14	27	37	48	62	......	38	26	12	11
1845	18	8	13	18	36	51	53	65	......	26	9	—12
1846	7	1	17	31	43	48	52	62	47	31	16	18
1847	—4	5	11	24	38	47	52	48	40	27	16	0
1848	—4	13	2	32	42	47	54	56	36	32	22	19
1849	5	—2	25	22	42	56	54	56	42	36	22	—2
1850	4	—2	14	24	36	44	60	54	40	30	24	11
1851	—2	14	20	27	27	48	50	50	39	24	22	—10
1852	—10	14	8	30	35	42	51	51	44	36	25	18
1853	6	—1	15	35	42	57	57	50	44	31	23	7

Lowest temperatures observed at Highland, Illinois—Latitude 38° 40'.—Dr. Ryhiner.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1841	5	—2	19	33	34	48	54	51	43	17	14	15
1842	12	—2	23	37	37	38	48	36	35	28	3	—3
1843	—2	—4	2	22	36	40	50	50	49	23	18	9
1844	5	14	21	33	39	51	62	48	34	24	15	7
1845	18	12	16	20	35	50	54	57	38	21	3	—7
1846	16	—1	17	30	50	50	49	56	49	27	16	18
1847	—5	0	13	29	43	52	56	57	43	27	19	4
1848	—5	8	2	33	47	53	60	62	41	37	15	5
1849	6	—3	27	33	41	61	60	53	48	40	29	7
1850	8	—2	19	22	42	54	66	59	48	30	25	2
1851	—2	16	24	38	36	63	61	62	38	27	25	—4
1852	—15	15	19	32	48	54	59	58	48	40	20	17

NOTE.—Both these localities destroy the European grape by extremes of cold. Hillsborough is near the best grape districts of Southern Ohio, though its elevation is such as to give much greater single extremes of cold than Cincinnati. The difference in these cases is near five degrees of temperature for each marked extreme.

NOTES TO CULTIVATION OF THE VINE.

The limitations assigned to the wine districts of Europe are so various, as given by different authors, that it may be well to append here that of Gasparin, as given in his valuable work on the agriculture of France. It is instructive on many points of general climatology in Europe, and all these references aid much in the precise investigation of our own.

In Europe, also, the vine is made significant of permanent facts of climatology—the permanence or variableness of the constant quantities

of temperature and amount of rain. Some statistics are given by Gasparin in this view, which are not only sufficiently valuable in this particular purpose to repay their reproduction here, but they also possess a general interest as illustrating all questions involved in permanence of climate.

Gasparin's definition of the region of vines in Europe.

The culture of the vine embraces generally the region of olives; and beyond this the greater part of the plateau of Central Spain, and all the coasts west and north. In France, from the west coast at Guérande, near the mouth of the Loire, a line of limits extends in the direction of the Rhine, passing a little north of Paris, and terminating near Dresden. From this point it returns along the frontiers of Bohemia to its point of crossing the Rhine at Coblentz. It is then limited to the valley of this river and of the Lake Constance. Turning to the west at the approach of the high mountains of Switzerland, it does not include in its circuit the lower parts of the valleys of the Aar, the Theile, and Lake Leman, Geneva and Valais. Traversing the Alps in the middle of this last named canton, it follows the declivities southward to Venice, to return through lower Austria, Hungary, and Wallachia, eastward, to the Crimea. The mountainous districts of Servia and Bulgaria are the only exceptions to the districts here indicated, and are mostly limited to the production of Cereal grains and pasturage. These limits show an immense extent of country in which the vine is susceptible of cultivation, and which brings its fruits to maturity in Europe.

But there are important limitations to make in this general region. In the southern portions, the vine needs no shelter. If this is given, it is to increase the calorific effect for a particular purpose, and nct at all in fear of a failure to obtain ripe fruit. In the northern part it is necessary to choose localities with a declivity and direct exposure southward—really, the climate of the open country some distance southward. In these cases, the vine is not so much the product of the country generally as of particular localities. We may therefore bound the vine region again by a line of limits to its growth in general exposures and without shelter, and this is found to be very nearly coincident with the limit of maize. To define its precise limits in this sense, we embrace in the circuit so designated all localities where it is actually so cultivated, but it may be better first to define the sub-region of maize. We may premise that the sub-region of the north, where this plant does not mature, is a climate of transition ranging into the region of the Cereals and nearly separated from that of the vines. This exception made, we may proceed to limit the sub-region of maize.

This limit is nearly defined by a line of latitude crossing the mouth of the Garonne at Spire. In the country this embraces, maize is everywhere cultivated in the plains bordering the Pyrenees, the valleys descending from the Jura, in Lombardy, the Venitian States, Austria, and Hungary, in the plains—in a word, the warmest and the most sunny, and, at the same time, on the coldest districts of this region. In the centre of the olive region, however, the cultivation of maize is restricted by summer droughts, where irrigation cannot be had. North of the

line indicated, neither the duration nor the intensity of solar heat is sufficient.

PERMANENCE OF CLIMATE.

Mean annual amount of rain falling at Paris for decades of years from 1689 to 1834.

	Inches.
1689 to 1698	20.748
1699 to 1708	19.695
1709 to 1718	19.410
1719 to 1728	14.095
1729 to 1738	15.315
1739 to 1748	16.693
1749 to 1754	20.236
1783 to 1788	21.417
1805 to 1814	19.016
1815 to 1824	21.417
1825 to 1834	22.166
109 years' mean	19.055

Thus in the basin of Paris the amount of rain, so far from having diminished, appears to have slightly augmented since 1689.

Cesaris has discovered the same appearance of increase from 1763 for the city of Milan. The numbers are also for decades of years.

	Inches.
1764 to 1773	36.776
1774 to 1783	34.094
1784 to 1793	39.056
1794 to 1803	38.268
1804 to 1813	40.632
1814 to 1824	48.190
61 years' mean	39.460

In tracing these results by the calculus of probabilities, M. Cesaris found that the possible error is less than two millimetres, more or less, and that the hypothesis of increase in amount is most probable.

At La Rochelle, M. Fleurian found, for the years 1777 to 1834, a mean quantity of 25.118 inches; and from 1835 to 1840, 28.898 inches. This also indicates an augmentation in the quantity of rain.

In the basin of the Rhone, the result of observations of Flangerges shows the following means:

	Inches.
1778 to 1787	33.150
1788 to 1797	35.356
1798 to 1807	36.458
1808 to 1817	40.632

Here is again the same tendency to increase.

REMARK.—It may be said of these tables, and the remarks of Gasparin in this connexion, that the increase and decrease in amount of rain are both claimed to exist for districts but slightly separated, if not quite the same. Schouw assigns a much less increase to Milan than that here given, and names localities of both decrease and increase in the south of Europe. The balance of these various results leaves the general result an unchanged quantity for the whole comparisons.

In America, no evidence of change in amount of rain has yet been obtained. In another connexion the fullest discussion of this point will be made by the aid of all existing observations. It is sufficient here to say, that no change or periodicity in amount has yet become apparent.

NOTICES OF GRAPE CULTIVATION AND NATURAL VINE CLIMATES IN VARIOUS PARTS OF THE UNITED STATES AND TERRITORIES.

In the preparation of the article on the climatology of the vine, many incidental notices of its growth, as native, and of the success of cultivation in particular localities, have been obtained. Many of these may be valuable, if reproduced; and as the matter of this article scarcely admitted their incorporation in its substance, they are grouped as mere notices here.

At various points on the southern boundary of California, from San Diego to the Colorado river, Lieut. Whipple found, in 1849, very superior vineyards, and a great abundance of the most delicious grapes. Very little care was taken in cultivation, and many of the estates were then abandoned by their original proprietors.

Other parties have found them very abundant and superior in all the valleys of Southern California, and in many cases quite wild, as well as in vineyards where the country was occupied. Unfortunately there has been no observation whether they were European varieties introduced by the missions, or whether native species were so cultivated.*

At Monterey, Mexico, it is too warm for the grape; vines are abundant, but they fail in fruit.

At Parras, west of Monterey, and at an elevation of 5,000 feet, the district has long been celebrated for its abundance of grapes and cheap wine.

At El Paso, a superior vine district exists, and excellent wines are made. The grapes are of Spanish origin; a blue variety is the best; and a superior white grape is grown.

In Texas, grapes cannot be grown upon the low plains; but wild grapes of a superior quality are abundant on the borders of the plains. Wild grapes are also abundant on the Upper Canadian and Red rivers of the plains; but, both here and in Texas, none have been found without the characteristic thick skin of native grapes of the Southern United States.

At Natchez, Mississippi, several kinds of grape have been grown, but the wines made are variable, and the perfection of fine fruits uncertain.

In Northern Alabama and Georgia, grapes may be abundantly grown, and the native variety, called "Scuppernong," is quite successful.

The "Catawba" grape is claimed to be native at Catawba, Georgia,

* One of the principal varieties of the grape cultivated in California is stated to have been introduced from Malaga, by the Jesuits, about one hundred and fifty years ago. See statement of Mr. Waite, p. 299 of this Report. D. J. B.

and in parts of North Carolina. It was found near Asheville, North Carolina, by Col. Murray, in 1802, and by others in adjoining districts soon after.

The Scuppernong is much cultivated in the northern part of North Carolina, where it is native.

Boonville and Hermann, Missouri, are admirably adapted to the growth of the grape; and the native varieties are there much cultivated.

At Highland, Illinois, the European grape is destroyed by the winter, but many acres are covered by vineyards of the Catawba.

In Southern Indiana, as at Vevay, the vine is less successful than at Cincinnati.

TOBACCO.

The distinctive requirement of this staple, as respects climate, is very nearly the same as that of Indian corn. It differs somewhat in the degree of peculiarity, or in the measure of the differences from common climates, which constitute that requirement. This is shown in the European range of tobacco cultivation in France, Holland, and Germany, and the narrow difference which permits its extension over those countries extends only so much further the line of absolute and ultimate restriction. With a slightly milder temperature for the spring and autumn months, it will go to the line of 63° of mean temperature for July, or two degrees beyond the utmost limit of Indian corn, which is 65° for the same month. With lower temperatures than those found in Europe for the extreme months of the summer period, a higher temperature than 65° fails to secure a good growth.

Taking these measures, we may designate the climatological limit of tobacco cultivation for all parts of the United States. Wherever the growth of corn is completely successful, as in districts of a temperature for July above 68°, tobacco is and may be freely grown. Connecticut, Central New York, Ohio, and parts of Michigan, Indiana, Illinois, and part of Iowa, are all scarcely less adapted to tobacco culture than Kentucky and Virginia. The chief difference is a slight limitation of its period in time, and experience has fully shown that, to this extent, this may be very safely effected by a little care in selection of varieties.

Southward, its range is also like that of maize, with perhaps the exception of producing more desirable varieties in tropical climates. Cuba is the favorite of all known districts, indeed, and there seem to be no dangers to this plant from tropical excesses either of heat or humidity during the period of growth alone. In Cuba, extraordinary care is given to perfecting the peculiar qualities of the leaf, and the uniformity of climate at the close of the season is the greater of the advantages that island has over any part of the United States in accomplishing this end.* The ripening season is so often variable and extreme in the United States, that much is lost which is not really chargeable to the climate generally, or which might be avoided by adequate precautions.

*** It may here be remarked that, with the exception of that grown at Vuelta de Abago and other favored localities, the tobacco of Cuba is of no better quality than that grown in Florida and other parts of the South. D. J. B.**

The specific distinctions of this plant, as cultivated in America, do not appear important. The principal species, *Nicotiana tabacum*, is sufficiently variable and sufficiently capable of a wide adaptation to permit Cuban varieties to be immediately transferred to Ohio or New York; and there is probably no part of the continent in which tobacco has been, or may be grown, to which varieties from almost any other localities may not be directly taken. Several species are found on other parts of the continent as native, and the wild tobacco of the Pacific districts is used by the Indians, as that of the West Indies and Virginia was by the natives there at the discovery of America. In Persia, there is a native species; but most of the tobacco cultivated on the Eastern continent is from introduced American species. The existence, on remote parts of this continent, of native species of this genus, which strikingly resemble the best varieties in cultivation—as on the Missouri river; in Oregon, on the Columbia; in California, on the Colorado; and in New Mexico—sufficiently proves the almost universal adaptation of the plant to the temperature limits we have assigned. The species here discovered differ in so slight a degree as to bring them all decidedly within the list of luxuries, and to make their use as such common to the natives of the countries where they are found. For all that the extreme use of this article of luxury may ever require, there is ample space on this continent and the fullest adaptation in its climate.

The distinctions which may have some value in this connexion are those of districts in which climate and soil are alike favorable, and in which competing staples do not exist of so much prominence as to preclude attention to this. Maryland, Virginia, and Kentucky, will probably remain preferred districts for these reasons, though a large list of adjoining States might be added in case increased prices or exhaustion of soil should render it desirable.

As the distinctions in climate have reference to temperature mainly, at least on the side of limits towards the colder regions, and as these are very nearly accordant with those limiting the growth of Indian corn, it is unnecessary to give tabular statistics in this connexion. The measures of temperature for July, given at the commencement of this article, may be used, with the exceptions there indicated in regard to the temperatures of spring and autumn months. May to September, or from the middle of May to the 20th of September, is the average period required to be exempt from frosts, and this term of one hundred and twenty-five days is sufficient to mature not only this but many other products of American origin of the greatest liability to injury by frosts.

Statistics of temperature and of amount of rain would have little significance for the warmer regions. Texas and Cuba give the highest measures for particular months that are found on the continent, yet they do not seem particularly important, as such, to the cultivation of tobacco. No profusion of rain, as said before, appears important in that respect during the period of growth, or climatologically important. It will not illustrate any point, therefore, to distinguish districts in this manner. Whatever importance the amount or period of rains may have, appears only to refer to convenience of cultivation and curing, to which it is not proposed here to refer.

WHEAT CLIMATES.

The climatic range of wheat is greater than that of any other single staple whatever, in respect to some conditions. It differs so much from most others in its requirement of time, or the portion of the year occupied in its growth, that the temperature of the year, or of the seasons, is a less decisive test, practically, than would appear in a comparison of statistics for its several successful districts. Its flexibility, in respect to temperature, is very great on the side of high temperatures also in dry climates; and with both these points of direction in which it may extend its range, it becomes a cosmopolitan in cultivation, and goes almost everywhere through the temperate climates.

There are important limitations to its growth, however, in temperate climates, and many points on which its entire success depends are disclosed in an examination of the peculiar distribution of heat, humidity, and amount of rain throughout the year. It is very sensitive to certain extremes of this sort, and it is often very much restricted in actual cultivation by the risks arising from this irregularity alone.

The absolute temperature limits of the growth of wheat belong to the summer months, or to those in which it ripens; and for these months, they may be very precisely defined. The points of both the extremes are not far apart; and if absolute mean temperatures as recorded for the year could be employed, the district embraced would be very narrow. Before referring to actual districts of its growth, it may be well to give the apparent temperature limits of this ripening season.

In England, the summer of 1853 was, in many parts, of too low temperature to ripen wheat. The general deficiency of heat was from one-third to one-half less than usual. The temperature of July and August was two degrees below the average for those months, and 57° to 59° each. It is clear, from an examination of the temperatures for that climate, that a mean, for the ripening months, of 57° is insufficient to perfect the grain of wheat. As there are no American districts in which the temperature of other months is sufficient, and in which the heat of July falls so low as 57°, we cannot trace the line from these single months here. The temperatures are higher here as far northward as any grains may be grown, but for many parts of Europe this mean may be taken as a precise limit.

On the side of high temperatures, the United States give very good results from the experience of cultivation in various districts. At the extreme South, May is the ripening month, with a mean of 67° to 70°. In Virginia, June is embraced, and the temperatures are 63° to 65° for May, and 68° to 72° for June. Dividing the time in two months preceding the harvest, the means would be nearly 64° and 69° respectively.

In New York, at Rochester, the month of July is mainly included, and June and July are respectively 64° and 69°. In Illinois, the harvest closes in June, and the temperature of the last month is less than 70°; that of the one next preceding 60° to 62°.

From these comparisons, it may be seen that a temperature for the last month of the growth of wheat cannot exceed 70°, but falls rather below this limit. The recession of the ripening, as warmer climates are approached, to June, May, and even to April, as in Egypt, is sufficient proof of the temperature limit in that direction. There are, therefore, but 13° of absolute range in this respect for all climates, and for the climates in which we find these higher limits probably but 9°, or from 60° to 69°. The equable temperature and uniform humidity of the English climate, give a lower point for the low temperature extreme; and with the same equable and humid character, the higher limit would probably fall some degrees short of that found in dry and variable climates. Ten degrees of difference may be assigned as the maximum range of temperature under which wheat will ripen in similar climates, and 13° as the range for all, as far as we may now compare them.

The sensitiveness of wheat in general cultivation to the various modified forms of temperature and humidity, is probably greater in the United States than in Europe. All conditions are so uniform in Western Europe, that low temperatures are more decidedly indicative of injury than other changes, and the variability of production is mainly on that side. It is variable from many purely climatological causes here; and if we may compare these with some precision among themselves and with Europe, some useful results may be attained.

The period, or portion of the year, required for the growth of wheat is a noticeable point. In England and parts of Europe the entire year is embraced, and the temperature and other conditions for every month must be taken into the account. In the south of Europe, two months of the last of summer are not included, and at the southern limit of this cultivation in the United States, two and a half and three months must be omitted. In all parts of the United States where wheat may be grown, at least one month, August, is not among those affecting it in any manner.

The next important point is its variability as to requiring the winter, or embracing its extreme months in its period; as in the United States, at least, a very large amount is grown requiring but one summer. The climatological difference is less, however, in this case than would appear probable, as the winter varieties will grow almost or quite to the northward limit of the summer varieties. The difference is merely one of varieties, also, and they may, by changing the time of sowing, be mutually transformed at any time. The apparent difference of climatic requirement singularly fails in the case, therefore, and the variability seems an adaptation to peculiar soils, rather than peculiar climates. For the greatest perfection of the grain, as well as for the districts of most successful cultivation of any variety, we have to consider the winter climate.

In a succeeding list, stations limiting the growth of wheat by too high temperatures are given. These are at the limits of success sufficient to repay attention to it, rather than those at which some variety would not grow, and they limit it both in the winter and summer temperatures. By a slight examination, however, it will be seen that temperature alone does not decide it, as Fort Graham, near the dry plains of Texas, is quite as favorable to the growth of wheat as Fort Smith, Arkansas, or Memphis. Upper Georgia and South Carolina, also, are more favorable at the same temperatures than coast or lower districts; the cause in these cases being evidently in the differences of humidity and amount of rain. In a more particular reference to the humidity of various districts, this point will be again referred to.

An element in the winter climate is also embraced, not measurable in temperature merely. The amount of snow and degree of surface protection are very important, as the United States furnishes many excellent winter climates for wheat where it has moderate measure of surface protection, which are entirely destructive without it, and of which the measures of winter temperature alone would therefore be a very imperfect guide. It may be sufficient, however, to say that in the small portion of our wheat districts at the extreme Northwest only, is the amount of winter precipitation so small as to leave the surface generally unprotected by snow at the critical periods; and even in these districts the devices of agriculturists in leaving some previous crop on the ground, or by protection in some other manner, may and do avoid much of the injury.

Of this winter climate another remark should be made—that it must suspend vegetation almost entirely; and it may, indeed, keep it wholly dormant for four or five months. There appears to be no important restriction in this case except on the side of too much growth, and the plant is preserved as perfectly when five and a half months under snow in Maine, as when but one month without growth in Georgia.

Even in the Northwest, on the open plains, it is evidently more the alternations of temperature than the absolute temperatures that destroy it on exposure, though we are deficient in observations of the point how far the air temperatures may fall, or what absolute temperatures would be destructive. But we find limits to its successful growth in the temperature of other parts of the year before these extremes are reached, except in the variability of extreme years, so that the more important limitations are expressed in monthly means, as usually observed.

First in the grouping of districts and comparison of their observed temperatures, those of the best districts of the United States may be given, and a few stations are sufficient to represent these. The first stations of the following table are selected for this purpose: Rochester, for the incomparable wheat district of Central New York; Gettysburg for those of Pennsylvania and Maryland; Cleveland for Northern Ohio and Michigan; and Milwaukie for Wisconsin and Northern Illinois. These are extraordinarily favorable wheat climates, and the winter temperatures require only the partial protection the snows of these districts afford. August is always out of the year for these districts.

The next list is at the northern limits of wheat cultivation on this portion of the continent. West of the Rocky mountains no station is found at the precise limits, though our northern boundary is there very near it. At Castine, Maine, the summer temperature, or that of the earlier months of summer, is the most decisive limitation. At Quebec, Fort Coulonge on the Ottawa river, Fort Brady, and Fort Ripley of Minnesota, limiting temperatures for some of the summer months exist, and perhaps at Fort Brady that of the highest summer month is too low. At Montreal, Fort Howard of Northern Wisconsin, and Fort Snelling, the risks of low extremes in the earlier months of summer are considerable. The stations given in this table limit cultivation quite as far westward as the sources of the Mississippi; but here the declivity of the general

surface northward gives a singular extension of the district in which it may be grown to some extent.

Sir J. Richardson* notices this district particularly, and, except the previously known wheat district of Lake Winnipeg, at Fort Garry, his observations and information are new.

As the temperature for the whole summer is higher at Fort Garry than at the sources of the Red river of the North and of the Mississippi, the successful growth of both wheat and Indian corn near Lake Winnipeg is not so decidedly anomalous. Wheat is there said to be of as good quality as in the average of the United States wheat districts, though it is a spring wheat, and does not incur the risks of winter temperatures.

Richardson remarks, that "wheat is raised with profit at Fort Liard, in latitude 60° 5′ north, longitude 122° 31′ west, and at an altitude of between 400 and 500 feet above the sea. This locality, however, being in the vicinity of the Rocky mountains, is subject to summer frosts, and the grain does not ripen perfectly every year, though in favorable seasons it gives a good return." This is on Mackenzie's river. "At Dunnegan, on Peace river, lying in latitude 56° 6′ north, longitude 117° 45′ west, and at an altitude of 778 feet, the culture of this grain is said to be equally precarious. It grows, however, freely on the banks of the Saskatchawan, except near Hudson's bay, where the summer temperature is too low. From Mr. McPherson, I learned that on the west side of the Rocky mountains good crops of wheat are raised with facility at Alexandria, on Frazer's river, in latitude 52° 30′ north, longitude 122° 40′ west, and 300 to 400 feet above the sea; also at Fort George, on the same river, more than a degree further north, and 100 feet higher.

"At Fort James, on the border of Stuart's lake, in latitude 54½° north, in a mountainous region near the source of Frazer's river, wheat continues to grow, but often suffers from the summer frosts. In these districts the grain comes to maturity in about four months. In the colony of Red river its growth is luxuriant, though the upper part of that country, which touches the 49th parallel of latitude, is elevated about 1,000 feet above the sea.

"At Fort Francis, situated on the banks of Rainy river, in latitude 48° 36′ north, longitude 93° 28′ west, wheat is generally sown about the first of May, and is reaped in the latter end of August, after an interval of about 120 days.

"On the island of Sitka, lying in 57° to 58° north latitude, though the forest, nourished by comparatively high mean temperatures and a very moist atmosphere, is equal to the richest woodlands of the Northern United States, yet wheat does not grow."

This extension of the district in which wheat may be grown with some degree of success is very remarkable; and though it does not attain any considerable importance as an agricultural or industrial pursuit, the possibilities of cultivation are highly interesting, as belonging to the climatology of this staple.

*Journal of a boat voyage through Rupert's Land; Arctic searching expedition; by Sir John Richardson—1851.

It must be observed, also, that the temperatures of the months from May to August preserve a singular uniformity over this great area. Thus, at Fort Ripley and the various stations about Lake Superior and the sources of the Mississippi, the mean temperature of May is 48° to 50°; that at Fort Garry, 52°; that of Cumberland House, 52°; that of Fort Chippewan, Lake Athabasca, 15½°; and that of Fort Simpson and Fort Liard, at 60° north latitude, in the valley of Mackenzie's river, 47°. For the remaining months of summer, the temperature is much the same as that of the stations given as the northern limit of wheat cultivation, in the table on the opposite page.

On both sides of this district, and from the longitude of the west side of Hudson's bay, eastward, as well as west of the Rocky mountains, the temperature of all the months of summer is too low, and every degree of this cultivation falls off to the limits elsewhere indicated.

There are a number of districts in the United States, also, in which *high* temperature and humidity together very much restrict or quite discourage wheat cultivation, and three stations are given as representatives of their temperatures: Cincinnati, New Harmony, (Indiana,) and St. Louis. Generally, this area embraces the district of the greatest amount of rain on the Western rivers—that of the Ohio, as far up as Portsmouth, Ohio, and including much of the southern half of both Indiana and Illinois. A large portion of Missouri, with some part of Iowa, is of this character; and still more of the States further south, near the Mississippi. In these districts there is change sometimes in the nutritive matter of the wheat itself, it would appear, as that of Southern Illinois and Indiana is often injurious to health—in the local designation, "sick wheat." That this is the result of peculiarities of climate is scarcely to be doubted, though no precise examination of wheat of this character is known to have been made. The difficulty of growing it, and its variable and imperfect character, in warm and humid climates, are well known, and it is undoubtedly to extreme conditions of this sort that this defective and half-poisonous grain of the south of Illinois is due.

In continuation of these general temperature comparisons, we can scarcely arrive at any important result for the interior and Pacific climates. With extremely variable temperatures there, the adaptation to wheat is almost always good; and Oregon, with a climate of English uniformity, or with high winter and low summer temperatures, as compared with the United States at the East, produces wheat no more bountifully than the heated valleys of the San Joaquin and Sacramento rivers of California. The valley of the Salt Lake and New Mexico are, equally with the Pacific districts, very favorable wheat climates; but it may be said of all these, that where the temperatures are not moderate the climate is very dry, and that, in this respect, the principal source of injury to this product in warm climates is quite avoided.

In these references to districts of high summer temperature, it must be observed that the period of growth is invariably limited to earlier months, where those of the midsummer are so warm. The measures previously indicated as belonging to the several months of growth and ripening, are not, so far as known of any of the interior or Pacific climates, altered in any considerable amount.

Mean temperatures of the wheat districts of the United States.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Rochester	26.9	26.5	36.2	47.1	59.0	66.7	72.1	69.2	61.7	50.1	40.5	29.7	47.4	69.3	50.8	27.4	48.7
Gettysburg	28.4	30.8	39.3	50.0	60.0	68.8	73.4	70.8	62.9	49.1	38.3	31.4	49.8	71.0	50.1	30.2	50.3
Cleveland	27.2	30.1	36.4	44.4	56.1	68.1	71.7	68.0	62.1	51.0	35.8	29.0	45.6	69.3	49.6	28.8	48.3
Milwaukie	25.2	29.4	34.8	40.7	51.3	64.8	69.8	67.5	61.2	50.7	38.5	23.5	42.3	67.3	50.1	26.0	46.4
Northern limits.																	
Castine	21.4	22.5	30.4	41.4	50.3	59.4	64.8	64.6	58.4	48.4	38.0	25.5	40.7	61.9	48.3	23.2	43.4
Quebec	9.8	12.8	24.3	38.6	52.8	63.7	66.8	65.5	56.2	44.1	31.5	17.3	38.6	65.3	43.9	13.3	40.3
Fort Coulonge	11.5	15.7	28.7	40.5	54.4	65.4	69.4	66.4	56.3	45.0	31.3	17.0	41.2	67.1	44.2	14.7	41.8
Fort Brady	17.4	17.0	25.7	38.5	49.5	59.4	65.1	63.2	53.9	43.6	32.7	21.3	37.9	62.6	43.4	18.5	40.6
Fort Ripley	8.6	13.7	25.7	36.2	49.7	61.9	66.9	64.7	57.1	43.1	30.7	6.6	37.2	64.5	43.6	9.6	38.7
Southern limits.																	
Norfolk	40.4	40.9	47.5	56.1	65.9	74.1	78.3	77.1	71.4	61.7	51.2	43.2	56.5	76.5	61.4	41.5	59.0
Camden	44.6	49.9	55.6	60.6	71.0	76.2	79.7	77.8	73.3	62.2	52.3	47.7	62.4	77.9	62.6	47.4	62.6
Sparta, Ga	42.5	51.2	54.9	65.7	71.9	81.6	82.8	81.8	74.9	61.4	56.7	43.4	64.1	82.1	64.3	45.7	64.1
Huntsville	42.0	42.6	51.3	61.3	67.2	74.2	76.4	76.2	70.1	59.5	49.7	41.8	59.9	75.6	59.8	42.1	59.7
Memphis	41.7	45.9	55.3	59.0	68.9	75.8	79.9	78.5	72.5	58.4	53.3	40.2	61.1	78.1	61.4	42.6	60.8
Fort Smith	41.6	44.8	50.2	63.1	69.1	75.7	79.6	78.1	72.1	60.3	49.7	40.0	60.8	77.8	60.7	42.1	60.2
Fort Graham	47.0	53.1	59.6	63.2	73.3	79.4	85.4	85.2	77.8	68.4	52.1	47.4	65.4	83.4	66.1	49.1	66.0
Cincinnati	33.0	36.7	45.1	51.1	63.3	71.8	78.6	75.5	66.4	55.1	44.6	34.1	53.2	75.3	55.4	34.7	54.7
New Harmony	34.1	41.2	52.5	56.0	67.6	76.3	78.8	75.5	65.6	55.7	43.3	37.6	58.7	76.9	54.9	37.6	57.0
St. Louis	33.2	34.9	44 3	59.0	66.3	73.8	78.4	76.3	68.1	54.9	40.0	33.8	56.5	76.2	54.4	34.0	55.6

PRINCIPAL EUROPEAN WHEAT DISTRICTS.

England, the northern plain of Germany, and the central areas of Russia—the last stretching eastward from Moscow to the Volga, at the boundary of European Russia, and southward from Moscow to the Black sea, with Wallachia and Lower Hungary west of this sea—may be designated as the chief wheat climates of Europe. In northern Italy a great amount of wheat is also grown, and this last district may properly represent the warmer climates of that continent on which it may be successful. For these great divisions, the climate is very various, especially in temperature. The British islands have singularly uniform and equable temperatures, rarely broken by non-periodic extremes of any considerable measure, or of any great severity. The east and north of England are better adapted to wheat-growing than the western counties and Ireland; and two stations, one in York and the other in Essex, are given, which represent the temperatures best adapted to this crop, as grown there. They are seen to have no analogies in the American climate, except on the North Pacific coast, and to be extremely unlike those of Central New York, Maryland, and Wisconsin.

In England, the summer growth reaches forward also to the first of September, and its whole period embraces the entire year. It also requires very nearly the full measure of summer heat for each month, and is seriously injured or destroyed by a diminution of two or three degrees on the mean of a month. The same measure of diminution would produce no injury in American wheat districts.

The Baltic wheat climates are next in the European list, and their temperatures very much resemble those of England. They have a more decidedly continental winter, and the spring and autumn are marked in the same manner. For winter, the temperature is about 10°

lower in the mean of the three months; for the spring, 6°; and for autumn, one or two degrees. The climate is less humid, also, than that of England, and somewhat more variable in non-periodic extremes; and its range of safe production, or liability to injury in extreme seasons from too low temperatures, is somewhat greater than that of the British islands. Failures in the Baltic wheat crops are more frequent and more disastrous than in England.

The interior districts of Russia constitute quite another distinct climate, of a continental character mainly, though not the highest measure for the Eastern continent. From Moscow to the eastern boundary of European Russia, the distribution of heat through the year is most nearly as in Wisconsin and Minnesota, of the United States. Little is known of the precise relations of temperature to cultivation of wheat in these districts, or what varieties are most successful. Whether the winter enters into the temperatures to be considered, is also uncertain. Single extremes of temperature are here very severe, but there is a considerable amount of winter rains, &c., and the country is generally well protected by snow. As far as definite information exists, this protection must be somewhat greater than in the same temperatures of the United States, and more uniformly preserved through the winter. For the summer months, the heat is greater here than in England and North Germany; for July, four or five degrees greater in the mean of the month. At Kasan, the eastern extremity of this wheat region, the mean of the winter is lower than in any district in which it may be grown on this continent, and an effective winter protection must necessarily exist there.

In South Russia and Hungary, embracing the plains west of the Black sea in Wallachia and Moldavia, another immense wheat district exists. The northern and elevated portions would differ little in climate from Moscow, and the central portions are correctly represented by Bucharest. From one to the other of these extreme points, the temperature changes are as those from Minnesota to Central New York—all parts being continental climates of different measures.

This district is also so near the limit of the heat necessary to successful cultivation as to be somewhat variable in the amount produced in different seasons. Further south, however, it merges into the dryer and warmer climate of the vicinity of the Mediterranean and Asia Minor, which still produce wheat largely, and in which Egypt may also be embraced. The changes and transitions, in passing through this range of districts, are far greater than in the United States, or on any part of the North American continent; and the great differences between Kasan, of Eastern Russia, and the valley of the Nile, show the temperature adaptation of wheat cultivation in a very striking light.

Generally, it may be considered sufficiently clear that temperature limits, as represented in the full record for the year, are not the most decisive in restricting the growth of wheat. Variable as its period is in the year, from a growth requiring every month, as in England, to one from December to April only, as in Egypt, it has a very great range in respect to the mean temperature for the summer and year. By reverting to the peculiarities of the climate of the United States in regard to amount of rain and to humid extremes, we shall find that its

southern border here is defined by these circumstances more decidedly than by temperature. On the Pacific coast, and in the climates of the interior, where so much rain and such extremes of humidity do not occur, wheat grows well when the highest temperatures prevail during many months. The valleys of California are almost or quite tropical in the actual measures of temperature for the summer months, yet the wheat there grown is of the best character, and the produce immense in amount for the surface covered.

These Southern Pacific districts are the Italy and Asia Minor of this continent, in these more important features of climatic adaptation, indeed; and are somewhat anomalous in many respects, in comparison with all other wheat climates, and especially with those of England and the Baltic.

Wheat climates of England and the Eastern Continent.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
York	33.4	39.0	42.9	48.2	57.0	61.2	62.4	63.5	57.2	47.8	40.8	36.4	49.4	62.4	48 6	36.3	49.1
Epping	36.9	39.4	43.2	48.9	56.6	60.0	62.2	60.9	57.4	50.0	42.9	40.8	49.2	61.0	50.1	39.0	49.8
Dantzic	27.4	30.8	35.2	43.4	52.1	59.3	63.6	62.9	56.1	47.0	38.0	31.8	43.5	61.9	47.1	30.0	45.6
Konigsberg	24.4	26.9	31.4	41.3	51.9	57.4	62 6	61.7	53.6	43.7	35.8	27.1	41.6	60.5	44.3	26.2	43.2
Berlin	27.7	31.6	38.1	47.5	56.5	63.4	65.8	64.4	58.4	49.9	39.3	34.9	47.4	64.5	49.2	31.4	48.1
Moscow	13.6	16.0	26.7	41.7	54.4	62.4	66.4	63.1	53.2	39.5	27.1	16.0	41.0	63.9	39.9	15.2	40.0
Tambow	12.3	17.5	27.4	42.4	55.5	63 9	67.5	63.8	52.8	41.0	28.1	17.1	41.8	65.0	40.6	16.0	40.8
Kasan	3.5	8.1	20.7	36.3	51.5	61.3	64 8	60.8	49.0	37.1	24.6	7.5	36.2	62.4	36.9	6.3	35.5
Bucharest	24.0	26.3	31.7	44.3	56.3	62.5	68.1	65.2	58 3	49.3	42.8	33.1	44.1	65.3	50.1	27.8	46.8
Alexandria	57.3	57.8	62.1	66.9	70.2	76.2	78.5	80.3	78.1	74.8	68.4	60.4	66.4	78.3	73.8	58.5	69.3

CLIMATOLOGY OF GRASSES IN THE UNITED STATES.

A brief sketch of some leading points in this branch of agricultural climatology is all that may be attempted here. It is, for many reasons, a very difficult branch of the subject, and one on which little general comparison has been attempted. The necessity for any distinctions of districts or of adaptation has not previously existed, and no considerable extension of the cultivation of this branch of the graminæ has been required, except in the occupation of the United States. In the portions of the country first occupied, the climate permitted transplanting English and European species to the extent then required.

For the greater portion of the continent, however, we must find new species and a new adaptation. Those of English origin at least cannot go into our plains and arid districts; and whether these districts develop any new forms of unusual value or of especial adaptation remains to be examined.

The principal climatological differences that control the growth of grasses are those of moisture and dryness—humidity and aridity, as conditions of the air alone through the year. The temperature and amount of rain are less important, singly, though a saturated and retentive soil may make amends for lack of atmospheric moisture. Such soils are, however, almost invariably associated with climates of considerable and uniform humidity, and the distinction practically amounts

to little, except as first mentioned, or that between wet and dry climates in the usual sense of the terms. There are many subordinate distinctions in the character of the soil, and special adaptations in this respect, independent of climatic peculiarities. A class of grasses will flourish only on arenaceous tracts, and even on perfectly naked sands of a moist climate, which would not grow at all on sandy tracts of arid climates. Grasses adapted to these soils, therefore, are peculiar in this respect, in a degree subordinate to their climatological peculiarity; and those valuable in the sandy districts of a northern coast, in Europe or America, will not be likely to prove as valuable in any interior.

As now cultivated, or as relied upon in their natural growths, there are two well-marked divisions of American and naturalized grasses belonging to the dry and humid climates, respectively, of the whole United States. There is another distinction in the temperature of moist climates, as the cultivated grasses do not go into the warmer portions of the country, however humid. The English grasses are the principal ones, and consist of the genera *Poa, Phleum, Festuca, Agrostis*, and *Dactylis;* and their most striking peculiarity is the uniform turf they form in growth. Most of these are very well adapted to the climate of the Northern and Eastern States, and of the North Pacific coast; and they here form the great reliance of cultivators. But they also approach their climatic limit here very nearly in both temperature and humidity, and prove their native position to be in a more equable climate. The winter of the upper parts of the New England States and of New York is sometimes destructive from low temperature alone, and the dry extremes are very injurious, and sometimes absolutely destructive. What precise measures of low temperature destroy these grasses it is difficult to say; but every alternate year affords some locality in which the cold is so great as to destroy the Timothy and orchard grasses. A continuance of cold for some days below zero of Fahrenheit, and with a minimum of 20° below zero, is undoubtedly certain to be fatal if the surface is exposed to the air, and is without protection by snow or otherwise.

There is apparently little difference in the hardiness of the principal cultivated grasses in resisting the temperature extremes. Low temperature alone may destroy them in all the elevated portions of the New England States and New York, and in Wisconsin and some parts of Illinois. In most cases the destruction of the three principal grasses occurs at the same time, and no singling out of particular species is remarked.

In the direction of high temperatures there appears no definite limit of this sort, or none depending on single extremes; but all these grasses fail when the mean temperature of the summer months attains to 80°. They have but a variable and uncertain success in Virginia, and in all the States South and Westward they are still less reliable, or fail altogether. As they are all perennial in the highest sense, the whole year and all its extremes must be taken into the account. They cannot, as in the Cereals, choose a portion of the year only, and adapt their requirement of time to the temperature. In this respect they differ most widely from a very important class of native grasses, which occupy the arid portions of the continent.

In further notice of the limitations of the European grasses, the humidity of climate must be considered. The dry extremes of many of the States where they may generally succeed are quite injurious or destructive in many cases, and this is especially true of the States at the West, where the soil is less tenacious and retentive than at the East. They fail to form the characteristic turf there, and are so much injured by those dry periods as to become displaced, or to decay gradually, if not suddenly, and to require frequent renewal. This departure from the native climate of these grasses is so great at the plains beyond the Mississippi as to require a wholly new class, and the European forms there cease, to re-appear only on the coast of the Pacific, in Oregon and Washington Territories, where the English climate is itself in some degree reproduced.

The northern or low temperature limits of these grasses appear nearly identical with those of wheat, and their liability to destruction by the cold of winter alone, without regard to the lifting of the plant from the soil, as is the case with wheat on tenacious soils, does not greatly differ. The grasses will perhaps endure a few degrees lower temperature.

The high temperature limits are nearly the same as with wheat also, taking the month of ripening for wheat as the highest temperature for any month of the year. The range of the English grasses is here little greater than that of wheat in this definition. As in cultivation, they succeed when the mean temperature for July is 75° to 78°, while the limit of wheat is little above 70° for the same month. In cultivation without unusual care they would not differ widely.

There is a possible limit also in low summer temperatures, especially if accompanied with a large amount of moisture in the soil and atmosphere. We are not able to give so precise limits for the English climate in this respect as for wheat, though the grasses we have received from them will not go many degrees lower than wheat for the ripening period—probably not lower than to 55° for the warmest month of summer, while the same limit for wheat is above 57°. In the United States, it may not go so low; though the question is practically unimportant, as we have no districts below 60° for July. In cold and wet localities of the Northern States, the difficulty of preserving these grasses is well known; and, as in other directions of limit, they fail gradually under measures of climatic disadvantage not absolutely destructive.

The contrasted class of grasses adapted to arid climates may advantageously be examined next, and these are all, or nearly all, natives of the interior and western portions of this continent, where they are required. Nutritious grasses of general range over the country of their origin are few in number, while those growing in particular localities, as in wet, or sheltered spots, or in others not representing the general surface, are quite numerous everywhere. The principal of the new American grasses is the buffalo grass, (*Sesleria dactylöides;*) the bunch grass, (*Festuca;*) and the several species of gramma grass, *Chondrosium*, or *Atheropogon.* The range of these is, for the last, or the gramma grass proper, as given by Captain Marcy in his Report on the survey of Red river, "bounded on the north by near the parallel of 36° north latitude, and on the east by the meridian of 98° west longitude. It extends

south and west indefinitely; but appears to flourish better in about the latitude of 33° than any other. As there is generally a drought on these prairies from about the first of May to the middle of August, it would appear that the particular varieties of grass growing here do not require much moisture to sustain them."

The buffalo grass, or small gramma, extends at least to latitude 40° in the same longitude, and the associated genera and species called "*mezquit*"* with these, cover the best portions of the valley of the Great Salt Lake, with the entire country south and west on which rains fall at any season. This whole family is extremely valuable, seeding profusely, and covering every portion of the country where sufficient rain for its growth may be found at any season. In the mountains a winter variety is found remaining fresh, while that of the plains and valleys is dried by the late summer heats. The whole class is admirably adapted to the requirement of the country, as they remain during the warmest months of summer, and until the rains of the next season come on, in a dried form, preserving the nutritive qualities throughout.

The precise time at which the heat and aridity check its growth, and convert it into dried hay, is not sufficiently known for the different districts. It is probably controlled more by absence of water in the soil, and want of rain, than by temperature—the heat being sufficient for this purpose when the water wholly fails.

Wislizenus, Emory, and Abert, met the smaller gramma, called the buffalo grass, at 38° north latitude, and by their references it might be inferred that this was the northern border at that degree of longitude. But Fremont found it at 40°, on the same meridian and 98° west longitude, and near the Platte or Nebraska river. It probably extends still further northward, and over much of this great plain to the Missouri. There are no satisfactory notices of the grasses of this great region; but the inference is reasonable that it should range nearly as far as subsistence is afforded to the immense herds of buffalo occupying that area. The recent surveys north of the Missouri were, however, unable to find any considerable amount of it; and Richardson was also unable to find the buffalo grass on the Saskatchawan, though at the time of his visit, recent fires had destroyed the growth of all kinds. He remarks a large intermixture of carices with the festuca, and other true grasses, on all the northern portions of the prairie region.

The new forms of valuable grasses found in this great range in our interior, deserve the greatest attention in reference to their introduction in field cultivation. The native species of the prairie region, east of the Mississippi, probably cannot be cultivated—they give way too easily at the approach of cultivation, and those of the dry prairies are rarely found in seed. The turf of this prairie growth is very strong and enduring; and in the native state, these are valuable grasses, well adapted to the intermediate climates in which they occur, where the

* The term *mezquit*, *muskeet*, or *musquit*, is applied indiscriminately in Texas both to certain grasses and shrubs. Several dwarfy species of mimosa and acacia are called "muskeet trees." Some kinds of rich nutritious grasses, growing in tufts in that region, are called "muskeet grass." The true "musquit," (*Stipa spata*,) obtained from the banks of the Missouri, in 1804, by Lewis and Clarke, has been cultivated in Florida and Mississippi with the most favorable results. D. J. B.

humid and dry conditions pass into each other by gradual transition. These range over most of the country of the upper Missouri, as well as on the prairies eastward.

There is a large district in the United States deficient in adaptation to our present cultivated grasses, to which it may be possible to bring those of the interior ultimately. The prairie districts of the States bordering the Mississippi, and the principal portion of the Southern States, greatly need some better adaptations both to their soil and climate. The new grasses of the Southwest would probably not find a congenial climate in the Southern States because of the excess of rain and of atmospheric humidity; but for the drier portions of the States in the upper Mississippi valley, they may be found well suited. Some success has already attended efforts to introduce them.

They are perennials of as great endurance in the turf, apparently, as the English grasses, though they spread very slowly by the expansion of the root, and are reported to leave the centre of the concentric tufts in which they grow open, as by decay of the original root. But all the gramma and associated grasses produce seed largely, and under cultivation they might become all that could be desired as field grasses.

In California, valuable native grasses exist, in part of these and in part of other genera. There the climate is even more extreme in its contrasts, and some of the valuable grasses appear to be annuals. The bunch grass (*festuca*) is abundant on the upland slopes and valleys, and it is there, as everywhere, of great value. Whether this may be cultivated is more problematical than in case of the gramma, and there has probably been no attempt at it yet. In the lower plains and valleys, oat-grasses and annuals form a larger share; but whether they are exclusive occupants is not sufficiently known. There is certainly a tendency towards a less permanently perennial character in most of the grasses of the South and West, and they approach the higher graminaceous forms which constitute the grains, more nearly than those of northern origin, and the natives of humid climates.* The grains are, indeed, the product of the great continental interior of the Eastern continent, and belong to arid climates wholly in their original state. By analogy we might look for high graminaceous forms in the interior of this continent, but it is not known that any bread grain has had its origin in similar climates of this continent. Maize is one of the grasses or higher graminaceous plants, but this had a tropical origin, and it is, wherever grown, of a purely tropical type.

The grasses of the American interior are singular in all respects, and, so far as known, have no analogous forms in Asia. Too little is known, however, of the nutritious grasses of the interior of the Old World to institute a comparison of its forms found in arid climates with those produced here. It may be briefly referred to as a most desirable

* Bryant, in a work on California of some years since, says of the grasses of that country, "The varieties of grasses are greater than on the Atlantic side of the continent, and they are also far more nutritious. I have seen seven different kinds of clover," (not analogous to the true clovers,) "several of them in a dry state, depositing a seed upon the ground so abundant as to cover it, which is eaten by cattle, horses, and other animals, as corn and oats, when threshed, would be. All the grasses—and they cover the entire country—are heavily seeded, and when ripe are as fattening to stock as other grains."

point for investigation, however, and the continuance of the examination respecting climatic adaptation for the great interior area our agriculture should immediately embrace, is urged by the strongest consideration of both private and national economy.*

Little allusion has so far been made to the grasses fitted to the climate of the humid districts of the South. These have an essentially different requirement from either the arid regions of the interior and Southwest, or the debatable ground between these and the other extreme in the cool and humid climates of the North and East. From these last they of course differ still more widely. Experiment has very fully proved the impossibility of carrying the English and northern grasses under the excessive temperatures found in the Southern States. Both the temperature and humidity, or the joint effect of these, rather, precludes their growth entirely; though it is difficult to say whether either condition alone would so preclude it. Comparing the more humid climates of England with those of equally high saturation at the South, we might infer that temperature alone caused the difference, but positions in the States near the 39th parallel of latitude have temperatures in summer quite equal to those near the Gulf, and yet permit a considerable success in the growth of English grasses.

Agriculturists at the South have scarcely been successful in the attention hitherto given to the introduction of valuable grasses. Their cultivation is less a necessity of plantation management than of farm occupation, as at the North, and it only becomes imperatively such when the preservation of the soil from washing and exhaustion becomes necessary. Such is, at present, the state of much of the cultivated area at the South, and it is of the first importance to know whether the permanent grass covering of the soil may be attained by any possible means.

The normal range of the grasses, strictly speaking, is not so far south. Their native climates are north of the native grain districts, and in cooler and more humid atmospheres, while the southern part of the United States has a tropical summer, and lies on the opposite side of the climatological limit. We cannot anticipate success in grasses taken from the colder extreme in this opposite position, and probably very little for those adapted to dry climates, whether warm or cold. The source should be tropical or semi-tropical; and such has, indeed, been the origin of many species introduced and cultivated to some extent at the South. The Guinea grass (*Holcus polygamum*) is of this sort, and the Bermuda

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* Fremont remarks of the value of these indigenous grasses, as found in his earlier expedition to the Great Basin and to Oregon: "The grazing capabilities of this region are great, and in the indigenous grasses an element of individual and national wealth may be found. In fact, the valuable grasses begin within one hundred and fifty miles of the Missouri frontier, and extend to the Pacific ocean. East of the Rocky mountains, it is the short curly grass, on which the buffalo delight to feed, (whence its name of *buffalo grass*,) and which is still good when dry and apparently dead. West of the mountains it is a larger growth, in clusters, and hence called *bunch grass*. This has a second or fall growth. Plains and mountains both exhibit them; and I have seen good pasturage at an elevation of ten thousand feet. In this spontaneous product, the trading or travelling caravans can find subsistence for their animals; and in military operations any number of cavalry may be moved, and any number of cattle may be driven; and thus men and horses supported on long expeditions, and even in winter in the sheltered situations." (Report of Exploring Expedition, p. 277.)

grass, (*Digitaria dactylon.*) The last is much like the cane in its root and habit of growth, and both are purely tropical forms. The sugar-cane is itself frequently cultivated as a grass, with success; and all these are more easily cultivated as forage plants, to be used for pasturage and soiling only, than as dried in the form of hay. The succulent character of the growth scarcely permits curing, and the mixture of "winter grasses," or the coarser festucas often cultivated there for their winter's produce, of which the gramma grass and the technical "winter grass" are the principal, will ultimately be necessary to answer the end proposed in their grass cultivation, and indispensable, indeed, to their agricultural prosperity. The gramma grass of Texas and New Mexico may bear a considerable extension over the drier soils and least humid portions of the South, and it has already been introduced with some success.

These are substitutes for the true grasses, also, which may go into warmer climates than any grasses not of tropical origin. The trefoils—clover and lucerne—are important forage plants, not strictly grasses; and the lucerne is very well adapted to warm climates, at least in Europe. The clovers are nearly universal in their range; and as they add nothing to the climatic illustration respecting the grasses generally, they have not been alluded to. In some varieties, the clovers or trefoils will undoubtedly add to the resources of the warmer parts of the United States. The Chilian clover is new to the United States, and said to be successful to some extent. Leguminaceous plants also afford several species cultivated as forage plants in the South and West, or growing wild there. Several varieties of the wild pea are valuable in the native state, and many are cultivated. In California, a geranium (*Erodium cicutarium*) becomes a forage plant of great value; and several varieties, not precisely distinguished, have the general designation of "California clover."

These various substitutes will probably remain the principal reliance for our warmer climates; and among so many, it cannot be impossible to adapt some to both the winter and summer requirement of the South. The field occupation of their lands, in the interval of staple cultivation, by forage crops of some kind, is a most pressing need of Southern agriculture; and the selection from the list of plants capable of temporary or permanent occupation of the soil should be made without delay.

The grasses characteristic of arenaceous districts in the North and in Europe are very important in the economy of cultivation and in the reclamation of sea sands. In many localities on the North Atlantic coast they will be required to arrest the march of sand dunes, as in Holland, and on the English coast. But, as said before, their characteristic differences belong to soil rather than to climate; and, so far as known, the varieties used for that purpose would be of little value on the sandy plains of the interior. The gramma grass approaches nearest the qualities desirable there, and its distinctive adaptation is not to arenaceous soils merely nor mainly, but to the dry atmosphere and small amount of rain found in those districts.

In the present purpose, no illustration could be drawn from the experience of Europeans with arenaceous grasses, as there known. In the economical view alone, much may and should be done to introduce the species found valuable in Europe; and the attention of those most in-

terested has recently been turned to the subject, and results of great local importance may be anticipated. In some portions of Virginia an arenaceous grass is found to possess considerable value; and further attention to the varieties found so valuable on the coasts of Holland and England, as well as recently in Massachusetts, may develop a variety valuable on the sands of the interior.

COMPARISON OF THE LAST THREE YEARS IN THE RELATIONS OF CLIMATE TO AGRICULTURAL INTERESTS.

The following special comparisons for 1853 were prepared at the close of that year as a sketch of the more striking features of its agricultural climatology. With the mean quantities given in his comparison, other years may be examined in a similar manner, and an intelligible resumé of the more recent years, or those in which we have yet some interest and in fresh recollection, may be made in brief. The references to them are, for this reason, in a reverse order.

AGRICULTURAL RELATIONS OF THE SUMMER CLIMATE OF 1853.

The agricultural interests of the United States are more than elsewhere dependent on the peculiarities of any single year in regard to climate. If the area were no larger than that of European States generally, the consequences upon particular districts would be much worse than they now are, as any single product may be greatly injured or even wholly cut off over a small area. The principal staples range so far here, however, as to embrace districts of opposite character in any season's results, and losses in one portion may be balanced by unusual success in another, notwithstanding those losses are very severe where they happen to fall.

To distinguish and attach proper value to the real occurrences in any year, it is necessary to use the precise measures afforded by scientific observation. It is not difficult now to do this, and to apply current results of observation to actual consequences on agricultural prosperity. With the amount of valuable and precise observation of the several conditions of climate now accumulated through the meteorological systems, the relation of particular changes to actual results may be made clear and practically valuable, it is believed, and be brought into the service of the great economical and business interests depending upon agriculture.

In this purpose it has been attempted to distinguish the climatic peculiarities of the last three or four years, and to indicate their relation to agricultural prosperity in that period. For the year 1853, an unusually distinct character could be defined both here and in Europe, and the greater interest in its results has induced placing its examination first, and the elaboration of the points necessary to make a basis of comparison in that connexion.

The effort to accumulate and apply statistics in this purpose cannot at least be without some effect in directing attention to precise statements, and to the value of climatic observation. The observed mean temperatures, the extremes of temperature, and the amount of rain for the growing months of the season, will be given, with such comparisons of them with the general mean as may be possible from observations previously made in the same locality. The measure of these differences which vegetation ultimately gives is really more precise than would be supposed, and it corresponds very nearly with the mean result of instrumental measurements.

With the usual supply of rain, the mean temperature of any month of the growing season is, in our climate, a very direct measure of its comparative productiveness. Single extremes of temperature are less important unless they reach a frost, and in any case they are easily defined, and the precise degree of their importance may be promptly stated. In England a greater uniformity exists in temperature; yet a depression to the minimum of the monthly mean for any month of the growing season there never fails to cause great injury, and is often disastrous to important staples. We have here a more elastic class of staples, or a greater margin over which they may be forced without severe losses; and we have also a far greater range in all the conditions of climate, and especially in temperature and humidity. Our growths are probably much more irregular and variable than those of any part of Europe, and our extreme losses only injure us less from the elasticity of our economical interests and the range of our staples into districts so widely separated that the effects of the climate of any year are never uniform over the whole.

The first three months of the year are scarcely included in the present purpose. Unless distinguished by unusual severity of some feature of climate, they have little influence on cultivation, and only a partial control over any of its interests. For the year 1853, none of the first three months had any extraordinary character; they were generally somewhat above the mean temperature, and with few extremes of cold. In March the rains were heavy at the South; otherwise the precipitation, or entire amount of water falling in rain and snow, for the three months, was of the usual quantity, and quite equally distributed.

In April there was a somewhat injurious drought in Maine; the usual amount of rain in Vermont, the interior of New York, and on the Atlantic coast as far south as North Carolina. A district embracing most of the remaining part of New England, and the more elevated portions of the States southward to Alabama, had a large excess of rain; and most of the Western States had a similar excess, particularly Michigan, Wisconsin, and Iowa. In the extreme South, there was very little rain; in parts of Florida and Georgia, none during the month.

In May, it continued excessively dry at the South in the same districts affected in April, with a slight exception just on the Atlantic coast. The distribution was much the same northward, but with some excess in Lower Virginia, and in Eastern Pennsylvania and New Jersey. In all the Northeastern States the rains were very heavy in May, usually twice the average amount. In Michigan, Wisconsin, and adjacent parts of Indiana, Illinois, and Iowa, the amount was even more excessive than in April—the States south, in the Mississippi valley, having a little less than the usual amount.

The effect of this distribution for the two months most important to

the planting States was extensively injurious. At the North, April scarcely enters into the list of months affecting cultivation, and the profusion of rain was favorable to all that could be affected at that time, as it was attended with unusually high temperature in New York and in the New England States. The absence of rain in some parts of Maine in April, was the only unfavorable event in the general and early advancement of vegetation at the Northeast through both months.

In the Northwestern States, the temperature of April was but slightly higher than usual, and vegetation little beyond its usual stage of advancement. In Kentucky and Tennessee, it was more decidedly warmer, being from three to five degrees above the mean temperature, and, with the considerable fall of rain, unusually favorable.

May was usually colder than the mean at the South, though its mean was not so low as the effects of the month on vegetation might seem to show. There were several extremes of cold, and these in connexion with rains also, which were quite unfavorable at the West in this month; and in the States of Alabama, Georgia, and eastward, the drought was very severe. The effect of the absence of rain in any considerable quantity in a large area here, from March to some time in June, was generally injurious, and in many instances quite destructive to whatever was capable of injury at the time. The most unfavorable cold weather was in Kentucky and Tennessee, where frosts occurred several times. There were slight frosts in Lower Virginia and North Carolina, also, on the 14th and 15th.

In Central Pennsylvania and Western New York, the usual changeable character of the month was experienced, with a favorable preponderance in most respects. In the New England States the temperature was higher, the amount of rain greater, and the season more advanced than elsewhere. The rains were uniformly distributed and abundant in these States, and the number and severity of frosts not greater than in Kentucky and Tennessee. All vegetable growths were brought forth rapidly, and were much in advance of those of the same latitude at the West. The mean temperature of May in Vermont, New Hampshire, and adjacent parts of other States, was from two to five degrees above the general mean.

In Ohio, the mean temperature was slightly greater than usual, and the seasons not unfavorable; but further west, in Illinois and Iowa, the mean for the month was two to four degrees below the average, and, with the frequent frosts and some severe and cold rains, vegetation was generally retarded.

The mean amount of rain for April and May for a series of years, may be given here in a tabular form, at several stations, for comparison with the general tables for the present year, at the close. The readier verification of the detailed statements just given, may be had by giving the general means a place here.

Mean annual amount of rain for April and May.

	April.	May.
	Inches.	*Inches.*
Gardiner, Maine, 16 years	3.3	4.1
Hanover, New Hampshire, 18 years	3.1	3.8
Burlington, Vermont, 18 years	1.9	3.4
Amherst, Massachusetts, 17 years	2.9	3.8
New Bedford, 40 years	3.5	3.6
Providence, 21 years	3.4	3.4
Erasmus Hall, Long Island, New York, 34 years	3.5	3.8
Albany, 27 years	3.1	3.8
Utica, 20 years	3.2	3.2
Rochester, 20 years	1.9	3.2
Philadelphia, 28 years	3.3	3.4
Baltimore, 16 years	3.3	3.3
Washington, 16 years	3.0	3.3
Norfolk, 16 years	3.0	3.8
Charleston, 7 years	2.2	4.3
Savannah, 13 years	2.1	5.8
Key West, 14 years	1.1	3.1
Mobile, 10 years	4.4	4.3
Huntsville, Alabama, 12 years	5.0	4.0
New Orleans, 13 years	4.1	3.4
Matamoras, 3 years	0.6	2.4
Fort Gibson, 16 years	4.3	4.3
Nashville, 7 years	4.4	4.7
Louisville, 11 years	3.5	4.2
Cincinnati, 13 years	3.8	3.4
Marietta, 25 years	3.0	3.8
Detroit, 9 years	2.8	2.3
St. Louis, 16 years	4.0	4.6
Athens, Illinois, 10 years	4.9	4.4
Muscatine, Iowa, 8 years	3.6	5.2
Milwaukie, 7 years	2.4	2.5
Mackinac, 8 years	1.2	2.0
Fort Snelling, 15 years	2.3	3.2
Fort Leavenworth, 16 years	3.6	3.9

It will be seen from this table, that April has generally less rain than May, though not uniformly. The interior at the North has less rain in April; but at the South, as Mobile, Huntsville, and New Orleans, usually more. On the Atlantic slope, from Baltimore to Maine, the amounts are strikingly equal.

In temperature, a basis of comparison, by which the statements may be followed through, may be given in a list of mean temperatures for April, which is usually near the annual mean, and in a statement of monthly differences of successive months to September.

Thus the mean temperature of April for forty years at Castine, Maine, is 41°.4; the mean of May is 8°.9 above that for April; June 9°.1 above May; July 5°.4 above June; August 0°.2 *below* July; and September 6°.2 below August.

Mean absolute and comparative temperatures of the summer months.

	April.	May.	June.	July.	August.	Sept.	Year.
	°	°	°	°	°	°	°
Castine, Maine, 40 years....	41.4	8.9	9.1	5.4	—1.2	—6.2	43.6
Portsmouth, N. H., 17 years.	42.4	9.7	9.3	5.3	—1.6	—6.1	45.2
Burlington, Vt., 18 years ...	42.0	12.9	9.6	4.6	—1.2	—8.6	44.8
Salem, Mass., 43 years......	46.0	10.8	10.7	5.3	—2.0	—7.6	46.9
Boston, Mass., 26 years	46.3	10.8	9.8	5.4	—2.2	—7.2	48.8
New Bedford, Mass., 41 y'rs.	44.6	9.8	9.5	5.6	—1.2	—6.4	48.4
Providence, R. I., 21 years .	44.7	9.8	9.8	7.4	—6.1	—8.1	48.1
New York, 30 years.........	49.1	10.5	9.5	5.8	—1.6	—7.4	51.9
Albany, 22 years...........	47.6	12.1	8.3	5.2	—2.0	—8.8	48.3
Rochester, 18 years.........	45.8	10.4	8.2	4.6	—3.0	—7.2	46.9
Toronto, 13 years..........	41.4	10.3	9.3	5.3	—0.7	—8.3	44.2
Philadelphia, 63 years......	51.1	11.8	8.5	4.7	—2.8	—6.5	52.0
Baltimore, 22 years.........	52.9	10.3	8.4	5.0	—2.0	—6.8	54.4
Norfolk, 25 years..........	56.1	9.8	8.2	4.2	—1.2	—4.7	59.0
Charleston, 20 years........	64.9	7.9	5.8	2.3	—1.0	—4.2	66.0
Key West, 9 years..........	76.3	4.0	2.9	1.2	0.3	—1.0	77.1
Mobile, 10 years...........	67.1	7.0	3.8	2.0	—0.4	—3.3	66.5
New Orleans, 18 years......	67.6	6.4	5.4	1.8	—0.8	—2.5	67.5
Fort Gibson, 25 years.......	62.6	7.1	6.3	4.3	—0.2	—6.8	60.8
St. Louis, 16 years.........	59.0	7.3	7.5	4.6	—2.1	—8.2	55.6
Cincinnati, 18 years........	54.5	9.0	7.6	5.1	—2.5	—8.2	53.7
Marietta, 24 years..........	53.0	8.7	7.4	3.5	—1.8	—7.4	52.4
Fort Gratiot, 17 years......	44.4	9.4	9.8	5.8	—2.0	—7.1	46.4
Green Bay, 23 years........	42.9	14.8	8.8	4.8	—3.4	10.8	44.9
Fort Snelling, 30 years.....	46.4	12.6	9.0	5.5	—3.7	—11.0	44.6
Sault St. Marie, 21 years....	38.5	11.0	10.0	5.7	—2.0	—9.3	40.6

The relation of the several months affecting vegetable growths to each other in mean temperature may be readily seen by this table for most parts of the United States. It is intended only to give such data as are important in the present case, however, and the more distant States and stations are therefore not included.

April is seen to be below the mean temperature for the year by an average of two degrees, except in the West; where, as at St. Louis and Fort Gibson, it is as much above the annual mean. May and June increase in temperature equally in the Northern States, and each is nearly 10 degrees above the preceding month; but at the South this difference is much less and least for June. The average difference from July to June is half the previous differences very uniformly—decreasing from the north southward, from five degrees in Maine to one degree at Key West.

August differs from July very slightly—from three and a half degrees as the maximum in the Northwest, to nothing in the extreme South. September is 10 degrees colder than August in the Northwest, and 6 to 8 degrees in other parts of the North; falling off to a difference at New Orleans of two and a half degrees, and of one degree only at Key West.

The basis for comparison here given may be made available by any one possessing observations for the present year, whatever difference in absolute temperature may exist between his station and the stations in the table, by selecting the nearest as the proper representative of the curve of monthly differences at his locality.

In June the extremes of every sort were equally great, though not, as in May, of an opposite character in different parts of the United States. It was characterized by excessive heat and severe droughts almost everywhere, to the last of which extremes the only exception was in Wisconsin and Iowa. In these States only the rain was profuse, and somewhat greater than the normal mean. The almost universal deficiency of rain for this month has scarcely been equalled, and the partial exceptions, or mitigations rather, in addition to that just mentioned, were in Lower Florida, some parts of Virginia, and of Northern Ohio and Eastern New York, with Western Massachusetts. The vicinity of New York city was the only decided exception east of Wisconsin.

The temperature of June was uniformly very high, reaching the highest point of eight and nine degrees above the normal mean in the Western States, and it was generally equal to that for July, while the mean summer curve places it three to four and a half degrees less.

The continuation of the long drought in Georgia and parts of adjacent States, which began at the close of March, was complete to the last of June, and the general expression of those interested in agricultural affairs there was, that the failure of important staples would be extensive. The same extreme absence of rain produced decidedly unfavorable effects in Massachusetts and portions of adjacent States, and the close of the month was a period of most extraordinary heat in the central parts of the United States, without sufficient rain to relieve vegetation, except in the vicinity of New York city. At the South, however, the rains became abundant, and even excessive, in the districts of severe drought up to that time. In the planting States east of the Mississippi they began near the first of the month, and were continued and profuse throughout, giving as the amount of water falling, from seven to eleven inches, or nearly twice the mean depth. At New Orleans, and at Cedar Keys, Florida, the amount was eleven and a half inches. Some of these flooding rains were locally injurious, but such injuries were confined to the overflow of river bottoms, and the usual destruction from thunder storms of limited extent. The mean temperature of the month was very near the general mean, and only equal to that of June at the South, except immediately on the Gulf coast.

For the planting States the character of the month may be briefly summed up as extraordinarily favorable, and as going far to neutralize the greatly unfavorable character of the preceding months.

In Tennessee and the States west, and in all districts in this latitude, the rains were near the usual amount and well distributed through the month. In Central Illinois there was some deficiency; but further north, in Iowa and Wisconsin, an excess, reaching to near double the usual amount. In Michigan, Eastern Ohio and Western Pennsylvania, and New York, there were severe droughts through the entire month and continuing into August. Portions of Central and Eastern Ohio, and of Pennsylvania, suffered most in this month, and the effect was disastrous on some products, and especially on the grazing interests. West of Harrisburg, Pennsylvania, with some exceptions of violent showers in limited districts, the rains for the month were very small; and the same conditions prevailed in Central and Western New York, while the eastern portions of both States had profuse rains nearly throughout.

In the New England States there was no exception to the general sufficiency and equal distribution of rain and snow, and the temperature was rather above than below the mean—in Maine, decidedly above the general mean. In some parts of the country the month appeared colder than usual by the contrast with June,* but it was not so in reality by the best comparisons we are able to make with well-determined mean quantities.

August in most parts of the United States was equal in temperature to July, and warmer than usual by the normal difference between these months, which difference varies from two to three degrees in the Northern States and disappears gradually toward the Gulf coast. The early part of this month was excessively warm everywhere, but the latter portion had a singular extreme of cold, resulting in frosts in portions of Michigan, Wisconsin, Northern Iowa, Illinois, and Indiana. Some decided injury was done to the crops in parts of the first mentioned States—more conspicuous, however, from its rarity, than important in amount.

The distribution of rain for August was very unequal in the various parts of the country, and also through the month at any locality. The dry period, already so severe in Western New York, continued through much of the month in some elevated districts, and in some parts of Michigan, Ohio, and Pennsylvania. In the East, and about New York city, the rains were excessive—the district of greatest excess, from Lower New Hampshire to Northern New Jersey, varying from seven to twelve inches in depth of water fallen. At the South the amount of rain was not far from the average, and very well distributed through the month. Some portions of Georgia were deficient, and there was more than the usual amount in South Carolina.

The unfavorable points of the month were, some damage from excess of rain at the East; some prolongations of the drought in the grazing districts of New York, and slight injury at the West from frost and absence of rain.

September was above the normal mean temperature in all parts of the United States to the amount of two or three degrees in some parts of the West, and one to two degrees over the entire North and East. Its character in this respect was favorable, though cold extremes of temperature become very important to some descriptions of cultivation in this month, and some notice of its frosts is required to complete this statement.

The first frost in Maine and New Hampshire occurred on the 12th, the second on the 25th; the last of which was the decided check of vegetation. In Vermont, at Burlington, and in the eastern parts of Massachusetts, the first frosts were on the 25th, and variably on the 30th. In New Jersey the first frosts were also on the 30th, and in most parts of Pennsylvania at the same time, though elevated districts had light frosts on the 12th. In Maryland and the mountain valleys of Virginia there were frosts destroying vegetation on the 30th, but no

* At Cincinnati Mr. Lea reports it "the coldest but two in ten years;" but the mean he gives is but 1.5° below his own general mean, and very nearly equal to that given by Professor Ray for eighteen years.

injury was done on the low plain of Virginia nor southward, though slight frost appeared in some places.

In the hilly parts of Southern Ohio there was light frost on the 28th, and on the lake shore at the North.

In Michigan there were light frosts on the 10th, with "killing frosts" on the 23d, 25th, and 28th.

In Central Indiana the first frosts were on the 20th and 23d, and the same in Central Illinois. In some parts of Iowa and Wisconsin the first severe frosts were on the 31st, though the most elevated places had frosts on the 8th.

September is less important than other months in the influence of its amount of rain on producing interests. The amount was again very large at the East and in the South, amounting to fifteen inches at Cedar Keys and Pensacola, and to ten inches from Jacksonville to Charleston. Some damage was done by these rains in retarding the development of the cotton boll and by flooding low lands. From the most important localities in the southward which might be influenced in this manner our information is meagre, and it is only known that some complaint is made of this result generally by Southern observers. In parts of the Northwest, and especially in Michigan, it continued dry.

Of the remaining portion of the season affecting vegetation it is only necessary to give the extremes which close it up at the South. The mean temperature of October is comparatively unimportant, except to semi-tropical cultivation, and to the grazing interests of particular States. The extremes which bring the "killing frosts" are, however, peculiarly important in American seasons, and to distinctively American staples. A brief notice of this point is sufficient here, from the signal character of this "killing frost" in the present year to the farthest point southward the phenomenon ever extends.

At Charleston, South Carolina, there was killing frost on October 21st, and universally over the entire South on the morning of the 25th. This was probably the first damage to the cotton-planting interests anywhere, though in the uplands of several States there were frosts as early as the 14th.

The retarded cotton crop no doubt suffered much injury at the last. The rains of September and the generally wet character of the latter parts of the season, together added a considerable item to the first cause of failure in the early droughts.

Some injury was done by frosts early in October to the tobacco crop of Virginia, but to this staple the season was generally favorable.

The whole summer of 1853 was much warmer than usual on this continent. At all places in the central and northern portions of the United States the mean temperature for the six months was two degrees above the mean, determined by series of observations of from twenty to forty years, and the uniformity of this measure there is remarkable through all the comparisons. At the South this difference fell off gradually to less than one degree on the Gulf coast.

To give the fullest value to these comparisons, a clear limitation should be made of the districts having peculiar climatic adaptation to the several staples of agricultural production. To do this satisfactorily, however, requires more of time and space than can be here devoted to

it. It is also apart from the direct purpose in this statement, which is to define climatic conditions mainly, and to give so much only of the incidents and effects as will permit ready application of the data to such purposes. The limit of certain staples is, nevertheless, essentially climatic, and the definition of the cotton, sugar, hemp, and wine-producing districts may be referred to as far as these are now determined.

It is difficult to give a summary, in a single statement, of the resulting character of the producing season for the whole country. It may be said, however, that the cotton-growing districts were generally unfortunate in all their staples, though the cane and the cotton of the extreme Southwest scarcely shared in these disadvantages. The grazing districts of some portions of the Northern States also suffered heavy losses. These, if not all, are the most considerable enumerations of injurious results from the extraordinary conditions of a summer usually favorable to most agricultural interests, and especially so to the grain production of the Central and Northern States.

A brief comparison with the character of the summer in England and in Europe may be given in conclusion. An English statement, brought down to the close of September, gives the following differences for each month from the mean of the same month for twenty-seven years at London. The same comparison is given for Philadelphia, Marietta, Ohio, and New Orleans. The signs indicate the excess or deficiency of mean temperature in degrees and tenths.

Temperatures of 1853 *compared with constant means.*

	London, 27 years.	Philadelphia, 60 years.	Marietta, O., 24 years.	New Orleans, 18 years.
January	+1°.8	−1°.8	−1°.6	−4°.7
February	−6.8	+0.4	−0.4	+1.8
March	−5.0	+1.0	−1.3	+0.7
April	−1.8	+2.0	+1.7	+1.2
May	−2.7	+3.6	+2.0	−1.1
June	−1.4	+3.1	+6.9	+1.8
July	−1.3	+0.2	+0.4	−0.2
August	−2.4	+2.7	+3.1	+0.0
September	−1.6	+1.8	+0.8	−2.2
Mean of 6 mos., April to Sept.	−1.87	+2.28	+2.48	+0.50

Thus, for the growing months of the year, the temperature was uniformly below the mean in England, and by an average of nearly two degrees. By a comparison with the destructive season of 1816, the present year is shown to have approached nearer to the low temperature of that year than any other in this century. June and July only were warmer than in that year, by from one to two degrees each. The summer of 1816 was also colder in the United States than any other in the records of temperature, which are quite complete from 1740. The result of the present summer on the agricultural interests of Great Britain cannot fail to prove disastrous, and to demand all the surplus of our own production.

On the continent of Europe, the summer of 1853 was also much below the mean temperature to the close of June; but in July and August it rose one to two degrees above the mean of a series of years. No decisive statements have yet reached us; but Western Europe undoubtedly has much resemblance to England in the effect on agricultural production, as it has in the observed temperature.

The stations that follow are selected in such a manner as to represent the several States and districts intelligibly with as small a number as possible. From two to three hundred returns, more or less complete through the various months, are received for every year, exclusive of the military posts, which number eighty or ninety; and this very large, and also very accurate and reliable system of observation, constitutes an effective force for these more immediate and practical determinations, as well for those of a remote and purely scientific character, without, as it is believed, an equal in co-operative research on the laws and effects of climate.

Depth of rain falling at various stations in the United States, from April to September, 1853, *in inches and tenths.*

	April.	May.	June.	July.	August.	Sept.
Albion Mines, Nova Scotia	1.8	2.9	3.1	2.9	4.1	......
Montreal	3.6	6.4	3.1	3.1	7.0	10.1
Eastport, Maine	1.9	3.3	0.3	1.7	4.9	......
Bucksport, do	0.8	6.4	0.0	3.4	....	......
Biddeford, do	1.8	5.1	0.6	1.8	3.3	4.9
Fryeburg, do	0.8	6.5	0.8	1.5	3.1	6.7
Londonderry, New Hampshire	3.2	5.8	1.2	2.9	6.8	4.3
Concord, do	3.1	6.4	1.3	4.0	4.8	5.4
Manchester, do	3.0	6.3	1.0	1.9	9.1	4.9
St. Johnsbury, Vermont	2.3	7.6	1.8	3.1	....	......
Burlington do	2.2	3.9	1.7	3.1	3.4	5.7
Worcester, Massachusetts	4.9	5.4	1.0	3.2	10.7	5.3
Amherst, do	3.4	5.4	2.6	3.5	6.1	5.7
Newburyport, do	3.1	6.2	0.6	1.7	6.9	3.5
N. Attleboro, do	5.0	6.3	1.8	3.5	8.8	4.3
Barnstable, do	7.0	7.1	2.0	3.5	2.4	5.3
Elmwood, do	4.0	7.3	2.3	4.0	10.2	......
Southwick, do	3,5	4.7	1.6	5.3	8.5	6.2
New Bedford, do	3.5	3.9	0.8	3.5	2.6	3.4
Pomfret, Connecticut	4.3	4.5	1.4	3.8	6.8	3.9
Fort Hamilton, New York	4.8	6.0	4.4	5.8	5.5	3.7
Fort Columbus, do	3.3	5.8	4.8	4.4	5.2	5.5
West Point, do	5.8	8.0	3.7	10.4	7.8	3.5
Madrid, do	1.9	5.3	0.9	1.7	3.9	......
Gouverneur, do	4.0	2.0	1.6	0.8	....	6.7
Lodi, do	3.2	3.0	2.2	0.7	4.7	5.4
Buffalo, do	....	2.4	1.0	....	2.1	4.0
Newark, New Jersey	3.0	4.7	3.6	3.2	....	......
Bloomfield, do	3.0	4.6	2.7	3.6	12.1	4.3
Ceres, Pennsylvania	4.4	3.7	....	....	....	2.3
Moss Grove, do	3.7	3.1	2.5	0 7	3.1	2.1
Indiana, do	5.7	4.7	....	....	....	......
Hollidaysburg, do	4.0	3.6	1.0	1.1	5.0	1.8

TABLE OF RAIN—Continued.

	April.	May.	June.	July.	August.	Sept.
Pittsburg, Pennsylvania	3.6	4.3	1.8	3.4	7.7	2.4
Bedford, do	2.5	0.9	0.3	1.5	2.3	......
Gettysburg, do	4.5	3.6	0.2	5.6	3.3	3.9
Norristown, do	4.0	6.0	1.5	4.8	5.0	2.9
Morrisville, do	4.1	5.1	3.2	7.0	4.6	5.4
Harrisburg, do	3.2	5.0	0.5	3.6	2.8	2.3
Lima, do	3.6	5.5	1.0	6.8	2.9	4.3
Philadelphia do	3.8	5.2	1.0	6.2	3.0	4.4
Baltimore, Maryland	3.3	4.4	0.1	2.4	4.7	3.3
Schellman Hall, do	5.2	3.1	......	2.6	6.6	4.1
Frederick, do	5.2	4.5	0.3	4.1	4.0	3.3
Baltimore, do	3.7	5.4	0.7	3.5	3.5	4.1
Smithsonian Institution, Washington	3.5	3.9	2.3	5.3	4.5	3.6
Alexandria, Virginia	3.4	5.3	2.8	5.1	5.9	3.5
Richmond, do	2.5	2.3	2.7	4.7	2.7	......
Lewisburg, do	3.7	2.6	2.3	4.4	2.4	4.6
Buffalo, do	4.4	3.0	0.6	3.8	2.7	......
Brunswick co., do	5.1	1.8	2.6	5.8	4.0	3.2
Portsmouth, do	5.4	5.8	0.3	......	......	......
Fort Monroe, do	2.5	2.1	0.5	5.8	1.9	1.1
Camden, South Carolina	1.0	0.5	3.3	7.1	5.7	6.2
Fort Moultrie, do	1.1	2.5	1.5	10.9	2.2	8.1
Savannah, Georgia	0.4	3.9	0.7	6.4	8.1	9.4
Sparta, do	0.6	0.8	0.7	5.3	2.7	......
Whitemarsh Island, Georgia	0.4	2.5	1.2	5.2	5.5	13.2
Penfield, do	......	......	0.2	3.7	1.9	5.3
Culloden, do	1.8	0.7	0.3	9.8	1.1	5.4
Perry, do	0.6	0.5	......	......	......	......
Jacksonville, Florida	0.4	1.5	3.2	7.4	2.7	9.7
Key West, do	0.0	0.9	18.1	2.3	5.0	......
Cedar Keys, do	0.0	1.5	3.2	11.4	3.6	15.4
Knox Hill, do	0.1	1.9	3.4	7.5	......	5.1
Tallahassee, do	0.0	0.2	2.8	7.9	4.6	8.0
Pensacola, do	0.5	0.2	1.2	2.5	1.5	14.7
Eutaw, Alabama	......	1.9	0.7	8.9	5.8	......
Monroeville, do	......	......	......	......	[illegible]	9.6
New Orleans, Louisiana	1.8	3.8	1.7	11.5	6.3	4.9
Fort Graham, Texas	2.0	3.3	2.0	2.1	0.3	......
Austin, do	*m.	pro.	pro.	pro.	pro.	pro.
New Wied, do	m.	sm.	pro.	pro.	pro.	m.
Fort Towson, Cherokee Nation	5.0	9.1	0.9	5.4	0.5	6.1
Lebanon, Tennessee	4.2	3.5	1.0	4.9	......	......
Glenwood, do	4.0	4.4	0.9	3.6	4.5	4.1
Knoxville, do	5.5	3.9	1.4	......	......	......
Danville, Kentucky	4.5	2.6	0.3	......	3.4	5.0
Louisville, do	4.7	1.9	0.7	4.8	4.0	3.2
Cincinnati, Ohio	7.7	2.2	1.9	4.8	......	3.9
Granville, do	3.9	2.6	1.3	......	4.0	3.9
Marietta, do	5.6	2.6	0.6	3.7	1.3	2.3
Cleveland, do	1.5	1.9	3.4	......	......	......
Oberlin, do	3.9	3.9	2.1	3.7	4.7	4.6
Detroit, Michigan	5.9	7.9	2.5	2.3	3.6	2.6
Ann Arbor, do	5.0	5.9	0.7	1.1	3.9	1.4
Brooklyn, do	5.0	7.0	1.5	1.7	......	......
Battle Cr'k, do	4.1	5.7	1.6	1.5	1.0	4.1

* The amount at some important and remote stations is vaguely given as *profuse*, *medium* or *small*.

TABLE OF RAIN—Continued.

	April.	May.	June.	July.	August.	Sept.
Richmond, Indiana	3.1	2.1	1.2	3.0	5.3	5.0
New Harmony, do	pro.	m.	1 2	2.4	......	5.5
Ottowa, Illinois	pro.	pro.	pro.	m.	m.	m.
Augusta, do	pro.	v. pro.	pro.	sm.	sm.	m.
Athens, do	2.5	6.7	5.5	3.8	3.6	3.4
Alton, do	m.	3.5	1.5	3.1	2.3	0.1
Hannibal, Missouri	pro.	m.	pro.	m.	pro.	1.2
Fort Leavenworth, Mo	2.4	3.4	5.9	3.2	5.0	1.4
Fort Madison, Iowa	9.2	3.1	7.6	3.8	5.0	2.9
Muscatine, do	11.8	4.6	6.4	6.6	1.7	......
Bowen's Prairie, do	pro.	......	m.	6.6	0.7	1.0
Poultney, do	4.8	5.7	3.3	6.3	0.5	2.9
Dubuque, do	4.6	5.5	5.0	5.9	2.2	2.2
Platteville, Wisconsin	5.1	7.2	3.6	7.7	1.1	......
Beloit, do	5.7	4.4	4.9	8.1	1.7	6.5
Janesville, do	2.9	3.9	2.6	4.6	......	......
Milwaukie, do	2.6	6.5	......	......	......	......
Baraboo, do	3.1	7.6	5.1	......	......	......
Fort Brady, Michigan	0.7	0.7	3.9	3.3	3.2	2.6
Fort Snelling, Minnesota	0.7	4.1	7.6	1.6	2.6	2.1

Mean temperature of each month from April to September, 1853, *at various stations in the United States.*

	April.	May.	June.	July.	August.	Sept.
Albion Mines, N. S	38.9	50.7	61.6	69.1	65.0	......
Montreal, C. E	42.1	54.9	68.7	68.0	60.1	57.6
Fort Sullivan, Maine	40.6	48.7	56.1	60.9	61.3	......
Carmel, do	41.2	55.4	64.0	69.5	66.1	53.0
Bucksport, do	44.3	55.8	66.0	72.0	......	......
Biddeford, do	......	58.4	69.4	73.6	70.2	......
Londonderry, New Hampshire	44.8	56.2	67.0	70.0	68.4	62.4
Francestown, do	42.9	55.5	68.9	70.1	......	......
Dublin, do	39.3	52.8	65.0	*67.2	64.9	60.0
Manchester, do	46.8	59.3	69.5	72.5	69.2	62.8
Concord, do	45.5	58.7	69.3	71.5	68.6	60.7
Brandon, Vermont	42.3	54.7	67.5	66.8	67.3	57.8
St. Johnsbury, do	39.4	54.4	65.0	65.9	......	......
Burlington, do	43.9	57.0	69.2	70.5	69.8	60.5
Worcester, Massachusetts	44.7	57.2	68.6	71.7	68.7	61.6
Amherst, do	44.0	56.5	67.0	68.4	69.3	59.7
Newburyport, do	44.8	56.8	67.0	71.5	67.2	61.6
N. Attleboro, do	44.8	57.1	67.4	72.2	......	61.7
Barnstable, do	44.3	55.2	66.7	71.0	71.0	64.6
New Bedford, do	44.9	55.2	64.8	69.7	68.7	61.9
Smithville, Connecticut	42.8	58.4	67.5	......	......	......
Pomfret, do	42.7	56.1	66.1	68.6	68.7	61.3
New London, do	46.3	57.6	66.7	70.4	72.1	64.3
Fort Hamilton, New York	47.1	59.0	67.0	73.5	74.2	68.7

* First 10 days.

MEAN TEMPERATURE—Continued.

	April.	May.	June.	July.	August.	Sept.
Fort Columbus, New York	48.7	60.8	71.2	72.7	73.5	67.1
West Point, do	46.4	59.6	69.1	70.8	71.4	70.2
Beverly, near W. P. do	48.0	60.0	70.0	69.1	70.7	64.2
Madrid, do	43.0	54.8	63.0	68.5	68.9	......
Gouverneur, do	39.7	54.6	69.8	70.7	70.3	57.7
Baldwinsville, do	44.7	56.2	69.3	67.5	68.9	60.4
Lodi, do	42.7	56.9	69.5	69.5	70.0	62.4
Seneca Falls, do	......	......	70.5	70.0	71.0	63.0
Buffalo, do	......	52.4	68.2	69.0	70.1	62.4
Bloomfield, New Jersey	48.6	60.2	69.9	71.3	71.8	65.2
Newark, do	49.7	61.3	71.1	73.1	......	......
Burlington, do	51.0	61.9	72.6	74.1	73.8	66.6
Ceres, Pennsylvania	42.1	50.5	......	......	......	60.4
Moss Grove, do	43.1	58.3	71.5	68.8	68.5	61.1
Indiana, do	47.1	57.5	......	......	......	......
Hollidaysburg, do	48.5	59.5	72.5	73.4	69.7	62.9
Pittsburg, do	48.0	61.0	74.0	72.0	71.0	64.1
Bedford, do	49.6	59.7	72.5	73.3	72.6	......
Gettysburg, do	50.2	62.1	74.9	74.7	73.0	66.0
Norristown, do	51.8	61.9	73.2	73.2	73.1	66.4
Morrisville, do	49.0	61.6	71.6	71.9	71.6	65.5
Harrisburg, do	52.9	65.7	79.0	79.6	78.1	70.7
Lima, do	49.5	60.7	71.5	72.9	71.2	64.5
Philadelphia, do	54.4	65.3	75.3	76.4	75.7	68.4
Baltimore, Maryland	54.9	65.9	77.7	78.5	77.9	70.7
Schellman Hall, do	52.6	63.5	74.0	74.2	77.2	67,6
Frederick, do	52.6	64.3	77.2	77.2	75.3	67.2
Smithsonian Institution, Washington	54.9	65.8	75.0	74.5	77.5	69.4
Winchester, Virginia	53.8	64.7	78.6	......	......	67.8
Alexandria, do	54.4	65.0	76.0	76.4	76.0	68.2
Lewisburg, do	55.0	63.6	74.0	75.0	75.5	68.1
Buffalo, do	56.3	64.4	77.0	75.1	75.7	......
Brunswick co., do	60.0	69.0	82.3	......	75.1	......
Portsmouth, do	57.4	67.8	79.6	......	......	......
Richmond, do	56.5	66.1	76.2	76.8	77.5	......
Fort Monroe, do	55.7	65.2	74.0	78.1	77.7	72.2
Scuppernong, North Carolina	60.4	68.8	......	79.1	76.3	71.6
Chapel Hill, do	60.2	66.1	76.4	77.1	76.4	69.7
Thornby, do	60.2	68.0	78.9	......	......	......
Camden, South Carolina	65.7	72.0	79.3	80.3	78.6	73.1
Fort Moultrie, do	66.4	73.4	78.5	82.8	80.1	76.8
Savannah, Georgia	68.1	74.0	79.0	81.5	79.4	75.8
Sparta, do	65.7	71.9	81.6	82.8	80.0	......
Whitemarsh Isl., do	67.0	71.8	77.4	80.9	78.6	74.8
Penfield, do	......	......	......	77.8	76.7	70.4
Culloden, do	66.4	72.8	81.7	81.6	80.4	74.0
Perry, do	67.2	73.7	......	......	......	......
Jacksonville, Florida	71.0	77.3	78.9	81.7	82.5	77.6
Key West, do	76.2	79.4	80.5	83.4	83.9	......
Cedar Keys, do	72.9	78.1	80.1	83.2	81.9	79.3
Knox Hill, do	69.2	74.5	78.7	79.9	79.9	76.8
Tallahassee, do	71.3	77.8	80.6	80.0	81.0	78.0
Pensacola, do	70.0	74.2	80.0	82.1	82.4	78.4
Eutaw, Alabama	......	73.4	83.7	81.4	81.2	......
New Orleans, Louisiana	69.8	72.9	80.4	80.2	79.6	75.9
Austin, Texas	71.4	75.3	80.8	82.0	81.0	76.8
New Weid, do	78.6	81.3	80.8	81.9	82.6	78.0
Ft. Graham, do	66.8	72.9	79.7	80.5	84.5	......

MEAN TEMPERATURE—Continued.

	April.	May.	June.	July.	Aug.	Sept.
Armstrong Academy, Cherokee Nation	67.5	71.3	79.1	80.5	84.7	......
Fort Towson, Cherokee Nation	64.0	67.5	78.3	80.0	81.0	74.3
Memphis, Tennessee	63.9	70.0	82.2	81.2	81.1	......
Lebanon, do	60.5	66.3	79.5	77.7	......	......
Glenwood, do	60.3	65.3	76.4	75.4	74.5	69.2
Dixon's Spring, do	59.3	66.0	79.0	78.0	......	......
Knoxville, do	59.4	63.8	75.3	......	......	......
Danville, Kentucky	58.2	67.5	79.3	76.6	76.5	69.6
Millersburg, do	......	63.8	78.1	75.6	74.9	66.8
Springdale, do	56.5	62.5	75.3	73.0	73.0	70.0
Cincinnati, Ohio	56.4	66.5	79.3	75.6	......	......
Hillsborough, do	52.1	61.1	73.6	71.8	71.3	63.5
Jackson C. H., do	53.4	62.2	74.4	74.3	72.6	64.7
Germantown, do	51.6	61.3	76.0	72.7	67.9	61.9
Granville, do	51.6	61.6	74.3	......	72.6	64.3
Marietta, do	52.1	62.4	75.0	73.1	74.0	64.2
Zanesville, do	......	......	76.0	76.8	75.7	......
Cleveland, do	48.5	61.3	68.5	......	......	......
Oberlin, do	47.6	59.1	75.5	70.8	73.4	68.8
Detroit, Michigan	48.5	59.6	76.5	75.0	74.5	65.8
Ann Arbor, do	45.5	56.5	71.4	79.6	72.2	61.8
Brooklyn, do	45.1	56.9	73.6	71.2	71.7	......
Battle Creek, do	45.4	56.8	74.3	71.5	73.5	65.0
Milton, Indiana	52.5	61.4	74.9	71.4	72.1	64.4
Richmond, do	51.7	64.4	74.0	73.5	72.6	64.2
N. Harmony, do	57.9	65.7	79.3	77.7	77.2	69.6
Ottawa, Illinois	49.9	59.2	74.1	71.5	72.2	65.5
Augusta, do	51.2	59.8	73.0	72.0	73.1	66.7
Athens, do	53.2	61.9	75.4	73.3	73.9	67.8
Alton, do	54.5	63.4	75.7	74.3	74.9	67.4
Fort Madison, Iowa	50.5	60.7	76.7	75.9	76.0	67.6
Muscatine, do	47.9	56.3	70.8	68.6	70.9	......
Keokuk, do	50.3	60.9	75.8	76.1	76.3	......
Bowen's Prairie, do	44.4	......	72.3	68.7	70.5	62.2
Poultney, do	......	57.4	70.5	68.8	68.6	55.6
Dubuque, do	45.3	56.8	73.7	69.6	70.6	63.7
Platteville, Wisconsin	45.8	58.4	74.4	72.3	74.9	......
Beloit, do	44.1	57.4	73.1	68.7	71.4	64.0
Janesville, do	45.6	51.7	73.2	69.1	......	......
Emerald Grove, do	45.1	56.0	70.7	69.0	71.9	......
Summit, do	43.4	53.4	69.1	66.7	68.5	61.4
Milwaukie, do	43.6	52.2	......	......	......	......
Madison, do	44.3	54.5	70.1	67.6	70.3	61.4
Baraboo, do	45.6	56.4	74.2	......	......	......
Bellefontaine, do	47.2	56.5	71.4	70.0	71.3	63.0
Lac-qui-parle, Minnesota	44.7	53.8	65.8	68.9	70.0	60.8
Fort Snelling, do	46.9	53.9	67.6	70.4	70.2	60.3
Fort Brady, Michigan	39.1	48.0	58.7	63.2	61.1	52.2
Fort Leavenworth, Missouri	55.0	60.0	73.7	75.3	75.9	68.7

Some notice of actual consequences upon production, for the present year, should properly be appended here. It is obvious, however, that in presenting statements of these results, we are liable to introduce some measure of the very error sought to be avoided by this comparison of well-determined climatic facts. What may appear conclusive

at the time of publication in local journals, perhaps proves partial or overcolored at a later period.

At the present time the mass of these results is very well known, however, and they may be generally stated as corroborative of the indications of the investigation just given. The English and foreign grain harvest suffered the greatest losses; and the consequences so clearly foreshadowed at the close of July, and known, or possible to be known, by attention to the temperature measurements received at that time from England and Northern Europe, with some definiteness even at that time, were realized in a very severe measure. Some notices of a general character will add to the force of the statement of this purely climatological result.

The tone of the following notices is uniformly sustained by all the statements of results there, at their dates, of which large numbers of instances are at hand:

"The reports from all parts of the kingdom agree in stating that the deficiency in wheat will be very serious. Several instances have come to our own knowledge, in which, upon threshing the produce of a given number of acres, the yield has scarcely exceeded half the quantity obtained from the same land in good average seasons; the deficiency, taking the kingdom collectively, will certainly amount to one-fourth, if not a third, and we shall unquestionably require to import very largely."—*London Mercantile Gazette, Sept.* 6.

"Harvest prospects are now the subject of anxiety and speculation—a subject intensely interesting to all classes alike. As a general statement, the crop may be pronounced bad for this period of the season. It will be found to hold, as a general rule, that a late harvest is a deficient one, and this season will prove no exception. The common report on this point is, that the crop is short, both as respects straw and grain; in some districts we find it set down at two-thirds of an average. On the whole, the prospects of the harvest are precarious, and an average return can hardly now be reckoned upon. And, as it is, there is no alarm throughout the country, and no excitement, save what prevails among dealers in grain, regarding our food prospects, notwithstanding the unpromising nature of the weather. The world is now before us, from which to obtain supply and make up our lack. The latest advices from the Continent speak of a defective harvest there as well as in this country, and the upward movement of the past week in Mark Lane has been chiefly caused by a large export demand for shipments to France, where the crop is said to have turned out worse than it is at all likely to do here."—*London Correspondence of Sept.* 27.

The *Agricultural Gazette and Gardeners' Chronicle* gives, in January, 1854, the following summary of results of the British harvest, collected with great care, through a general effort early entered upon by the agricultural interest. It is valuable for both the positive and comparative results it embodies, and illustrates the actual condition of British agriculture, as well as the climatological results of an unusually disastrous year:

REPORTS OF HARVEST OF 1853.

Counties.	WHEAT.		BARLEY.		OATS.		BEANS.		PEAS.	
	Bushels per acre.	Compared with an average crop.	Bushels per acre.	Compared with an average crop.	Bushels per acre.	Compared with an average crop.	Bushels per acre.	Compared with an average crop.	Bushels per acre.	Compared with an average crop.
SCOTLAND.										
Aberdeenshire				One-fifth under		One-fourth under				
Forfarshire	27	One-fourth under	36	Good	40	One-sixth under	26	One-fifth under	22	One-fifth under
	30	One-sixth under	43	Average	56	do	40	do		
Fifeshire	25	One-fourth to one-third under.	45	One-fifth under	50	Average	48	Average		
Stirlingshire		One-sixth under		Average		One sixth under		One-tenth under		
East Lothian	30½	One-fifth under	51	Full	60	Over	32	Full		
Mid-Lothian	30	Rather under	48	Full average	48	Full average	32	Rather under		
		One-fifth under		One-seventh under.		One-third under				
Lanarkshire	26	One-eighth under			40	One-tenth under	29	One-ninth under		
Renfrewshire	32	do	42	One-fifth under	36	One-sixth under	40	Average		
Ayr	24	One sixth under			40	Near	32	do		
Berwickshire	26	One-twelfth under.	42	Average	42	Average				
Roxburghshire	24	One-sixth under	32	do	33	One-eleventh under	24	One-eighth under	24	One-eighth under
	20	do	33	do	33	One-ninth under	27	One-tenth under	21	do
Dumfriesshire			38	do	33	One-eighth under				
	20	One-fourth under	32	One eighth under	28	One-seventh under.	32	One-eighth under		
Wigtonshire	27	Average	40	Average	30	Under	30+	Under		
ENGLAND.										
Northumberland	20	One-fourth under	32	Average	36	Average				
	20	One-third under	33	do	48	Full average		Full crop		Full crop
Cumberland	24	One-fourth under	36	do	40	Average	45	One-[illegible]th over	27	Average
	18	do	10	do	12	do				

Reports of harvest of 1853—Continued.

Counties.	WHEAT. Bushels per acre.	WHEAT. Compared with an average crop.	BARLEY. Bushels per acre.	BARLEY. Compared with an average crop.	OATS. Bushels per acre.	OATS. Compared with an average crop.	BEANS. Bushels per acre.	BEANS. Compared with an average crop.	PEAS. Bushels per acre.	PEAS. Compared with an average crop.
Durham	12	One-half under	20		20		14		10	
		Much under		Much over		Under		Average		Average
Westmoreland	24	One-eighth under	33	One-tenth under	36	One-ninth under	30	One-fifth under		
	22	Under	33	Full average	40	Four above				
Yorkshire	27		40		48		32		32	
	25	One-fourth under	40	One-tenth under	44					
	24	One-sixth under	36	Average	44	Under	36	Average		
	18	One-fifth under	32	do.			24	do.		
	20	One-fourth under	40	do.				do.		
		One-third under		do.		Average		Under average		
Lancashire		One-fourth under				Rather under				
	22	One-third under	45	Average	45	Under				
	28	do.	38	One-fourth under	50	Average				
	22	Much under	39	Full average	36	Not average				
Cheshire	16	One-third under	30	Average	35	Average	20	One-third under	20	One-third under
		Much under		do.		do.		Good		
	18	One-third under	40	do.	40	do.				
Derbyshire					36	One-third under				
	25	One-fourth under			40	Average				
Nottinghamshire	24	One-third under	40	Average			24	One-third under	24	One-third under
	20	do.	36	do.	36	Under	20	do.	20	do.
	22	One-third to one-half under.	36	One-third under				Under		
Lincolnshire	26	One-third under	32	One-sixth under	50	One-fifth under	34	One-eighth under	28	One-third under
	32	One-ninth under			44	do.			20	do.
	28	One-seventh under	40	One-tenth under						
Shropshire	15	One-third under	20	Under						
Staffordshire	16	Near one-half under	35	One-eighth under	40		20		20	

Counties.	WHEAT. Bushels per acre.	WHEAT. Compared with an average crop.	BARLEY. Bushels per acre.	BARLEY. Compared with an average crop.	OATS. Bushels per acre.	OATS. Compared with an average crop.	BEANS. Bushels per acre.	BEANS. Compared with an average crop.	PEAS. Bushels per acre.	PEAS. Compared with an average crop.
Leicestershire	22	One-fourth under	46	Average	44	Under	34	Over	30	Average
	20	One-fifth under	32	One-sixth under	40	One-sixth under				
Rutland	28	Average	34	One-sixth over	35	One-eighth over	24	Average	24	One-seventh over
Herefordshire	25	One-sixth under	30	One-fourth under						
	20	One-fifth under	30	One-tenth under						
Worcestershire	18	Two-fifths under		Average				Near average		Deficient
	12	One-half under	33	do.		Average	36	Over average		Very bad
	16	One-third under	36	One-sixth over			36	One-sixth over	10	Two-thirds under
	18	do.	40	Average	40	Average	24	One-fifth under	24	Average
	19	Two-fifths under	28	One-third under	30	One-fourth under	24	do.	12	One-half under
	18	do.	30	One-sixth under	30	do.	30	Average		Very bad
Warwickshire		Not half		Much under		Rather under		do.		Various
	18	Two-fifths under	40	Average		Much under	36	do.	24	One-fifth under
	19	One-third under	32	One-fourth under			27	One-sixth under	22	One-fourth under
Northamptonshire	24	Rather under	40	Average	40	Under	32	Average	24	Under
	24	One-fourth under	48	Full average	24	One-sixth under	40	Full average	12	Two-thirds under
Huntingdon	18	One-third under	36	One-tenth under			36	Average	32	Average
Cambridgeshire	28	One-fifth under			56	One-tenth under	34	do.		
Norfolk	20	One-third under	32	One-fifth under						
	30	One-eighth under	44	Average	48	One-seventh under	36	Average	16	One-half under
	22	One-fifth under	32	One-third under	48	One-fourth under	24	One-third under		
Suffolk		One-third under		Barely				One-fifth under		One-third under
	20	One-fourth under	32	One fifth under			16	Two-fifths under	10	Two-thirds under
	20	One-third under	36	Average	52	One-tenth under	22	do.	16	Half
	20	One-sixth under	30	One-seventh under	48	Under	24	One-seventh under	16	Very bad
Essex	16	Two-fifths under	28	One-eighth under	32	One-sixth under	24	Average	16	One-third under
	18	do.	28	One fourth under	40	Average	40	One-fifth over	14	Two-fifths under
	14	One-half under	28	Two-fifths under	36	One-fifth under	20	Average	16	One-third under
Bedfordshire	15	Two-fifths under	32	One-fifth under	40	One-sixth under	30	do.	25	One-sixth under
Buckinghamshire	14	One-half under	28	do.	30	One-fourth under	24	One-fifth under		
	24	One-third under	38	One-fourth under	34	Much under	40	Over		
Oxfordshire	16	do.	40	Average	45	Average		do.		
	24	One-fourth under	40	do.	24	Under	36	do.	18	One-fourth under
Gloucestershire	20	One-third under	30	do.	30	One-fifth under	30	Average	20	Two-fifths under
	18	One-fourth under	32	do.	30	One-fourth under	24	One-fourth under	32	Average
	20	do.	38	do.	40	Average	26	Average	18	Near
Somersetshire	24	Average	32	do.	40	do.	28	do.	16	One-third under
Wiltshire	22	One-third under	28	do.	40	do.	28	do.	20	One-fourth under
	22	do.			40	One-eighth under	24	do.	24	One-sixth under

Reports of harvest of 1853—Continued.

Counties.	Wheat. Bushels per acre.	Wheat. Compared with an average crop.	Barley. Bushels per acre.	Barley. Compared with an average crop.	Oats. Bushels per acre.	Oats. Compared with an average crop.	Beans. Bushels per acre.	Beans. Compared with an average crop.	Peas. Bushels per acre.	Peas. Compared with an average crop.
Wiltshire—Cont'd	20	One-third under	36	Average	40	Bad	32	Average	26	Under
	18	One-fourth under	30	One-sixth under	40	Average	38	One-sixth over	28	One-fifth under
Berkshire	16	One-third under	36	One-tenth under	44	One-twelfth under	28	One-eighth under	26	Over
	20	do.	40	One-twelfth under	48	One-seventh under	30	Under	24	Under
	25	do.	40				32	Fair		
Sussex	12	One half under	28	One-eighth under	28	One-fourth under	20	Two-fifths under	20	One-third under
	20	Two-fifths under	32	One-fifth under	60	Under	20	Under	10	Much under
Surrey	16	Half under	24	One-fourth under	40	Average				
Kent	28	One-third under	40	One-sixth under	50	One-fifth under	32	One-seventh under	24	One-third under
	20	Two-fifths under	28	One-fourth under	48	One-seventh under	48	One-third over	32	Average
	26	One-sixth under			52	One-tenth under				
Hampshire	16	One-third under	16	One-third under		Under	12	Two-thirds under		One-fourth under
	12	One-half under	16	Two-fifths under	24	Two-fifths under	16	One-fourth under	12	One-half under
	18	One-third under	28	One-seventh under	40	Average	26	Over	24	Average
	18	Two-fifths under	33	One-ninth under	48	do.	20	Two-fifths under	18	Two-fifths under
	16	Nearly one-half	28	One-eighth under	44	One-twelfth under	20	One-third under	18	do.
	20	Two-fifths under	32	One-fifth under	56	One-eighth under	20	Three-fifths under	8	Two-thirds under
	16	One-third under	26	Average	36	Average	20	One-sixth under	16	One-third under
Dorsetshire	24	One-half under	33	Not average	38	do.				
	12	More than half under.	22	One-fifth under	24	One-fifth under				Failure.
Devonshire	28	One-fifth under	36	One-fifth less			38	One-fifth under	40	One-fifth over
	12	One-fourth under	30	Average						
		Half a crop		do.		Average				

CLIMATOLOGICAL PECULIARITIES OF THE YEAR 1852 IN RELATION TO AGRICULTURE.

The characteristics of the year 1852 were much less striking than those of 1853, in the relation of the current climate—as its meteorological conditions may be termed—to the general agricultural prosperity. It did not differ largely from average years in temperature or amount of rain for the months affecting cultivation, though the winter, or January particularly, was unusually distinguished by extreme cold. The following table exhibits the number of degrees of difference for the year 1852 from the mean temperature for a considerable series of years at each station. The quanities are given without a mark where the temperature was greater, and with negative signs where it was less for each month.

Comparison of the temperatures of 1850 *with the general mean.*

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
Concord, N. H	-3.9	0.3	-3.5	-3.2	2.3	0.2	-1.0	1.0	0.5	-1.7	-2.2	6.7	-1.3	0.8	-1.1	1.1	-0.1
Cambridge, Mass	-4.6	2.3	-0.8	-3.1	2.1	1.6	1.2	-2.0	0.7	1.2	-1.0	6.6	-0.6	0.3	0.3	1.4	0.5
New Bedford, Mass	-4.5	0.0	-0.9	-3.0	0.5	1.2	1.2	-1.8	0.0	0.7	-2.2	6.0	-1.2	0.2	-0.5	0.5	-0.3
New York	-5.5	0.2	-1.7	-4.8	0.8	1.2	2.1	-0.1	-1.4	1.5	-1.8	7.1	-1.9	1.1	-0.6	0.6	-0.3
Rochester, N. Y	-6.0	0.9	-0.9	-5.2	-0.1	0.3	0.2	0.5	0.1	2.5	-1.3	5.9	-2.1	0.3	0.4	0.3	-0.4
Philadelphia	-6.6	0.0	-1.1	-5.6	-1.0	1.0	1.2	-1.3	-0.5	2.3	-2.8	5.7	-2.6	0.3	-0.3	-0.3	-1.0
Baltimore	-6.8	-0.6	0.6	-4.7	2.1	-0.6	0.4	-1.0	-1.8	4.0	-3.4	4.0	-0.7	-0.4	-0.4	-1.1	-0.9
Washington	-5.8	-1.0	1.0	-4.8	0.2	-1.4	-0.4	-3.0	-1.3	4.5	-2.7	4.4	-1.2	-1.6	0.2	-0.8	-1.1
Chapel Hill, N. C	-6.0	1.6	2.5	-3.0	1.6	-1.9	-0.2	-2.2	-1.9	3.7	-3.7	3.3	0.4	-1.4	-0.6	-0.4	-0.7
Savannah, Ga	-8.3	1.2	2.0	-4.6	-1.8	-4.0	-1.3	-2.9	-2.4	2.2	-1.2	3.6	-1.5	-2.7	-0.5	-1.2	-2.0
Key West	-3.9	-1.0	0.8	0.3	0.0	1.0	-0.4	0.4	-0.1	1.0	1.5	3.5	0.7	0.3	0.6	-0.5	0.4
Mobile	-8.1	3.0	2.5	-3.0	2.8	-1.7	-2.0	-2.7	-1.0	2.5	-2.7	4.5	0.8	-2.1	-0.3	-0.2	-0.4
New Orleans	-7.8	3.2	2.0	-2.0	0.8	-0.5	-0.8	-0.7	-0.3	1.8	-2.5	4.0	0.3	-0.7	-0.3	-0.2	-0.3
San Antonio, Texas	-5.8	4.3	2.0	-2.5	3.5	-1.2	-0.5	-0.7	-2.0	1.1	2.0	2.5	1.0	-0.8	0.4	0.3	-0.3
Memphis	-5.4	2.0	1.2	-2.0	0.8	-1.5	-1.0	-2.7	-1.0	4.5	-1.6	5.3	0.0	-1.7	0.6	0.6	-0.6
Cincinnati	-5.2	2.8	2.9	-3.8	1.1	-0.9	1.5	-1.4	-0.4	5.6	-3.0	6.1	-0.1	-0.3	0.7	1.2	0.5
Detroit	-4.0	-1.1	0.1	-1.5	2.4	-2.0	1.0	-0.4	-0.6	4.0	-1.0	3.5	0.3	-0.5	0.8	-0.5	0.0
St. Louis	-5.0	4.0	3.5	-6.0	1.0	-2.3	0.1	-4.0	0.5	7.2	-2.0	4.0	-0.5	-2.1	1.9	-1.0	-0.6
Milwaukie	-4.5	-1.3	-2.9	-1.5	2.5	0.8	0.6	0.6	-2.3	2.6	-5.0	3.0	-0.6	0.7	-1.6	-0.9	[illegible]
Fort Snelling	-2.3	4.6	-4.3	-4.3	-0.8	0.6	-0.7	1.2	-4.9	5.9	-6.3	-3.3	-3.1	0.4	-1.8	-0.3	[illegible]
Puget Sound	4.1	3.0	-1.0	-2.1	1.6	1.0	0.5	0.6	-0.3	-0.7	2.7	-6.1	-0.5	0.7	0.6	0.3	[illegible]

The winter months are seen, by these comparisons, to have been very variable—January very cold and December unusually warm—but the only consequences important to our present purpose, resulting from these facts, were some injuries to tropical trees and plants in the extreme South, and to fruit and delicate trees generally, by the severe cold of January. April was also a cold month, and its low temperatures were prolonged into the early part of May in the Central and Southern States, retarding the progress of the principal staples considerably. The greater advancement of Southern agriculture at this season rendered this change more severe south of Philadelphia than in the States north. The cold of this month was quite universal, and the injury to fruit and fruit trees from this, and the great extreme of January, was scarcely less than in any previous instance. At Philadelphia, it was regarded as colder than any previous April for sixty-three years.

The differences of temperature for the remaining months, to October, are unimportant, and wholly within common limits. October was unusually warm, November colder by an equal measure, and December

again reversed the change. The last two months are, however, of very little importance to the current cultivation of the year.

In Europe, the comparison of temperatures for the year 1852 exhibits some remarkable differences, for the winter months, from those observed in the United States. There was not, however, any very remarkable change in the summer temperatures from the general mean, or any remarkable consequences on the harvest. The production was better than usual, on the whole, so far as can be learned, and the great Eastern granary of Europe near the Black sea, and in Central Russia, sustained its usual character of abundant grain harvests.

Comparison of temperatures for 1852 *in Europe with the general mean.*

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.
London, Greenwich Observatory	6.3	2.6	0.4	0.2	-1.1	-1.9	5.3	1.6	0.5	-1.4	6.5	8.8	-0.2	1.7	1.9	5.9	3.1
Paris	6.2	1.0	-3.9	-3.8	0.4	-0.9	6.8	0.7	-0.5	-1.6	7.4	8.0	-2.4	2.2	1.8	5.1	2.2
Berlin	10.6	3.7	-2.7	-5.7	0.7	-0.6	3.2	1.8	-0.2	-2.1	3.8	7.3	-2.6	1.5	0.5	7.2	2.1
St. Petersburg	3.0	-0.7	1.0	-8.5	-1.4	1.4	-4.5	-0.6	1.4	-7.0	-8.1	....	-2.9	-1.9	-4.6	....	....
*Poltova	-1.7	-5.3	-3.3	-6.2	0.0	5.1	-4.2	1.3	0.7	-1.7	1.2	....	-3.2	0.7	0.1	....	....

* In the Black Sea district of Southern Russia.

The winter months are seen to have been unusually warm in Europe, the cold January in America being there reversed. April was cold, as in the United States; and the summer months warmer than usual in Western Europe, though irregular in the East. The autumn was apparently quite opposite in temperature in different parts of Europe, especially for the month of November. London and Paris were many degrees warmer than usual, and St. Petersburg as many degrees colder. The comparison of several stations in the north of Europe is conclusive of the accuracy of the results given for St. Petersburg.

The European season was, on the whole, unusually favorable to its immense and sensitive harvest interests, and the contrast with the following year quite extreme for the usually equable European climate.

In the United States the amount of rain is always important, and almost equally so with the temperature. The range is here greater than in Europe in the distribution of rain for single months, and extremely irregular in respect to the districts where these droughts or excesses fall. For 1852 we may give a brief general sketch, with sufficient precision for the present purpose, and without tabular arrangement.

In the New England States, the early part of the summer was deficient in rain. In Maine, May was the most deficient, and the previous months had some excess. In Vermont, April and May were very dry; and in Massachusetts, and the south of New England, "the long-continued and wide-spread drought of 1852" embraced May, June, and July. August was a very wet month, and the remainder of the season much as usual. For the year, the amount of rain was very near the general mean, and the deficiency in the early summer was made up in March, April, and August.

Eastern and Northern New York, with part of Canada and Michigan, were deficient in rain through the same period. In Michigan, "the middle of May to the 20th of June" was without rain for some parts of the State. August was profusely rainy in Eastern New York, New Jersey, and Eastern Pennsylvania. Further west, and in Ohio, Michigan, and the adjacent States, the summer was more than usually dry, for August particularly. In Michigan and Wisconsin very little rain fell in August.

In the Central States near the Atlantic, April and August had a large amount of rain; and for the whole year the excess, in this part of the United States, was about five inches, or more than one-tenth of the average amount. There were no droughts of importance.

In the South, the distribution was irregular. In Florida and on the coast of South Carolina and Georgia, the three summer months were profusely rainy, but in the range of the Gulf States generally they were very variable. In the States near the Gulf, from Pensacola to New Orleans, June and September were very dry; and all the Central States south had near ten inches less for the year than the mean annual amount. October, in part, and November particularly, were wet months in this district, however; and coming at the close of the cotton-ripening season, and with more than usually high temperatures, some considerable injury resulted to this crop.

In the States bordering the Mississippi and next to those on the north, the amount became as large as usual for the year, and had few important peculiarities of monthly distribution. February, August, and December were wet months in Tennessee, and June and October were comparatively dry. The extremes did not, however, fall within the cultivable period in any important measure.

In the Ohio valley there was about four inches more than the usual amount of rain, the excess falling in December. Further west, in Indiana, Illinois, Missouri, and Iowa, the amount for the year was something more than usual, also, but the summer distribution more irregular. At St. Louis, March, May, and June were wet, and the summer, from June forward, unusually dry. In Iowa the autumn was unusually wet.

The distribution of rain for 1852 was less extreme and variable than usual. The droughts of Michigan and the New England States were the only injuries of importance to agricultural interests, though these were felt severely in those districts.

The year was little remarkable in its climatology through the season affecting cultivation. The temperature extremes of the winter months were very great, and some points of great scientific interest appear in that connexion. The compensations in temperature between the United States and Europe, or between distant portions of the same hemisphere, whether on the same continent or not, are very strikingly shown in the temperatures of London, Paris, and Berlin, at 6° to 10° above the mean temperature, while the eastern and southern portions of the United States were as many degrees below. On the Pacific coast, in California and Oregon, January was 2° to 5° above the mean temperature. Even at Fort Snelling there was much less difference than at New Orleans.

Careful statistics of the several staple crops of any year are, unfor-

tunately, very difficult to obtain for the United States. Those at the South, for cotton, sugar, &c., are much more precisely noted than the grain crops, and for the year 1852 we have some careful estimates of the cotton crop by eminent Southern authorities. Prof. McCay, of Georgia, and G. G. Henry, esq., of Mobile,* estimate the entire cotton crop for 1852 at 2,750,000 bales. The whole amount sent forward is larger, and is placed by these authorities at near 3,015,000 bales, and by New York cotton brokers at 3,260,000 bales. The last estimate is confirmed by the actual receipts up to September, 1853, which reached a total of 3,250,000 bales. This amount is much above that for any previous year, though less of this increase is due to a better crop than to the extension of cultivation generally. It was considerably injured in many localities by storms and weather changes. The crops for 1851 and 1852 are both designated as large by the best authorities of the South, however, and it cannot be doubted that the seasons were generally quite favorable. The crop of 1851 is very uniformly given at 2,355,000 bales—or the receipts, rather—of which it is not quite certain that the same amounts were in each year forwarded of that grown in the previous year. The above authorities assign only 37,000 bales as this difference, however, leaving the crop of 1851 less by a considerable measure than that of 1852.

CLIMATOLOGICAL NOTES FOR THE YEAR 1851.

The characteristics of climate for this year may be grouped and exhibited more readily than for either of those just given. Those of temperature will be given in a few comparisons without tabular statement.

In the New England States, the mean temperature of each of the several months forward to November, is almost precisely that of the mean of a series of years at each station. The differences never exceed two degrees, and fall equally on each side, and variously at stations near each other, in such a manner as to show them to be within the limits of imperfection of the series, or of error of observation. For November and December the year was colder by about two degrees for the first and five degrees for the last month. For the year, the mean falls almost precisely at the general mean.

In New York, the result was very nearly the same, a slight falling off of the mean for the year being exhibited also.

In Pennsylvania, Maryland, and Virginia, the results were quite the same, though February and March became decidedly above the mean temperature, and the year rather above than below. This condition holds through the States southward to Florida. In Western Florida, the differences are less, though February remains three degrees warmer than usual, and September is as much below and October as much above the mean. That for the year remains the same.

At New Orleans these differences are similar, but less. In Tennessee, and adjacent districts, the differences are less than elsewhere among the months, and the year slightly above the mean temperature.

In Ohio, the differences were much as in the Eastern States in the same latitude—February and March warmer, and December colder than

* De Bow's Review for March, 1853.

usual. The summer was unusually uniform, and the year a fraction of a degree above the mean temperature. At St. Louis and northward, the same differences are found, though they are less for any single month than in Ohio. At Fort Snelling they remain the same.

The most striking uniformity of temperatures prevailed on the Pacific coast, also, for 1851, both in Oregon and California. April, August, and December were each one to two degrees warmer than usual, and the year nearly a degree warmer in Oregon, though not so much in California.

In England, the spring and autumn were some degrees below the mean temperature for some months—April, May, September, and November. These were balanced by high temperatures in January and October, and the year was nearly as usual. None of the differences were so great as in subsequent years.

In all parts of Europe the results were quite uniformly as in England. Even in Central Russia, at Moscow, similar general temperatures occurred, with the exception that September and November were above instead of below the general mean.

No previous year in the records of temperature has exhibited greater uniformity than 1851 for the great range we may bring into comparison, and this peculiarity has induced a reference to it not absolutely required in this connexion. It was a year of great and general success in agricultural pursuits, as far as may be learned.

The amount of rain for the year 1851 was large in the Northern States—in Maine and the elevated portions of New York and Pennsylvania, and in Iowa and Illinois particularly. In the last-named States it reached the very large amount of sixty-four inches, and it came near fifty inches in Maine. The Central States, from New Jersey to Tennessee, were as largely deficient in amount of rain, and fell off fully ten inches from the annual mean. In the Southern States, it was again fully as large as usual, and in Lower Florida much greater. The excess in Maine was in April and October; in other parts of New England, and in New York, the same months, with July and November, gave a large fall of rain. No part of the year was particularly dry.

In the West, the great excess fell in the summer months, May included. Each of these was very wet, and January very dry. September was also dry.

In Ohio, or at Cincinnati particularly, the whole amount for the year was but little over thirty inches. In January and September scarcely any rain fell, and all seasons of the year were deficient more or less. There were less severe droughts in the months affecting cultivation, however, than would appear probable from the generally dry character of the year. In the Central States, eastward, the falling off was mainly in winter and autumn also, though June was comparatively dry.

In the South Atlantic States, the summer was very wet. Some extremes of temperature occurring in April and May were injurious to the planting interests, though they do not appear in the means of temperature, and for the remainder of the season there were many local injuries from summer storms and profuse rains. In Florida, some of these were very severe, and they were generally more than usually frequent and profuse in this part of the South. Westward, in Louisiana and

Texas, the summer was more than usually dry, yet not particularly injurious from this cause, except at the border of the plains, where there seems to have been very little for the entire three months of summer.

The statistics of agricultural production for distinct years are extremely difficult to procure, yet they are nevertheless among the most important of commercial data. The amount of any staple sent forward is comparatively easy to obtain for any year; yet the controlling element is the amount produced, which may be withheld in the hands of producers to a large extent, under low prices. There appears no mode of determining this so effectively as by direct solicitation in communications, at the close of the year; and a thorough digestion of such returns from the present sources of communication to the agricultural report, would give an exhibit of great value, commercially, for every year. At present, very few estimates of this sort are made. For the three years for which we have undertaken to determine the climatological character, and its great and decisive influence upon agricultural production, few have given precise statements of any year's results, and its relation to the general or average productions. The table given in connexion with the exhibit for 1853 is also almost the only English statement of the kind.

This remark is suggested by the great difficulty of giving definite results in connexion with this climatological distinction for successive years. Of the amount brought to tide-water in New York for any year, it is quite impossible to distinguish that grown in the year for which the statement is made, and the statistics given under that head are by far the best procurable of the grain produce of the United States. For Southern staples we may be more precise, and for cotton and sugar some clear statements may be made. In the extension of all these descriptions of cultivation, a per-centage of advance is always due to the opening of new lands, and the measures we have must be modified by the amount of this advance to render them decisive of the changes in successive years.

The amount of agricultural produce passing through the New York canals was nearly the same for wheat, flour, &c., as in the two previous years.

	1849.	1850.	1851.
Flour, barrels	3,263,087	3,256,077	3,358,465
Wheat, bushels	2,734,389	3,670,754	3,163,682
Indian corn, bushels	5,121,270	3,228,066	7,670,345

This statement would show a large and uniform production for the years embraced. It was, however, scarcely equal to the usual percentage of increase due to the increased area coming into cultivation. In the exports a more considerable falling off occurs. These were very large in 1848, after two abundant harvests, and with extensive European failures, as in 1853.

Aggregate value of breadstuffs and provisions exported from 1848 *to* 1852.

Year ending June 30, 1848	$68,701,921
Do. 1849	37,472,751

Year ending June 30, 1850	$38,155,507
Do. 1851	26,051,373
Do. 1852*	35,000,000

These are but indirect exhibits of the abundance of the harvests for each year; but they are the most satisfactory of those accessible at present.

The crop of cotton for the three years is given by Prof. McCay, of Georgia, with great accuracy, in the several papers published by him on this subject, and these generally exhibit great uniformity of production in the most sensitive crop through these years. The corrected comparison, by Mr. Henry, gives 2,355,000 bales to 1851, and 2,932,000 to 1852; with the remark that the crop of 1853 will not probably exceed the last amount. Prof. McCay, after a graphic and clear enumeration of the climatological peculiarities of the summer of 1853, the drought in Georgia and the Atlantic States, the storms in Florida, the wet weather and rot in Mississippi and the Central States, and the unusually fine climate and crop in Texas and Tennessee, assigns 3,100,000 bales as the amount for 1853, in his earliest paper on the subject, embracing this year. Subsequently,† he gives the following statement of the crops and estimates:

	1851.	1852.	Estimate for 1853.	Estimate for 1854.
Bales	2,355,000	3,015,000	3,263,000	3,000,000

This statement applies to *receipts for the years named*, and is not, therefore, distinctive of the amount produced in each season. It throws the losses of 1853 forward into the estimates for 1854 mainly, and of the general climatological effect Prof. McCay again remarks as follows:

"From South Carolina and Georgia, a considerable decline may be expected. The first crop of bolls was small on account of the drought; the second was lessened by rains; and the third was generally cut off by the October frost; but many places have escaped one or the other of these calamities, and the deficiency of receipts at Charleston and Savannah will be made up in part by increased shipments from Columbus and the Tennessee river. Instead of 813,000 bales for the last year, 750,000 may be expected for 1854. From Florida, the falling off

* A comparative statement for this year is not given by the same authority, and is taken from tables in Hunt's Merchants' Magazine, where the value of "domestic produce" is given as follows for the three years:

1850	$43,957,018
1851	39,164,775
1852	40,716,781

The comparison for the last two years on the leading grains is as follows:

	1581.	1852.
Wheat, bushels	1,468,465	3,1[illegible]
Flour, barrels	1,264,322	1,365,597
Indian corn, bushels	1,605,674	758,436

The first table should give about $35,000,000, evidently, as the export for 1852.

† De Bow's Review for April, 1854.

will be small. The crops on the Flint and Chattahoochee rivers are much better than last year; the planting has been larger; they have had no disastrous storms; and the October frost did not everywhere stop the growth of the plant. The estimate for 1854 may be put at 160,000 bales.

"From Alabama the reports are various and contradictory. Up to July, the promise was never better; but the wet weather brought the boll-worm on many plantations, and its ravages were at some places very great. The frost then came and destroyed all hope of the late crop of bolls, though in many places this frost was not destructive, and through the whole month of November the fine weather for opening and gathering the crop favored the planters very much."

For the districts or area cultivated, the cotton crop of 1853 is undoubtedly the least of the three years, and that of sugar the greatest.

The sugar crop of 1852 is given by Mr. Champomier at 321,934 hogsheads for Louisiana, and 11,023 for Texas. He designates it as "one of the greatest ever known" for the area embraced, as the advanced cultivation gives it a great precedence in absolute amount.

For the remaining staples it is so difficult to procure definite statements for distinct years, that further statistics cannot be embraced in this connexion. With the measures of variation in temperature and amount of rain which control the result so decisively, however, the actual results should be associated. They are both primary commercial requirements, and they become such more decisively as our production is extended and the relations of supply and demand are more direct through a perfected commerce and the most prompt communication with all markets. The climate of the United States has a variability much greater than that of Europe, with differences among its different districts also unknown to Western Europe, at least. The mutual relations and peculiarities of each are shown most conspicuously in the last two years, by measures and results very imperfectly sketched in this comparison.

VERTICAL RANGE OF VEGETATION.

It is less important to American climatology to determine the elevation at which the various cultivated growths are most successful, or cease to flourish, than for Europe and the Eastern continent. The northern portion of the Alleghanies only develop climatological distinctions of this sort; and cultivation has not yet sufficiently occupied their lower areas, or tried any step of ascent, to render the definition of vertical range of any value there. On the southern portions of the Alleghanies the climatic differences due to elevation hardly appear, or only in the restriction of the growth of tropical staples. Precise limits of the grains and fruits of temperate latitudes are there unknown, and no approach to distinction is apparent in the highest cultivated localities. Indian corn, of precisely similar varieties to those grown on either hand at the level of the sea, flourishes unchanged on the highest cultivated portions of the Alleghanies of Virginia, at 2,500 to 3,000 feet elevation.

On the summits of many of these mountains the forests are thin and dwarfed, but there seems no sufficient difference of climate to account

for it, and there is adequate cause in defective soil. On the more elevated ridges of the White and Green mountains of the Northeast, forest limits appear, however, which belong to climate alone. The range of deciduous trees of the various species, and of some kinds of cultivated crops, might, perhaps, be examined with some precision in these last districts, but as yet we have no observations which may be used.

In the Rocky mountains, and from these to the Pacific, elevation becomes quite important in the range of cultivated plants, and it would be a most interesting examination to ascertain the limit of the various trees, grasses, and other native growths. Elevation has not here the same significance as in Europe, however, and a new scale of points would be necessary. In a succeeding list, the range of well-known grains and forest trees is given for the Caucasus, with limits of 6,000 to 7,000 feet above the sea. In portions of our own interior the general level is scarcely less than these limiting elevations, and from this plateau, mountains rise several thousands of feet higher, clothed with grasses and forests nearly to their summits.

The absence, in our western interior, of the usual distinctions belonging to elevation, is strikingly shown in the very high and almost universal range of cacti, and in the fact that this great characteristic form of dry and hot climates only gives place to the mosses at the highest portions of the mountain plateau. Fremont remarks, only at the South Pass, itself, "cacti have become rare, and mosses begin to dispute the hills with them." Deciduous trees flourish at this elevation of 8,000 feet, and on many equally elevated tracts on various parts of the range.

The mountains of Caucasus are between 40° and 45° north latitude, and the more elevated portions of the Rocky mountains between 38° and 42°. Though we are not now able to assign limits in the vertical range of cultivation nor of native growths on this continent, it evidently differs widely from that of the Alps and the Caucasus. As a general rule, similar growths go higher here, and the massive plateau from which the mountains, properly so called, take their rise, corresponds nearly in temperature with coast districts of the same latitude near the level of the sea.

In the prospective wants of the Pacific region, all the cultivable capacity of the adjacent country must be brought into requisition, and the mountain sides and elevated valleys will be made to yield whatever they may for support of large populations. The Rocky mountains and their connected ranges south of 42° north latitude may undoubtedly be cultivated or occupied to a much greater extent than the European Alps proper, and the whole region permit some forms of valuable production.

The following list of upper limits of various growths in the Caucasus is taken from Kupffer's report of the physical (meteorological) observatories of Central Russia. The district of the Caucasus lies between the 40th and 45th parallels of north latitude, and it gives us a more precise basis of comparison, in general climate, than the district of the Alps. The precise localities named are obscure, but they all lie near Tiflis, which is south of the principal chain of Caucasian mountains, and in latitude 42°:

Limit of the gramina and of Cereals (barley, wheat, &c.) in the Ossetie mountains of the Caucasus.

	English feet above sea.
Limit of grasses above the village of Iba	9,760
Limit of the Rhododendron Caucasicum	9,410
Limit of Cereals near the village of Calota	8,100
Do......near Zaki	7,550
Do......near Khoja	7,450
Do......near Baki	7,270
Do......on the Mt. Ardjivani	6,950
Do......at the village of Iba, (barley)	6,860
Do......at the village of Tapaukan	6,870
Do......at the village of Boçoïta	6,650
Do......at the village of Bajegat	6,430
Do......at the village of Roki	6,310
Do......over the village of Dodonastan	6,190
Do......near the village of Tedeleti, (in the forest)	5,850
Do......near the village of Guebriana, (in the forest)	5,590
Limit of vines in the village of Komta, on the river Hani	3,570
Do.....at the village of Outsai, on the river Rioni	3,230
Do.....at the village of Ateni, near the ruins of the monastery	2,250
Limit of forests above the village of Gomschen, in the district of Ratschink, (the birch)	8,010
Do......near the village of Tapankon	7,730
Do......on the western declivity of the mountain Guerwokha	7,620
Do......above the village of Guebriana, district of Tiflis	7,250
Do......above the village of Zoni	6,740
Do......above the Fort Djavi	6,730
Do......on the mountain Matsmind, (northwest declivity)	6,650
Do......southwest declivity of Mt. Cirkhlebert, Ossetie mountains	6,580
Do......above Manglis, district of Tiflis, (birches)	6,320
Do......southern declivity of Mt. Mtatsmind	6,250
Do......on the mountain Kildakar, district of Tiflis	5,930

Vertical range of vegetation on the Alps.

There is no thorough examination of this point accessible for the present purpose, and the notes are from scattered sources.

Vine cultivation ceases at	1,950 feet.
Limit of the chestnut-tree	3,000 "
Of the oak	4,000 "
Of the birch	4,680 "
A species of Rhododendron attains	7,800 "
Willow, herbaceous	8,000 "
The spruce fir	5,900 "
Saxifrages, gentians, and grasses, (to the snow-line)	9,000 "

Cereal grains in north of Switzerland	3,500 feet.
Maize, or Indian corn	2,800 "
Barley in south of Switzerland	5,900 "
The cherry-tree	3,050 "
The walnut	2,600 "
The walnut in the Pennine Alps	3,280 "
Mean limit of cultivated fields on the Pennine Alps	4,780 "
Limit of the beech in the north of Switzerland	4,250 "
Of the fir, in the same	5,900 "

It is to be regretted that no statistics exist of the vertical range of various plants and forest trees on our own mountain ranges. Some of those near the Pacific would afford valuable measures for comparison, and might show a correspondence with European results not found on the Rocky mountains. Pine and aspen forests certainly attain the height of 11,000 feet at the Parks, and generally near the sources of the great rivers which rise in that part of the Rocky mountains. The snow-line and limit of vegetation of every sort are undetermined. Further southwest, on the isolated mountains between Santa Fé and the Colorado of California, pine forests cover the San Francisco mountains to the summit, an elevation of 12,000 feet. Maize is cultivated in this district at an elevation of 5,000 to 6,000 feet, on the mountains of Zuñi, and others southward. The contrast afforded by the corn-fields and fruits cultivated at 6,300 feet elevation at Zuñi, with its limit at 2,500 in the Alps, may show how decisively American climates differ from the European in measures usually taken as standard.

HIGHEST TEMPERATURES IN THE UNITED STATES.

The following table is prepared to represent the principal agricultural districts of the United States in the extremes of high temperature through the several months. The first numbers at each station give the highest temperatures ever observed at the locality for each month, and a series of years has, in all cases, except those otherwise noted, been collated to obtain the positive maximum found there. The oscillations of these principal changes return in a period of ten or twelve years, and the numbers given may safely be taken as the highest to be anticipated at any time. The second set of numbers is the mean of the separate maxima observed in a series of years, and these points may be expected to be reached for every year. The last are the more important to cultivation.

The illustration of maximum temperatures as single measurements may be so uniform for all parts of the United States east of the Rocky mountains, that they have not been given in a tabular form in connexion with other temperature measures in illustrating the climatology of any staple. Reference may be made to the few representative stations given here for any one of them, though in most cases no distinctive importance attaches to this point. Generally, this uniformity of geographical range for extreme high temperatures is very important to cultivation, as proving a more decidedly high curve both of daily and monthly changes than would be found in climates giving no such single measures. The value of this peculiarity is, however, far better shown

in the monthly means, as respects the growth of plants requiring high temperatures.

Highest temperatures at stations representing the principal agricultural districts east of the Rocky Mountains.

Places.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Albion Mines, N. S	50	59	60	71	79	88	94	88	86	75	62	56
	43	44	50	62	72	83	86	82	80	71	55	45
Montreal, C. E	50	56	66	76	91	97	100	95	92	74	65	50
	42	45	55	68	85	90	93	89	86	68	60	44
Castine, Me	52	55	64	74	84	90	94	93	86	78	65	56
	42	43	52	64	75	83	87	84	78	67	55	48
Amherst, Mass	56	56	73	83	88	93	94	92	88	81	70	56
	43	45	62	75	83	85	89	85	82	73	65	44
New Bedford, Mass	58	59	73	80	90	95	96	91	88	83	68	60
	47	50	60	73	78	85	87	86	83	71	62	52
Burlington, Vt	......	......	......	......	......	97	100	96	92	......	......	......
	......	......	......	......	......	90	93	88	84	......	......	......
Rochester, N. Y	64	62	76	84	89	98	98	94	92	78	74	62
	48	45	64	76	84	90	93	87	86	73	62	48
New York	62	64	75	83	87	98	98	96	90	76	72	60
	48	50	65	74	84	88	90	86	83	72	63	50
Philadelphia	65	68	79	87	92	99	100	94	94	83	75	66
	52	53	66	80	86	91	95	90	85	76	68	54
Baltimore	66	71	81	88	93	99	100	95	92	82	73	68
	54	55	69	80	85	92	95	90	84	78	69	55
Washington	65	70	82	87	91	100	100	94	[illegible]	82	74	65
	53	56	67	79	86	92	95	90	[illegible]	76	67	54
Richmond	70	77	81	87	93	102	100	95	93	85	73	68
	......	......	......	......	......	92	94	91	......	......	......	......
Charleston	79	80	85	88	92	94	94	92	92	84	82	79
	72	73	80	82	87	90	92	90	87	80	75	73
St. Augustine	78	79	84	88	92	94	94	93	89	85	82	78
	73	74	80	83	89	90	91	90	86	80	74	72
Key West	81	84	85	86	88	89	89	89	88	87	84	83
	80	82	83	84	87	88	88	88	87	85	83	81
New Orleans	78	80	82	87	89	94	94	92	89	87	83	80
	74	75	77	82	85	89	89	87	85	84	80	75
Huntsville, Ala	75	75	84	86	90	92	95	94	91	86	78	70
	68	70	80	82	86	90	92	90	86	81	72	67
Nashville, Tenn	69	76	78	86	89	95	99	97	90	87	80	68
	63	70	72	80	83	89	92	89	84	80	75	62
St. Louis	66	72	81	86	92	97	97	95	94	84	79	65
	62	63	75	80	85	89	92	88	86	80	71	62
Cincinnati	65	68	78	86	90	98	100	94	92	84	78	65
	62	62	73	80	84	90	94	90	85	81	70	61
Marietta	62	65	75	82	86	96	98	95	93	78	70	65
	57	59	70	74	78	88	90	87	83	73	66	60
Cleveland	57	57	69	73	83	96	94	90	91	77	63	55
	54	55	65	68	77	83	87	83	80	72	60	54
Detroit	52	53	74	81	89	96	94	96	90	78	65	55
	46	47	67	74	80	87	90	86	79	73	62	48
Milwaukie	50	55	79	80	84	98	94	94	91	76	70	52
	46	46	68	73	80	84	87	83	78	70	60	45
Muscatine, Iowa	60	71	84	86	90	96	98	96	93	86	74	63
	52	55	72	80	84	88	92	90	86	78	65	53
Fort Snelling	49	60	72	86	92	96	95	97	90	81	67	46
	45	53	65	80	86	90	92	90	83	78	62	43
Fort Gibson	71	80	89	90	94	99	99	97	95	89	84	74
	66	75	84	86	88	95	95	94	92	86	80	68
Fort Graham, Texas, 1851	76	76	86	92	94	100	104	108	105	103	90	80
San Antonio, Texas, 1851	78	78	84	87	88	90	94	94	92	86	81	78
Fort Brown, Texas, 1851	83	84	86	92	98	96	94	99	96	89	87	78

Summary statement of coinage at the United States Mint at Philadelphia during the year 1853, *by* D. STURGEON, *Treasurer.*

GOLD.

Date.	Double eagles.	Eagles.	Half eagles.	Quarter eagles.	Dollars.	Bars.	Total values.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Value.	
January	201,223	11,460	27,576	95,910	292,673	....	$4,809,388 00
February	115,040	20,233	......	51,886	298,435	....	2,931,280 00
March	249,233	......	......	108,406	458,133	....	5,693,808 00
April	212,590	23,706	42,486	57,498	460,045	....	5,305,080 00
May	65,170	18,535	36,345	203,548	644,161	$2,296,716 11	5,120,222 11
June	26,474	21,777	51,757	330,602	172,494	2,769,211 51	4,774,245 51
July	50,228	20,860	43,000	83,216	60,276	2,762,993 28	4,459,469 28
August	83,730	22,005	26,860	108,264	215,121	605,498 83	3,120,229 83
September	166,097	27,614	35,365	60,738	294,848	136,064 11	4,357,662 11
October	40,070	......	23,725	95,864	582,955	3,515,236 97	5,265,876 97
November	20,912	......	......	63,612	355,238	827,979 17	1,760,487 17
December	31,159	35,063	18,656	145,124	241,672	2,922,297 96	4,593,869 96
	1,261,326	201,253	305,770	1,404,668	4,076,051	15,835,997 94	52,191,618 94

SILVER.

Date.	Dolls.	Half dollars.	Quarter dollars.	Dimes.	Half dimes.	Trimes.	Value.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	
January	......	....	....	....	....	3,125,000	$93,750 00
February	......	....	44,200	95,000	135,000	2,700,000	108,300 00
March	......	....	....	....	....	5,575,000	167,250 00
April	39,000	....	1,210,020	560,010	430,020	....	419,007 00
May	......	424,008	1,196,000	610,000	760,000	....	610,004 00
June	......	646,000	852,000	740,000	800,000	....	650,000 00
July	......	552,000	1,404,000	540,000	580,000	....	710,000 00
August	......	368,000	2,324,000	590,000	520,000	....	850,000 00
September	......	498,000	3,504,000	900,000	700,000	....	1,250,000 00
October	......	436,000	3,100,000	1,540,000	1,260,000	....	1,210,000 00
November	......	160,000	1,352,000	2,960,000	3,120,000	....	870,000 00
December	7,110	448,700	268,000	3,638,000	5,040,000	....	914,260 00
	46,110	3,532,708	15,254,220	12,173,010	13,345,020	11,400,000	7,852,571 00

COPPER.

Date.	Cents.	Half cents.	Value.
	Pieces.	Pieces.	
January	386,079		$3,860 79
February	200,031	....	2,000 31
March	403,376	19,500	4,131 26
April	214,614	73,080	2,511 54
May	912,019	....	9,120 19
June	366,732	....	3,667 32
July	183,228	....	1,832 28
August	559,460	....	5,594 60
September	765,760	....	7,657 60
October	447,955	....	4,479 55
November	670,588	....	6,705 88
December	1,531,289	37,114	15,498 46
	6,641,131	129,694	67,059 78

RECAPITULATION.

	Pieces.	
Gold	7,253,644	$52,191,618 94
Silver	55,751,068	7,852,571 00
Copper	6,770,825	67,059,78
Total	69,775,537	60,111,249 72

Comparative statement of the coinage of the United States Mint at Philadelphia for the years 1852 *and* 1853.

	1852.	1853.	1852.	1853.
	Pieces.	Pieces.		
Gold	6,095,065	7,253,644	$51,505,638 50	$52,191,618 94
Silver	21,454,790	55,751,068	847,410 00	7,852,571 00
Copper	5,062,094	6,770,825	50,620 94	67,059 78
	32,611,949	69,775,537	52,403,669 44	60,111,249 72

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